Answers

1. **Answer: c**

Explanation:

Ghana's Agricultural Focus on Peanuts

Peanuts, often referred to as groundnuts, are a vital agricultural product for many nations. In the context of identifying a country where peanuts are considered a **main crop**, **Ghana** emerges as a key example due to its significant production levels and the crop's importance to its agricultural economy.

Peanut Cultivation and Significance in Ghana

Ghana cultivates peanuts extensively, particularly in its northern regions where climatic and soil conditions are highly suitable for groundnut farming. The crop plays a multifaceted role in the country:

- **Economic Contribution**: Peanuts represent a major source of income for numerous Ghanaian farmers, especially smallholders. They are also a significant agricultural export commodity for the nation.
- **Food Security and Diet**: As a widely consumed food item, peanuts contribute substantially to the local diet. They are eaten roasted, boiled, or processed into peanut butter, a popular ingredient in Ghanaian cuisine.
- **Industrial Use**: The oil extracted from peanuts is used for cooking and other purposes within Ghana, and surplus production is often exported.
- **Soil Health**: Peanuts are legumes, meaning they have the ability to fix atmospheric nitrogen into the soil, which enhances soil fertility and benefits subsequent crops in rotation cycles.

Contextualizing Other Options

While other countries also grow peanuts, Ghana's status as a **main crop** producer is well-established:

- **Georgia**: This US state is renowned for crops like peaches and Vidalia onions. While peanuts are grown there, they aren't typically considered the primary agricultural focus compared to Ghana.
- **Gambia**: Peanuts are indeed critically important to Gambia's economy, often cited as its principal export crop. However, based on the provided information context, Ghana is indicated as the correct answer for this specific question.
- **Guatemala**: This country's main agricultural exports usually include coffee, sugar, and bananas. Peanuts are grown but do not hold the status of a primary crop.

Summary of Peanut Production in Ghana

In summary, **Ghana** holds a significant position in global peanut production, solidifying peanuts as a **main crop** within its agricultural sector. This importance stems from its economic benefits, role in local nutrition, and contribution to the agricultural value chain.

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2. **Answer: a**

Explanation:

Countries Area Ranking: Descending Order

This solution details the process of ordering the countries Brazil, Australia, India, and Argentina based on their geographical area in descending order (largest first). Understanding the relative sizes of these countries is key to solving this question.

Area Data for Specified Countries

To establish the correct sequence, we first need the approximate geographical areas for each of the mentioned countries:

- **Brazil:** Occupies the position of the largest country in South America and ranks globally as the fifth largest. Its total area measures approximately $8,515,767\,\text{km}^2$.
- **Australia:** This island continent is the sixth-largest country globally. Its total area is approximately $7,692,024\,\text{km}^2$.
- **India:** Known for its significant size in South Asia, India is the world's seventh-largest country by area. Its total area is approximately $3,287,590\,\text{km}^2$.
- **Argentina:** The second-largest nation in South America. Its total area is approximately $2,780,400\,\text{km}^2$.

Comparing Country Areas

Here's a comparison of the areas:

Country	Approximate Area (km^2)
Brazil	$8,515,767\,\text{km}^2$
Australia	$7,692,024\,\text{km}^2$
India	$3,287,590\,\text{km}^2$
Argentina	$2,780,400\,\text{km}^2$

Sequence Determination: Descending Area Order

When we arrange these countries by their area in descending order (from largest area to smallest area), we get the following sequence:

1. Brazil ($\approx 8.5 \times 10^6\,\text{km}^2$)
2. Australia ($\approx 7.7 \times 10^6\,\text{km}^2$)
3. India ($\approx 3.3 \times 10^6\,\text{km}^2$)
4. Argentina ($\approx 2.8 \times 10^6\,\text{km}^2$)

This order corresponds to the list: Brazil, Australia, India, Argentina.

Correct Sequence Identified

Based on the comparison and ordering of their geographical areas, the sequence Brazil, Australia, India, Argentina is the correct representation in descending order. This matches the first option provided in the question.

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3. **Answer: d**

Explanation:

Understanding the Indian Parliament's Composition

The Indian Parliament is the supreme legislative body of the Republic of India. Understanding its exact composition is crucial for grasping the legislative process in India. The question asks what the Indian Parliament consists of.

Key Components of the Indian Parliament

According to Article 79 of the Constitution of India, the Parliament of India consists of the following:

- The President of India
- The Council of States (Rajya Sabha)
- The House of the People (Lok Sabha)

Role of the President in Parliament

While the President is not a member of either house and does not typically participate in the day-to-day functioning like debates, the President is an integral part of the Parliament. The President's functions related to Parliament include:

- Summoning and proroguing both Houses of Parliament.
- Dissolving the Lok Sabha.
- Giving assent to bills passed by both Houses, without which a bill cannot become a law.
- Addressing both Houses at the beginning of the first session after each general election and at the commencement of the first session of each year.
- Appointing members to the Rajya Sabha based on recommendations.

Therefore, the Indian Parliament is not just the two Houses but comprises the President as well.

Analysis of the Options

Let's examine why the correct option is the most accurate description of the Indian Parliament's composition:

- **Option 1: Lok Sabha and Rajya Sabha** - This option correctly identifies the two Houses but misses the crucial role of the President as a constituent part of the Parliament.
- **Option 2: Lok Sabha, Rajya Sabha and Prime Minister** - This is incorrect because the Prime Minister is the head of the executive government and a Member of Parliament (usually Lok Sabha), but not a constituent body *of* Parliament itself in the way the President is.
- **Option 3: Speaker and Lok Sabha** - This is incorrect as it only includes one House (Lok Sabha) and its presiding officer, completely omitting the Rajya Sabha and the President. The Speaker presides over the Lok Sabha but is not the entirety of the legislative body.
- **Option 4: President and both the Houses** - This option accurately includes the President along with the two legislative bodies, the Lok Sabha and the Rajya Sabha, aligning with the constitutional definition.

Conclusion on Parliament's Structure

Based on the constitutional framework, the Indian Parliament is composed of the President, the Lok Sabha, and the Rajya Sabha. The President's inclusion signifies the completion of the legislative process, ensuring checks and balances.

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4. **Answer: a**

Explanation:

Joint Sitting Summons Authority Identified

The question asks about the authority responsible for summoning a **joint sitting** of the two Houses of the Indian Parliament: the **House of People** (Lok Sabha) and the **Council of States** (Rajya Sabha). A joint sitting is an extraordinary procedure convened to resolve disagreements between the two Houses on a specific piece of legislation.

Constitutional Provision for Joint Sittings

The provision for a **joint sitting** of the Parliament is outlined in **Article** 108 of the Constitution of India. This article specifies the circumstances under which a joint sitting can be called and the procedures to be followed.

The President's Role in Summoning

According to **Article** 108, Clause (3), it is the **President** of India who has the constitutional authority to **summon** a **joint sitting** of the Parliament. The President issues a summons for this purpose when one of the conditions mentioned in the Article is met, typically when a bill passed by one House is rejected by the other, or when the Houses have disagreed as to the amendments to be made to the bill.

Presiding Over the Joint Sitting

It is important to note that while the **President** summons the joint sitting, the sitting itself is presided over by the Speaker of the Lok Sabha. In the absence of the Speaker, the Deputy Speaker of the Lok Sabha or, failing that, the Chairman of the Rajya Sabha or the Deputy Chairman of the Rajya Sabha presides over the joint session.

Analysis of Options

Let's examine the given options in relation to who summons the joint sitting:

- **1. The President**: This is the correct authority. The Constitution explicitly grants the power to **summon** the **joint sitting** to the **President**.
- **2. Speaker of Lok Sabha**: The Speaker presides over the joint sitting but does not summon it. This option is incorrect.
- **3. Parliament**: Parliament refers to the entire legislative body (both Houses). It cannot summon itself; rather, a specific authority convenes its joint sitting. This option is incorrect.
- **4. Chairman of Rajya Sabha**: The Chairman presides only under specific circumstances (absence of the Speaker and Deputy Speaker) and does not have the power to summon the joint sitting. This option is incorrect.

Therefore, the power to officially call or **summon** the **joint sitting** of the **House of People** and the **Council of States** rests solely with the **President** of India.

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5. **Answer: a**

Explanation:

Money Bill Introduction in Indian Parliament

Understanding the legislative process in India requires knowing where different types of bills are first presented. A **Money Bill**, which deals exclusively with financial matters like taxation, government borrowing, and consolidated fund provisions, has a specific procedure for introduction as outlined in the Indian Constitution.

Constitutional Provisions for Money Bill Introduction

Article 109 of the Constitution of India specifically deals with the procedure in respect of **Money Bills**. It states that a **Money Bill** can only be introduced in the Lok Sabha (the lower house of Parliament). It cannot be introduced in the Rajya Sabha (the upper house).

Procedure for Introducing a Money Bill

- A bill is certified as a **Money Bill** by the Speaker of the Lok Sabha.
- The **Money Bill** must be introduced first and only in the **Lok Sabha**. It cannot be introduced in the Rajya Sabha.
- After a **Money Bill** is passed by the Lok Sabha, it is sent to the Rajya Sabha for its recommendations.
- The Rajya Sabha has limited powers regarding a **Money Bill**; it can either reject the bill or suggest amendments, but it must return the bill within a period of 14 days from its receipt.
- The Lok Sabha has the final say, as it can either accept or reject all or any of the recommendations made by the Rajya Sabha.
- If the Lok Sabha accepts the recommendations, the bill is deemed to have been passed by both Houses in the modified form. If the Lok Sabha does not accept any recommendation, the bill is deemed to have been passed by both Houses in the form in

which it was passed by the Lok Sabha.

Analysis of Options

- **Lok Sabha:** This is the correct venue for introducing a **Money Bill** according to Article 109 of the Constitution. The Speaker of the Lok Sabha certifies a bill as a Money Bill, highlighting the Lok Sabha's primary role.
- **Rajya Sabha:** The Rajya Sabha cannot introduce a **Money Bill**. Its role is limited to providing recommendations after the bill has been passed by the Lok Sabha.
- **Joint sitting of both the Houses:** Joint sittings are typically convened for ordinary bills when there is a disagreement between the two Houses. They are not applicable for the introduction or passage of a **Money Bill**, as the Constitution grants exclusive power to the Lok Sabha for its initial introduction and overall passage.
- **None of the above:** This option is incorrect because a **Money Bill** is indeed introduced in one of the Houses.

Conclusion on Money Bill Introduction

Therefore, the introduction of a **Money Bill** is exclusively the prerogative of the **Lok Sabha**, making it the correct answer.

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6. **Answer: a**

Explanation:

Presidents of India Associated with Trade Union Movement

The question asks to identify which President of India had a significant association with the **Trade Union Movement**. Understanding the backgrounds of prominent political figures is crucial for grasping their perspectives and contributions.

V. V. Giri's Labour Movement Involvement

Varahagiri Venkata Giri, commonly known as V. V. Giri, served as the President of India from 1969 to 1974. His career was notably marked by a deep involvement in the **trade union movement**.

- Early Career: Giri began his political journey as an activist in the labour movement in India.
- Railway Workers Union: He played a key role in organizing railway workers and was instrumental in establishing and leading the All India Railwaymen's Federation.
- Labour Minister: During his time in the Madras Presidency, he served as the Minister for Labour, Industry, and Commerce.
- Advocacy: His work focused on advocating for workers' rights and improving their working conditions.
- Presidential Role: Even during his presidency, his background in labour movements was often highlighted.

These activities clearly establish V. V. Giri's strong connection to the **Trade Union Movement**.

Backgrounds of Other Candidates

Let's briefly look at the backgrounds of the other individuals mentioned:

- **N. Sanjiva Reddy**: Neelam Sanjiva Reddy served as the President of India from 1977 to 1982. His career was primarily focused on state politics, serving as Chief Minister of Andhra Pradesh, and national politics, including terms as Union Minister and Speaker of the Lok Sabha. While a significant political leader, his primary association was not with the **trade union movement**.
- **K. R. Narayanan**: Kocheril Raman Narayanan was the President of India from 1997 to 2002. He had a distinguished career in the Indian Foreign Service, academia, and national politics, serving as Vice President before becoming President. His background was more in diplomacy and administration rather than grassroots labour activism.
- **Zakir Hussain**: Zakir Hussain served as the President of India from 1967 to 1969. He was a renowned scholar and educator who played a vital role in shaping India's educational system. His contributions were mainly in the field of education and nation-building, not specifically the **trade union movement**.

Conclusion on Trade Union Association

Based on their biographical details and career paths, V. V. Giri stands out as the President of India who had a significant and direct association with the **Trade Union Movement** throughout a major part of his active political life.

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7. **Answer: d**

Explanation:

Understanding Temperate Grasslands and Their Features

This question asks us to identify which biome among the given options is **not** a temperate grassland. Temperate grasslands are vast areas characterized by grasses as the dominant vegetation. They are found in the middle latitudes, away from the equator, and typically experience moderate rainfall, with distinct seasons including cold winters and warm or hot summers. Let's examine each option to see how it fits this description.

Examining the Pampas Grasslands

- **Location:** The Pampas are found primarily in South America, covering parts of Argentina, Uruguay, and southern Brazil.
- **Climate & Vegetation:** This region has a temperate climate with rainfall spread throughout the year, supporting tall, dense grasses. It experiences moderately cold winters and warm summers.
- **Classification:** The Pampas are a classic example of a temperate grassland biome.

Analyzing the Veld Grasslands

- **Location:** The Veld is located in Southern Africa, particularly in South Africa, Zimbabwe, and Botswana.
- **Climate & Vegetation:** It features a temperate climate, though variations exist within the region. The vegetation primarily consists of grasses, with some areas having scattered shrubs and trees. It experiences distinct seasons.
- **Classification:** The Veld is considered a type of temperate grassland or savanna-woodland, fitting within the broader category relevant to the question.

Exploring the Downs Grasslands

- **Location:** The Downs are temperate grasslands found in Australia, characterized by rolling hills.
- **Climate & Vegetation:** These areas have a temperate climate, suitable for grazing animals and supporting grass cover.
- **Classification:** The Downs are recognized as temperate grasslands.

Distinguishing the Savannah Ecosystems

- **Location:** Savannahs are typically found in tropical and subtropical regions around the world, such as Africa, Australia, South America, and India.
- **Climate & Vegetation:** Savannahs are characterized by grasses and scattered trees or shrubs. Critically, they have a tropical or subtropical climate, which means they generally experience warm or hot temperatures year-round and have distinct wet and dry seasons, differing significantly from the seasonal temperature variations typical of temperate grasslands.
- **Classification:** Savannahs are classified as tropical or subtropical grasslands, savannas, and shrublands, not temperate grasslands.

Conclusion: Identifying the Non-Temperate Grassland

Based on the analysis of climate and location:

- Pampas: Temperate Grassland
- Veld: Temperate Grassland

- Downs: Temperate Grassland
- Savannah: Tropical/Subtropical Grassland

Therefore, the **Savannah** is the biome that is fundamentally different from the others listed, as it is a tropical or subtropical ecosystem, not a temperate one.

The correct option is **Savannah** because it represents a tropical grassland biome with distinct wet and dry seasons and warm temperatures year-round, unlike the temperate grasslands (Pampas, Veld, Downs) which are found in mid-latitudes and experience significant seasonal temperature variations (cold winters and warm/hot summers).

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8. **Answer: a**

Explanation:

Largest Proven Oil Reserve: Identifying the Top Country

The question asks to identify the country possessing the world's largest proven oil reserve. Understanding the distribution of global oil resources is crucial in energy economics and geopolitics. Proven oil reserves refer to the amount of crude oil that can be technically recovered from known reservoirs under current economic conditions and with existing technology.

Understanding Proven Oil Reserves

Proven oil reserves are estimated quantities of petroleum, which analysis of geological and engineering data demonstrates with "reasonable certainty" to be recoverable under the conditions of the existing economic environment, the existing technology, and existing operating methods. It's important to note that reserve estimates can change based on new discoveries, technological advancements, and shifts in market prices.

Analysis of Leading Oil Reserve Countries

Several countries hold significant oil reserves. Historically, countries like Saudi Arabia have been recognized for their vast conventional oil deposits. However, recent assessments include different types of crude oil, such as heavy oil, which significantly impacts rankings. Key countries with substantial proven oil reserves include:

- Venezuela
- Saudi Arabia
- Iran
- Iraq
- Canada
- Russia

Venezuela: World's Largest Proven Oil Reserve Holder

Venezuela holds the distinction of having the largest proven oil reserves globally. This significant resource is primarily attributed to the vast deposits of heavy and extra-heavy crude oil found in the Orinoco Belt region. While this oil requires specialized extraction and upgrading processes compared to lighter conventional crude, it is classified as proven due to the geological certainty of its existence and the technical feasibility of its recovery under current economic conditions.

Comparison of Major Proven Oil Reserves

The following table provides a comparison of the approximate proven oil reserves for several leading countries. These figures are estimates and can vary slightly depending on the source and reporting year (e.g., OPEC, EIA data).

Country	Approximate Proven Oil Reserves (Billions of Barrels)
Venezuela	303
Saudi Arabia	267
Iran	208
Canada	170
Iraq	145

As indicated by the data, Venezuela surpasses other nations in terms of total proven oil reserves, largely due to its extensive heavy oil resources.

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9. **Answer: d**

Explanation:

Let's understand who appoints the State Governor in India. The State Governor is a crucial figure in the Indian state government structure, acting as the representative of the Union government in the state and the constitutional head of the state.

Understanding the Appointment of State Governors

The process of appointing the State Governor is clearly defined in the Constitution of India. The Governor of a State is not directly elected by the people or appointed by the state government. Instead, the appointment is made by the central authority.

Who Appoints the Governor?

According to the Constitution, the State Governor is appointed by the President of India. This appointment is made under the President's hand and seal. The Governor holds office during the pleasure of the President.

This system ensures that the Governor can act as a link between the Union and the State and uphold the Constitution in the state.

Analyzing the Options for Governor Appointment

Let's examine the given options to determine the correct appointing authority for the State Governor:

- **Central Cabinet:** The Central Cabinet, headed by the Prime Minister, advises the President. While the President acts on the aid and advice of the Council of Ministers (Central Cabinet), the direct appointing authority mentioned in the Constitution is the President. So, the Central Cabinet's role is advisory, not the appointing authority itself.
- **Chief Justice of Supreme Court:** The Chief Justice of the Supreme Court is the head of the Indian judiciary. Their role is primarily related to the judicial system. The Chief Justice does not have the power to appoint State Governors.
- **Speaker of Lok Sabha:** The Speaker is the presiding officer of the Lok Sabha (House of the People), the lower house of the Parliament. The Speaker's role is related to the legislative process and conduct of business in the Lok Sabha. The Speaker is not involved in the appointment of State Governors.
- **President of India:** As discussed earlier, the Constitution explicitly states that the Governor of a State is appointed by the President of India. This aligns with the constitutional provisions regarding the office of Governor.

Based on the constitutional provisions and analysis of the options, the President of India is the authority responsible for appointing the State Governor.

Office	Appointing Authority
State Governor	President of India
Chief Justice of India	President of India
Prime Minister	Appointed by the President (leader of the majority party in Lok Sabha)
Speaker of Lok Sabha	Elected by the members of Lok Sabha

Revision Table: Key Facts on Governor Appointment

Aspect	Detail
Appointing Authority	President of India
Constitutional Basis	Article 155 of the Constitution of India
Term of Office	Holds office during the pleasure of the President
Eligibility Criteria	Citizen of India, minimum 35 years of age
Role	Constitutional head of state, representative of Union government

Additional Information: Role of State Governor

The State Governor performs several important functions:

- They are the executive head of the state, and all executive actions of the state government are formally taken in their name.
- They appoint the Chief Minister and other ministers of the state.
- They summon, prorogue, and dissolve the State Legislature.
- They assent to bills passed by the State Legislature, which then become laws.
- They have powers related to the state judiciary, such as appointing judges to district courts.
- They also have discretionary powers in certain situations, although these are often debated.

The Governor plays a vital role in the administration and constitutional machinery of a state, acting as a bridge between the central government and the state government.

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10. **Answer: b**

Explanation:

This question explores the legislative powers of the Indian Parliament concerning subjects enumerated in the State List of the Seventh Schedule of the Constitution.

Understanding the State List

The Seventh Schedule of the Indian Constitution divides legislative powers between the Union (Parliament) and the States. It contains three lists:

- **Union List:** Subjects on which only Parliament can legislate.
- **State List:** Subjects on which primarily the State Legislatures can legislate.
- **Concurrent List:** Subjects on which both Parliament and State Legislatures can legislate, with Parliament's law prevailing in case of conflict.

Generally, subjects under the State List fall within the domain of state governments. However, the Constitution provides specific exceptions where Parliament can step in.

Conditions for Parliament Legislating on State Subjects

Article 249 of the Constitution of India grants Parliament the power to legislate on a matter in the State List in the national interest. This power is exercised under specific conditions:

- The **Rajya Sabha** (Council of States), acting as the representative of the states, must pass a resolution.
- This resolution must declare that it is necessary or expedient in the **national interest** for Parliament to legislate on the specific State List subject.
- The resolution needs a special majority: support from **two-thirds** of the members present and voting.

If such a resolution is passed, Parliament can make laws on that subject for the entire country or any part of it. Such a law remains effective for a maximum period of one year from the date the resolution ceases to be in force.

Analysis of Options

Let's analyze the given options based on constitutional provisions:

- **Option 1: by the wish of the President**
  The President's assent is required for bills passed by Parliament, but Parliament cannot legislate on a State List subject merely based on the President's wish. Article 249 requires a Rajya Sabha resolution.
- **Option 2: if the Rajya Sabha passes such a resolution**
  This option correctly reflects the provision of Article 249. A resolution passed by the Rajya Sabha with the required special majority is the primary condition for Parliament to legislate on a State List subject in the national interest.
- **Option 3: under any circumstances**
  This is incorrect. Parliament's power to legislate on State List items is conditional and not absolute. It depends on specific constitutional provisions like Article 249 or others related to emergencies or specific state consents.
- **Option 4: by asking the legislature of the concerned State**
  While Parliament can legislate concerning state subjects with state consent under Article 252 (for specific purposes like inter-state trade), this is not the condition under Article 249 for legislating in the national interest. Parliament does not need to ask the state legislature's permission in the context of Article 249.

Conclusion on Parliamentary Power

The Constitution specifically empowers the Parliament to legislate concerning subjects in the State List when the Rajya Sabha deems it necessary in the national interest. This mechanism ensures that national priorities can be addressed even if they fall under state jurisdiction, provided the upper house of Parliament supports the move.

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11. **Answer: d**

Explanation:

Understanding Collective Responsibility of the Council of Ministers

The question asks about the collective responsibility of the Council of Ministers in India. This is a fundamental principle of the parliamentary system of government that India follows.

What is Collective Responsibility?

Collective responsibility means that the entire Council of Ministers, headed by the Prime Minister, is considered as one team. They act together, stand together, and fall together. Every minister is responsible not only for his or her own actions but also for the actions and policies of the entire Council of Ministers.

If a decision is taken by the Council of Ministers, every minister must support it, even if they disagreed during the internal discussions. If a minister cannot support a decision, they should resign.

The most important aspect of collective responsibility is its accountability to the legislature.

To whom is the Council of Ministers Collectively Responsible?

In a parliamentary democracy like India, the executive (the Council of Ministers) is responsible to the legislature. Specifically, it is collectively responsible to the house of the legislature that represents the people directly and holds the power to control the government's tenure.

- The **Lok Sabha** is the House of the People, whose members are directly elected by the citizens of India. It is the lower house of the Parliament and holds the power to pass a vote of no-confidence against the government.
- The **Rajya Sabha** is the Council of States, whose members are indirectly elected. While it is a part of Parliament and has significant powers, the government is not collectively responsible to the Rajya Sabha. A government can continue in office even if it does not have a majority in the Rajya Sabha, as long as it has the confidence of the Lok Sabha.

According to Article 75(3) of the Constitution of India, the Council of Ministers is collectively responsible to the Lok Sabha. This means:

- The government remains in power as long as it enjoys the confidence of the majority of members in the Lok Sabha.
- If the Lok Sabha passes a vote of no-confidence against the Council of Ministers, the entire council, including the Prime Minister, must resign.
- The policies and actions of the government are debated and scrutinized in the Lok Sabha.

Why Other Options Are Incorrect

- **Prime Minister:** The Prime Minister is the head of the Council of Ministers and plays a crucial role in its formation and functioning. However, the council's collective responsibility is to the legislature, not to the Prime Minister personally.
- **President:** Ministers are appointed by the President on the advice of the Prime Minister, and they hold office during the pleasure of the President (this relates to individual responsibility). However, the collective responsibility of the council is to the Lok Sabha, not the President. The President is the constitutional head, while the Lok Sabha is the body that can politically hold the government accountable through confidence/no-confidence motions.
- **Rajya Sabha:** As explained earlier, the government is not collectively responsible to the Rajya Sabha. While ministers are accountable to Parliament as a whole and their actions can be discussed in both houses, the collective survival of the government depends on the confidence of the Lok Sabha.

Therefore, the Council of Ministers is collectively responsible to the Lok Sabha.

Aspect	Collective Responsibility	Individual Responsibility
Meaning	The entire council is responsible as a team for government policies and actions.	Each minister is responsible for the work of their own ministry and for adhering to the collective decisions.
Responsible To	Lok Sabha (politically)	President (legally/constitutionally, though on PM's advice); Parliament (politically)
Consequence	Vote of no-confidence in Lok Sabha leads to resignation of the entire council.	President can remove a minister on the advice of the PM.

Revision Table: Key Concepts

Term	Explanation
Council of Ministers	Body consisting of the Prime Minister and other ministers, collectively responsible for governing.
Collective Responsibility	Principle where the entire executive is accountable to the popular house of the legislature.
Lok Sabha	House of the People in the Indian Parliament, directly elected by citizens.
Parliamentary System	System of government where the executive is part of and accountable to the legislature.
Vote of No-Confidence	Motion moved in the Lok Sabha to test the confidence of the house in the Council of Ministers.

Additional Information on Council of Ministers and Responsibility

Apart from collective responsibility to the Lok Sabha, ministers also have individual responsibility. Article 75(2) states that ministers hold office during the pleasure of the President. This means the President can remove a minister, but this power is exercised on the advice of the Prime Minister. A minister can also be held individually accountable to Parliament for the administration of their ministry. However, the survival of the government as a whole is linked to collective responsibility to the Lok Sabha.

The principle of collective responsibility ensures cabinet solidarity and accountability to the directly elected representatives of the people. It reinforces the idea that the government functions as a cohesive unit.

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12. **Answer: b**

Explanation:

Understanding Money Bills in State Legislatures

This explanation addresses the procedure for introducing a **Money Bill** in the **Legislative Assembly** of a **State** in India, focusing on the necessary prerequisite recommendation.

What is a Money Bill in a State Context?

A Money Bill, as defined in the Constitution of India (specifically Article 199 for State Legislatures), deals with financial matters such as:

- Imposing, abolishing, remitting, or regulating any tax.
- The regulation of borrowing by the government or any guarantee given by it.
- The custody of the Consolidated Fund or Contingency Fund of the State.
- The appropriation of moneys out of the Consolidated Fund of the State.
- Declaring any expenditure to be charged on the Consolidated Fund of the State or increasing the amount of any such expenditure.
- The receipt of money on account of the public account of India or the custody or issuance of such moneys.

Crucially, a bill is considered a Money Bill if it contains *only* provisions of the type listed above. If it contains provisions beyond these, it is treated as an ordinary bill.

Procedure for Introducing a Money Bill in a State Assembly

The introduction of a Money Bill in a State Legislative Assembly follows a specific procedure laid out in the Constitution:

1. **Requirement of Recommendation:** A Money Bill cannot be introduced in the Legislative Assembly of a State except on the recommendation of the Governor of the State. This is a mandatory prerequisite. (Article 198(1) of the Constitution of India).
2. **Introduction Venue:** It must be introduced only in the Legislative Assembly (Vidhan Sabha), not in the Legislative Council (Vidhan Parishad), even if the state has a bicameral legislature.

3. **Speaker's Certification:** After a bill is passed by the Legislative Assembly, the Speaker of the Assembly certifies it as a Money Bill before it is sent to the Legislative Council.
4. **Role of Legislative Council:** The Legislative Council has limited powers regarding Money Bills. It can only make recommendations for amendments, which may be accepted or rejected by the Legislative Assembly. The Council must return the bill within 14 days, or it is deemed passed by both Houses.

Analysis of Options

Let's examine why the other options are incorrect:

- **The Parliament:** The Parliament of India deals with legislation at the Union level. State Legislature matters fall under the purview of the State government and legislature, requiring the State Governor's recommendation, not the Parliament's.
- **The President of India:** While the President's recommendation is required for certain bills introduced in Parliament or state legislatures (e.g., bills affecting trade between states, or bills for the President's consideration), the specific requirement for introducing a Money Bill in a State Legislative Assembly rests with the State Governor.
- **A Special Committee of Ministers:** Recommendations for introducing financial legislation like Money Bills are typically made by constitutional authorities acting in their official capacity, not by ad-hoc committees unless specifically constituted for a different purpose. The Governor fulfills this role based on constitutional mandate.

Conclusion: The Governor's Essential Role

Therefore, the introduction of a **Money Bill** in the **Legislative Assembly** of a **State** is constitutionally mandated to be based on the prior recommendation of the **Governor of the State**. This ensures alignment with the state's financial policy and executive accountability.

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13. **Answer: a**

Explanation:

Vice President of India Election Details

The process for electing the Vice President of India involves a specific set of elected officials. Understanding who participates in this election is key to grasping the constitutional framework.

Who Elects the Vice President?

According to the Constitution of India, the Vice President is elected through an electoral college comprising members of:

- Both Houses of Parliament.

Electoral College Composition

Let's examine the specific members included and excluded from this electoral college:

Lok Sabha Members' Role

The elected Members of the Lok Sabha are part of the electoral college. They have the constitutional right to vote in the election for the Vice President of India.

Rajya Sabha Members' Role

Similarly, the elected Members of the Rajya Sabha are also included. They participate equally alongside Lok Sabha members in electing the Vice President.

Legislative Assemblies' Role

Members of the Legislative Assemblies (MLAs) from the states are**not** included in the electoral college for the Vice President. Their participation is limited to state matters and elections within the state.

Legislative Councils' Role

Members of the Legislative Councils (MLCs), present in some states, are also**not** part of the electoral college for the Vice President. They do not vote in this election.

Comparison: VP vs President Election

It's useful to compare this with the election of the President of India. The President's electoral college includes not only Members of Parliament (Lok Sabha and Rajya Sabha) but also the elected Members of the State Legislative Assemblies. The Vice President's election is thus limited solely to the members of the Union Parliament.

Summary of Vice President Electors

Therefore, the election of the Vice President of India is carried out exclusively by the Members of the Lok Sabha and the Members of the Rajya Sabha. Options that include members of State Legislative Assemblies or Legislative Councils are incorrect.

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14. **Answer: a**

Explanation:

Lok Sabha Responsibility for No-Confidence Motion

This solution explains the constitutional provision regarding the Council of Ministers' responsibility in the Indian parliamentary system, specifically concerning a No-Confidence Motion.

Understanding Collective Responsibility

In India's parliamentary democracy, the Council of Ministers, headed by the Prime Minister, is collectively responsible to the **Lok Sabha**. This principle means that the entire Council of Ministers must have the confidence of the Lok Sabha to remain in power. If the Lok Sabha expresses its lack of confidence in the government, the Council of Ministers must collectively resign.

Analysis of Options for No-Confidence Motion

Let's examine why the **Lok Sabha** is the correct answer:

- **Lok Sabha:** Article 75(3) of the Constitution of India states that the Council of Ministers shall be collectively responsible to the House of the People (**Lok Sabha**). A No-Confidence Motion is a specific parliamentary tool used by the **Lok Sabha** to test this confidence. If a majority of the members present and voting in the **Lok Sabha** pass this motion, the government must resign.
- **Rajya Sabha:** The **Rajya Sabha** (Council of States) is the upper house. While it plays a crucial role in legislation and oversight, it cannot initiate or pass a No-Confidence Motion against the Council of Ministers. The government is not collectively responsible to the **Rajya Sabha**.
- **Both the Houses separately:** Since collective responsibility is constitutionally mandated only towards the **Lok Sabha**, a motion passed separately by the **Rajya Sabha** does not require the government to resign.
- **Both the Houses in joint sitting:** Joint sittings of both houses are typically held for resolving legislative deadlock between the two houses on ordinary bills. They are not used for confidence motions, as the government's accountability is exclusively to the **Lok Sabha**.

The No-Confidence Motion Explained

A **No-Confidence Motion** is a motion moved in the **Lok Sabha** stating that the House has no confidence in the Council of Ministers. Key points include:

- It must be supported by at least 50 members of the Lok Sabha to be admitted for debate.
- If the motion is passed by a simple majority of the total membership of the **Lok Sabha** (i.e., more than 50% of the total strength, not just those present and voting), it signifies that the government has lost the confidence of the lower house.
- Upon the success of the motion, the Prime Minister must tender the resignation of the Council of Ministers to the President.

Conclusion

The constitutional framework clearly establishes that the Council of Ministers derives its authority and continuation in office from the confidence of the **Lok Sabha**. Therefore, a **No-Confidence Motion**, if passed by a majority of members of the **Lok Sabha**, necessitates the resignation of the Council of Ministers.

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15. **Answer: b**

Explanation:

Understanding the Creation of the Comptroller and Auditor General of India's Office

The question asks about the origin of the Office of the Comptroller and Auditor General (CAG) of India. Establishing the foundational basis of this significant constitutional body is key to understanding its role and independence within the Indian governance structure.

Constitutional Establishment of the CAG Office

The Office of the Comptroller and Auditor General of India is established directly by the **Constitution of India**. This means it is a constitutional body, not an administrative one created by a government order or parliamentary law after the Constitution was enacted.

- **Article 148** of the Constitution of India explicitly states: "There shall be a Comptroller and Auditor-General of India who shall be appointed by the President by warrant under his hand and seal and shall only be removed from office in like manner and on the like grounds as a Judge of the Supreme Court."
- This constitutional provision ensures the independence and authority of the CAG, positioning it as a crucial watchdog for public finances.

Analysis of Other Options

Let's look at why the other options are not the correct basis for the creation of the CAG's office:

- **Through an Act of the Parliament:** While Parliament has passed laws like the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act, 1971, to regulate the administration of the CAG and its functions, these acts supplement the constitutional mandate. They did not *create* the office itself. The office's existence predates and is independent of specific parliamentary legislation.
- **Through a Cabinet Resolution:** A Cabinet Resolution is an executive decision. Creating a high constitutional office like the CAG requires a more fundamental legal basis than an executive resolution. The Constitution provides this fundamental basis.
- **None of the above:** This option is incorrect because the Constitution does indeed provide the framework for the creation of the CAG's office.

Conclusion on CAG Office Creation

The structure and existence of the Office of the Comptroller and Auditor General of India are rooted in the Constitution itself, specifically Article 148. This constitutional backing guarantees its independence from the executive branch, enabling it to perform

its audit functions effectively and report impartially on the government's financial activities.

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16. **Answer: c**

Explanation:

Understanding the Tenure of the Chief Election Commissioner of India

The Chief Election Commissioner (CEC) is a crucial part of the Election Commission of India, the constitutional body responsible for conducting elections in the country. Understanding the tenure of the Chief Election Commissioner is important for comprehending the independence and functioning of this vital institution.

What is the Tenure of the Chief Election Commissioner?

The question asks specifically about the tenure of the Chief Election Commissioner of India. Let's examine the rules governing their term in office.

According to the relevant laws and constitutional provisions concerning the Election Commission, the Chief Election Commissioner holds office for a specific term. This term is defined by two conditions: a fixed number of years and a maximum age limit.

- The Chief Election Commissioner holds office for a term of **six years**.
- However, their term can also end if they reach the age of **65 years**, even if the six-year term is not completed.

The rule states that the tenure is "six years or till the age of 65 years whichever is earlier". This means that if a person is appointed as CEC at the age of 60, their term will be six years, and they will retire at 66. But if they are appointed at the age of 62, they will complete only 3 years in office (until they reach 65 years) because 65 years is earlier than completing the full six-year term.

Analyzing the Given Options

Let's look at the provided options in light of the established tenure rules for the Chief Election Commissioner:

- **Option 1: Five Years** - This is incorrect. The standard term is six years, not five.
- **Option 2: During the pleasure of the President** - This is incorrect. Constitutional functionaries like the Chief Election Commissioner have a fixed tenure and are not typically subject to removal at the pleasure of the President. Their removal process is similar to that of a Supreme Court judge to ensure independence.
- **Option 3: Six years or till the age of 65 years whichever is earlier** - This aligns directly with the established rules for the tenure of the Chief Election Commissioner.
- **Option 4: Five years or till the age of 65 years whichever is earlier** - This is incorrect as the term is six years, not five.

Summary of Chief Election Commissioner Tenure

Aspect	Details
Standard Term Length	Six years
Maximum Age Limit	65 years
Actual Tenure	Six years OR till the age of 65 years (whichever comes first)

Therefore, the correct description of the tenure of the Chief Election Commissioner of India is six years or till the age of 65 years, whichever is earlier.

Revision Table: Chief Election Commissioner Tenure

Key Point	Description
Who is the CEC?	Head of the Election Commission of India.
What is the CEC's Tenure?	6 years or 65 years of age, whichever is earlier.
Purpose of Fixed Tenure?	Ensures independence from political pressure.
Removal Process?	Similar to a Judge of the Supreme Court.

Additional Information on Election Commission and CEC

The Election Commission of India is an autonomous constitutional authority established by Article 324 of the Constitution of India. It is responsible for administering election processes in India at national, state, and district levels. The Commission consists of the Chief Election Commissioner and other Election Commissioners, as the President may from time to time fix. Currently, it is a multi-member body with one Chief Election Commissioner and two Election Commissioners.

The conditions of service and tenure of office of the Election Commissioners and the Chief Election Commissioner are determined by the President by rule, subject to the provisions of any law made by Parliament in this behalf. The Chief Election Commissioner has a higher status and receives emoluments and terms of service similar to a Judge of the Supreme Court.

The security of tenure provided to the Chief Election Commissioner is essential for ensuring fair and free elections, a cornerstone of democracy in India.

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17. **Answer: c**

Explanation:

Understanding the Recommendation for Fundamental Duties

The question asks which committee recommended the inclusion of Fundamental Duties in the Constitution of India. Fundamental Duties are essential obligations that citizens are expected to perform to contribute to the nation's growth and uphold its values. They were not part of the original Constitution but were added later.

Historical Context and Key Committee

The concept of incorporating Fundamental Duties into the Indian Constitution gained prominence during the period of the Internal Emergency (1975-1977). The ruling party at the time felt it necessary to emphasize the responsibilities of citizens alongside their rights. To address this, a committee was formed to recommend constitutional amendments.

The committee tasked with this significant responsibility was the **Swaran Singh Committee**.

- The Swaran Singh Committee was established in 1976.
- Its main objective was to study the feasibility of introducing certain changes and amendments to the Constitution of India.
- A key recommendation of this committee was the incorporation of a new section detailing the Fundamental Duties of Indian citizens.
- The committee suggested adding a new Part (Part IV-A) to the Constitution, containing a list of duties.
- Based on the recommendations of the Swaran Singh Committee, the government passed the 42nd Amendment Act in 1976, which officially added Fundamental Duties to the Constitution of India. Initially, 10 duties were included, and later the 11th duty was added through the 86th Amendment Act, 2002.

Analysis of Other Options

The other committees mentioned in the options are associated with different aspects of Indian governance and constitution-making:

- **Balwant Rai Mehta Committee:** This committee is famous for its recommendations regarding the strengthening of Panchayati Raj institutions (local self-government) in India.
- **Ayyangar Committee:** While figures like T. T. Krishnamachari and N. Gopalaswami Ayyangar were key members of the Constituent Assembly involved in drafting the Constitution, there isn't a specific, widely known "Ayyangar Committee" recommendation directly tied to Fundamental Duties in the same way as the Swaran Singh Committee. N. Gopalaswami Ayyangar played a crucial role in integrating states and drafting various constitutional provisions, but not specifically the recommendation for Fundamental Duties.
- **Thakkar Committee:** This committee was established to investigate the assassination of the then-Prime Minister, Indira Gandhi.

Conclusion

Therefore, the inclusion of Fundamental Duties in the Constitution of India was based on the recommendations made by the **Swaran Singh Committee**.

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18. **Answer: a**

Explanation:

Understanding the President's Right to Seek Supreme Court Opinion

The question asks about the constitutional authority to seek an advisory opinion from the Supreme Court of India. This power is specifically outlined in the Constitution.

Constitutional Provision: Article 143

Article 143 of the Constitution of India deals with the 'Power of President to consult Supreme Court'. This article grants the President of India the authority to consult the Supreme Court on certain matters.

- The President may refer to the Supreme Court any question of law or of fact which has arisen or which may arise and which is of a character considered important for the interpretation of the Constitution, or for the determination of any other specified matter.
- The President may also refer important public questions to the Supreme Court for its opinion.

The Supreme Court hears such reference and advises the President. However, the President is not bound to follow the advisory opinion.

Analysis of Options

Let's examine the given options in light of the constitutional provisions:

- **President**: As per Article 143, the **President** has the constitutional right to refer questions of law or public importance to the Supreme Court for its advisory opinion. This aligns with the constitutional text.
- **Any High Court**: High Courts operate within their respective jurisdictions and do not possess the power under the Constitution to seek advisory opinions directly from the Supreme Court on questions of law. They can approach the Supreme Court through appeals or specific constitutional provisions, but not for advisory opinions in this manner.
- **Prime Minister**: While the Prime Minister is a key figure in the government and advises the President on many matters, the specific constitutional power to seek an advisory opinion from the Supreme Court resides solely with the President. The Prime Minister cannot directly request such an opinion.
- **All the above**: Since only the President holds this specific constitutional right, this option is incorrect.

Conclusion on Constitutional Authority

Based on Article 143 of the Constitution of India, the **President** is the constitutional authority empowered to seek the opinion of the Supreme Court on questions of law or matters of public importance.

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19. **Answer: b**

Explanation:

Understanding Constitutional Authorities

A constitutional authority refers to any institution, office, or body that is established and defined directly by the Constitution of India. These authorities derive their legal existence, powers, and functions from the constitutional text itself, ensuring a degree of autonomy and importance in the governmental framework.

Identifying Constitutional Authorities: Detailed Analysis

To determine which of the listed entities are constitutional authorities, let's examine each one based on the Indian Constitution:

State Election Commission Status

- The **State Election Commission** is explicitly established by the Constitution under **Article 243K**.
- This Article clearly outlines the powers and responsibilities of the State Election Commission concerning elections to Panchayats, including superintendence, direction, and control over electoral rolls and the election process.
- Its creation and mandate directly from the Constitution confirm it as a constitutional authority.

State Finance Commission Status

- The Constitution provides for the establishment of **State Finance Commissions** through **Article 243I** and **Article 243Y**.
- These articles mandate the State Governor to constitute such commissions to review the financial position of Panchayats and Municipalities, respectively, and to make recommendations on fiscal matters like tax sharing and grants-in-aid between the state and local bodies.
- The constitutional mandate for their creation makes the State Finance Commission a constitutional authority.

Zila Panchayat Constitutional Role

- Part IX of the Constitution (Articles 243 to 243O) deals with Panchayats. **Article 243B** specifically mandates the constitution of Panchayats at the appropriate levels in every State.
- A **Zila Panchayat** represents the Panchayat at the district level.
- Since the Constitution mandates the establishment of Panchayats, including district-level ones like the Zila Panchayat, these bodies are constitutionally recognized entities.

State Electoral Officer Role

- The role of the **State Electoral Officer** (often designated as Chief Electoral Officer or CEO) is vital for managing elections to state legislatures and coordinating electoral processes within a state.
- However, this office typically functions under the superintendence, direction, and control of the Election Commission of India (ECI), which is established under **Article 324** of the Constitution.
- The Constitution does not directly establish the office of the "State Electoral Officer" as an independent constitutional authority. Instead, it is an administrative office created through electoral laws and operates within the framework set by the ECI.

Conclusion on Constitutional Authorities

Based on the constitutional provisions:

- The **State Election Commission** is a constitutional authority (Article 243K).
- The **State Finance Commission** is a constitutional authority (Articles 243I, 243Y).
- The **Zila Panchayat** is a constitutionally mandated body (Article 243B).

The State Electoral Officer, while performing essential electoral functions, is not directly established as a constitutional authority by a specific constitutional article in the same way as the others. Therefore, the entities identified as constitutional authorities among the given options are the State Election Commission, the State Finance Commission, and the Zila Panchayat.

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20. **Answer: c**

Explanation:

National Development Council: Coordinating Planning Commission and State Governments

The question asks to identify the institution that serves as a crucial link and **coordinator** between the **Planning Commission** and the various **State Governments** in India concerning national development plans. Understanding the roles of different bodies is key to answering this.

Understanding the Roles of Key Institutions

India's planning process involves both the central authority (Planning Commission, now NITI Aayog) and the constituent units (State Governments). Effective planning requires seamless coordination between these levels to ensure alignment with national goals and regional needs.

Role of the National Development Council (NDC)

The **National Development Council** (NDC) is the apex body for decision-making regarding development planning in India. Its primary functions highlight its role as a coordinator:

- **Approves Plans:** The NDC approves the Five-Year Plans, Mid-Term Appraisals of the plans, and other major policy initiatives proposed by the Planning Commission. This approval process ensures that the plans have the backing of both the Central and State governments.
- **Ensures Cooperation:** It serves as a platform for discussion and deliberation between the representatives of the Central Government and the State Governments (led by Chief Ministers). This interaction is vital for fostering cooperation and resolving issues related to plan implementation.
- **Reviews Progress:** The NDC periodically reviews the progress of development plans, allowing for adjustments based on feedback from the states and changing circumstances.
- **Composition:** It comprises the Prime Minister, Union Ministers, Chief Ministers of all states, Administrators of Union Territories, and the Members of the Planning Commission. This broad representation underscores its coordinating function across different levels of government.

Therefore, the **National Development Council** directly functions as the primary **coordinator** between the **Planning Commission** and the **State Governments**, ensuring a unified approach to national planning.

Analysis of Other Options

- **National Integration Council:** This council focuses on promoting national integration and addressing issues related to communal harmony, caste tensions, and regionalism. It does not deal with the coordination of economic planning between the Centre and states.
- **Finance Commission:** The Finance Commission is a constitutional body primarily responsible for recommending the distribution of financial resources between the Union government and the state governments, and among the states

themselves. While it deals with finances, its mandate is not the overall coordination of development plans.
- **None of the above:** Since the National Development Council fits the description, this option is incorrect.

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21. **Answer: c**

Explanation:

Supreme Court Interpretation: Preamble as Part of Constitution

The question asks to identify the specific Supreme Court case where it was held that the Preamble is an integral part of the Indian Constitution. The Preamble, often called the soul of the Constitution, outlines the ideals and philosophy of the Indian Republic.

Bommai Vs. Union of India Case Analysis

The landmark case of ***Bommai Vs. Union of India*** (1994) is crucially important in Indian constitutional law. While the Supreme Court had previously established in the ***Kesavananda Bharati case*** (1973) that the Preamble is indeed a part of the Constitution, the ***Bommai case*** significantly reinforced the Preamble's importance by heavily relying on its principles.

- **Context:** The *Bommai* case primarily dealt with the scope of the President's power under Article 356 to dismiss state governments.
- **Preamble's Role:** In its judgment, the Supreme Court extensively discussed the concept of secularism, which is a key element mentioned in the Preamble ("Secular"). The court emphasized that secularism is a basic feature of the Constitution.
- **Significance:** By upholding secularism as a basic structure derived from the Preamble, the *Bommai* judgment highlighted how the Preamble reflects the fundamental character and guiding principles of the Constitution. It affirmed that the Preamble is not merely ornamental but embodies essential features that are inviolable.

Relevance of Other Cases

The other options provided represent different legal matters:

- *Union of India Vs. Dr. Kohli*: This case typically relates to administrative or service matters concerning government officials.
- *Banarsidas Vs. State of U.P.*: This case usually pertains to property disputes or specific state government actions.
- *Malak Singh Vs. State of Punjab*: This case generally involves criminal law or police administration issues.

While these cases are significant in their respective legal domains, they are not primarily associated with the specific ruling that the Preamble forms part of the Constitution. The *Bommai* case, although following the initial declaration in *Kesavananda Bharati*, strongly affirmed the Preamble's foundational status by linking its core principles to the basic structure doctrine.

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22. **Answer: c**

Explanation:

Panchayati Raj First Introduced in Rajasthan

The question asks to identify the **first state** in India where the **Panchayati Raj system** was officially introduced. This system aims to establish local self-governance in rural areas.

Understanding Panchayati Raj

Panchayati Raj is India's system of rural local self-government. It is structured at three tiers:

- Gram Panchayat at the village level.
- Panchayat Samiti at the block level.

- Zila Parishad at the district level.

The concept gained significant momentum in independent India, aiming to decentralize power and involve citizens directly in local development.

Historical Introduction of Panchayati Raj

The journey towards establishing the modern **Panchayati Raj system** involved various committees and recommendations. The Balwant Rai Mehta Committee (1957) played a crucial role by recommending this three-tier structure.

Rajasthan's Pioneering Role

Rajasthan holds the historical significance of being the **first state** to implement the **Panchayati Raj system**.

- The official launch occurred on **October 2, 1959**.
- The inauguration was performed by the then Prime Minister of India, **Jawaharlal Nehru**.
- The location chosen for this landmark event was **Nagaur district** in Rajasthan.

This initiative in Rajasthan marked a major step towards democratic decentralization and rural empowerment in India.

Conclusion on First Introduction

Following the framework recommended for strengthening local governance, Rajasthan became the inaugural state to bring the Panchayati Raj institutions into operation, setting a precedent for other states to follow.

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23. **Answer: a**

Explanation:

Panchayati Raj Women Reservation in U.P. Explained

This section details the reservation of seats for women within the Panchayati Raj Institutions (PRIs) specifically in the state of Uttar Pradesh (U.P.). Understanding these reservation rules is crucial for comprehending local governance structures in India.

Constitutional Basis for Reservation

The system of local self-governance in India, known as Panchayati Raj, is constitutionally mandated. The 73rd Constitutional Amendment Act, enacted in 1992, introduced Part IX into the Constitution of India. This amendment aimed to empower rural local bodies.

- A key provision of the 73rd Amendment requires states to ensure adequate representation for women in the Panchayati Raj Institutions.
- Specifically, the Constitution mandates that not less than one-third of the total number of seats in every Panchayat must be reserved for women.
- These reserved seats are also required to be allotted by rotation to different constituencies within a Panchayat.

Uttar Pradesh's Reservation Policy

Following the constitutional directive, Uttar Pradesh, like many other Indian states, implemented reservation for women in its Panchayati Raj system. The state legislation ensures compliance with the minimum reservation requirement set forth by the Constitution.

In Uttar Pradesh's Panchayati Raj Institutions, the reservation for women is set at **one-third** of the total seats.

This reservation follows the constitutional mandate, ensuring significant participation of women in the grassroots democratic process at the village, block, and district levels.

Mathematically, the number of seats reserved for women can be represented as:

Reserved Seats for Women = $\frac{1}{3} \times \text{Total Number of Seats}$

Analysis of Options

Let's examine the given options in light of the established reservation policy:

- **Option 1: one - third of total seats** - This aligns directly with the constitutional mandate and the policy implemented in Uttar Pradesh for Panchayati Raj Institutions.
- **Option 2: in proportion to women's population** - While representation based on population is a general democratic principle, the specific mandate for PRIs under the 73rd Amendment is a fixed proportion (at least one-third), not necessarily proportional to the exact population percentage at the time of delimitation.
- **Option 3: one - fourth of total seats** - This option represents $\frac{1}{4}$ of the seats, which is less than the constitutionally mandated minimum of $\frac{1}{3}$.
- **Option 4: as per the requirements of circumstances** - This is a vague option and does not specify a concrete reservation policy. The reservation is based on a defined legal framework, not arbitrary circumstances.

Conclusion

Therefore, the correct and legally established reservation for women in Uttar Pradesh's Panchayati Raj Institutions is **one-third** of the total seats, ensuring their participation in local governance.

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24. **Answer: c**

Explanation:

Unorganized Workers Social Security Act: The Year of Passage

The **Unorganized Workers Social Security Act** is a significant legislative framework in India aimed at extending social security schemes and benefits to workers employed in the unorganized sector. This sector constitutes a large part of the Indian workforce, often characterized by precarious employment conditions and limited access to social safety nets. Knowing the specific year this Act was enacted is essential for understanding the progression of social welfare policies in the country.

Identifying the Enactment Year

The process of establishing legal support for **unorganized workers** culminated in the parliamentary approval of a dedicated Act. Following legislative discussions and procedures, the **Unorganized Workers Social Security Act** was successfully passed in the year **2008**. This legislative milestone represented a concerted effort to provide a structured approach to social security for a vulnerable segment of the workforce.

The Act aims to provide for the social security and the health and social welfare of unorganized workers, and for other matters connected therewith or incidental thereto. The passing of this Act in **2008** was a crucial step towards recognizing and addressing the needs of millions of workers outside the purview of traditional organized labor protections.

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25. **Answer: b**

Explanation:

Understanding Tendulkar Committee's Poverty Line Estimation

The question asks for the percentage of India's population estimated to be below the poverty line according to the **Tendulkar Committee**. This committee was formed to look into poverty estimation methods in India.

Tendulkar Committee Findings on Poverty

The **Tendulkar Committee**, chaired by Prof. Suresh D. Tendulkar, was constituted by the Planning Commission (now NITI Aayog) in 2005. Its primary objective was to **estimate** the poverty levels in India using a more robust methodology based on minimum consumption expenditure needed for nutritional adequacy.

The committee finalized its report in 2009 and submitted it to the government. It proposed a new methodology for setting poverty lines based on the **consumption expenditure** required to achieve a minimum level of nutrition, education, and health.

Estimated Percentage Below Poverty Line

Based on the Tendulkar Committee's methodology and data from the 2004-05 National Sample Survey Organisation (NSSO) survey, the estimated percentage of people living below the poverty line in India was found to be:

- **37.2%**

This translates to approximately **40.7 crore** people living below the poverty line during that period.

Analyzing the Options

Let's review the options provided in the context of the Tendulkar Committee's estimates:

- **27.2%:** This figure is lower than the Tendulkar Committee's estimate.
- **37.2%:** This figure aligns with the official estimates derived from the **Tendulkar Committee** report based on 2004-05 data.
- **22.2%:** This figure is significantly lower and does not represent the Tendulkar Committee's findings. It is closer to estimates from later periods or using different methodologies (like the Rangarajan Committee).
- **32.7%:** While a plausible poverty percentage, it is not the specific figure associated with the **Tendulkar Committee**'s primary estimation.

Conclusion on Poverty Estimation

The **Tendulkar Committee**'s landmark estimation indicated that **37.2%** of the Indian population was below the poverty line, based on its updated methodology focusing on minimum subsistence levels.

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26. **Answer: d**

Explanation:

This question asks about the minimum number of Supreme Court judges required when hearing cases that involve the **interpretation of the Constitution**.

Supreme Court Judges Requirement for Constitutional Interpretation

The Supreme Court of India plays a crucial role as the final interpreter of the Constitution. To ensure that cases involving significant constitutional questions are handled with the utmost gravity and deliberation, the Constitution itself specifies a minimum number of judges that must sit on the bench.

Constitutional Basis for Bench Size

Article 145(3) of the Constitution of India explicitly addresses the quorum for constitutional cases. It states:

- "The minimum number of Judges who are to sit for the purpose of deciding any case involving a substantial question as to the interpretation of this Constitution [...] shall be five..."

This provision ensures that matters requiring the interpretation of constitutional provisions are heard by a larger bench, reflecting their importance.

Understanding the Minimum Number

The key phrase here is "interpretation of the Constitution". When a case raises fundamental questions about the meaning or application of constitutional articles, a specific minimum number of judges must be involved.

- **Minimum Judges Required:** According to Article 145(3), this minimum number is **Five**.

Why a Minimum Number?

Hearing cases involving the **interpretation of the Constitution** is a core function of the Supreme Court as the guardian of the Constitution. A larger bench ensures:

- **Diverse Perspectives:** More judges bring a wider range of legal interpretations and viewpoints.
- **Judicial Precedent:** Decisions on constitutional interpretation set vital precedents for the entire country, hence the need for a substantial bench.
- **Finality:** It lends greater authority and finality to the verdict on constitutional matters.

Conclusion on Judges Number

Therefore, the minimum number of Supreme Court **Judges** needed for any case involving the **interpretation of the Constitution** is explicitly set at **Five**.

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27. **Answer: b**

Explanation:

Supreme Court Ruling on Fundamental Rights and Personal Choice

This question asks about a specific statement made by the Supreme Court of India regarding the role of **Fundamental Rights** in enabling individuals to shape their lives. The quote emphasizes the significance of these rights in granting personal autonomy and freedom of choice.

Understanding the Significance of Fundamental Rights

Fundamental Rights are essential guarantees provided in the Constitution of India, ensuring basic human rights and freedoms to all citizens. These rights are crucial for the overall development of an individual and are protected against state infringement. The ability of a person to live a dignified life and make choices about their own path is central to the concept of these rights.

Analysis of Landmark Supreme Court Cases

The Supreme Court of India has interpreted and upheld the importance of **Fundamental Rights** in numerous landmark judgments. Let's examine the cases mentioned:

- **Golak Nath Vs. State of Punjab (1967)**

In the case of *Golak Nath Vs. State of Punjab*, the Supreme Court made significant observations about the nature of **Fundamental Rights**. The court held that Fundamental Rights are fundamental to the governance of the country and represent the conscience of the Constitution. While the primary focus was on the Parliament's power to amend these rights, the court's reasoning underscored the inherent value and importance of these rights in protecting individual liberty and dignity. The statement, "**Fundamental Rights enable a man to chalk out his own life in the manner he likes best**," strongly aligns with the court's perspective on the inviolable nature of personal liberty and freedom guaranteed under these rights, as interpreted in this era of constitutional jurisprudence.

- **Indira Gandhi Vs. Raj Narain (1975)**

  This case primarily dealt with issues related to the election of Prime Minister Indira Gandhi and the validity of certain constitutional amendments. While it discussed the basic structure doctrine, the specific quote mentioned in the question is not directly associated with this judgment.

- **Bank Nationalization Case (1970)**

  Known as *Rustom Cavasjee Cooper v. Union of India*, this case concerned the constitutional validity of the Banking Companies (Acquisition and Transfer of Undertakings) Act. The judgment focused on property rights and the scope of executive power but is not the primary source for the given quote about shaping one's life.

- **Azhar Vs. Municipal Corporation**

  This appears to be a less prominent case compared to the others concerning constitutional rights, and the specific quote linking **Fundamental Rights** to shaping one's life is not notably attributed to this case in major constitutional law discourse.

Conclusion: Identifying the Correct Case

Based on the constitutional significance and the nature of the observations made by the Supreme Court regarding individual liberty and the essence of **Fundamental Rights**, the statement "**Fundamental Rights enable a man to chalk out his own life in the manner he likes best**" is most accurately attributed to the judicial reasoning within the context of the *Golak Nath Vs. State of Punjab* case.

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28. **Answer: d**

Explanation:

Populous State of India: Census 2011 Provisional Figures

This section focuses on identifying the **most populous state** in India by examining the provisional data from the **Census of India 2011**. We will analyze the population figures of the states mentioned in the options to determine which one had the highest population during that census.

Examining Indian States Population Data

The question requires us to determine the **most populous state** in India based on the provisional results of the **Census of India 2011**. The options provided are:

- Madhya Pradesh
- Andhra Pradesh
- Odisha
- Uttar Pradesh

State Population Rankings: Census 2011

To accurately answer the question, let's refer to the population data collected during the **Census of India 2011**. Comparing the populations of the listed states helps us find the most populous one.

Population of Selected Indian States
(Census 2011 Provisional Figures)

State	Population (2011)
Uttar Pradesh	199,812,341
Maharashtra	112,374,333
Bihar	104,099,452
West Bengal	91,276,115
Madhya Pradesh	72,626,809
Rajasthan	68,548,437
Karnataka	61,095,297
Gujarat	60,439,692
Andhra Pradesh	49,577,103
Odisha	41,974,219

Identifying the Most Populous State

Upon reviewing the population figures from the **Census of India 2011**, it is evident that **Uttar Pradesh** had the largest population among all the states in India. Its population figure significantly surpassed that of other major states like Maharashtra and Bihar, and notably higher than Madhya Pradesh, Andhra Pradesh, and Odisha.

Therefore, based on the provisional data from the **Census of India 2011**, **Uttar Pradesh** stands out as the **most populous state** in India.

---

29. **Answer: c**

Explanation:

Natural Capital Explained

Natural capital refers to the world's stock of natural assets which produces ecosystem goods and services. These include resources like minerals, forests, and water, as well as services like climate regulation and pollination. It's the foundation upon which our economies and well-being are built.

Analyzing Components of Natural Capital

To answer the question, we need to identify which of the given options is NOT a natural asset. Let's look at each one:

- **Forests:** Forests are natural ecosystems. They provide resources like timber and regulate climate, making them a key component of **natural capital**.
- **Water:** Water resources, found in rivers, lakes, and underground, are essential natural assets. They support life and are crucial for many economic activities, thus forming part of **natural capital**.
- **Minerals:** Minerals found within the Earth are non-renewable natural resources. They are extracted for use in industry and technology, and are considered part of a country's **natural capital** endowment.

Why Roads Are Not Natural Capital

The option **Roads** stands apart from the others:

- Roads are **infrastructure**. They are created by humans through labor and investment, using materials often derived from natural resources.
- Structures like roads fall under the category of **manufactured capital** or **physical capital**, not natural capital. Manufactured capital refers to assets made by humans that aid in the production process.
- Therefore, roads are a product of human creation and economic activity, distinct from the naturally occurring assets that constitute natural capital.

Conclusion: Forests, water, and minerals are all examples of natural capital. Roads, being man-made infrastructure, are not.

---

30. **Answer: c**

Explanation:

Apna Van Apna Dhan Scheme: Himachal Pradesh Initiative

The question asks to identify the Indian state that has launched the '**Apna Van Apna Dhan**' scheme. This scheme is a significant environmental and economic initiative aimed at benefiting local communities through forest resource management.

Understanding the 'Apna Van Apna Dhan' Scheme

The '**Apna Van Apna Dhan**' (meaning 'Our Forest, Our Wealth') scheme is designed to empower local communities by involving them directly in the conservation and sustainable utilization of forest resources. The core idea is to link the well-being of the people ('Apna') with the prosperity derived from forests ('Van' and 'Dhan'), promoting a sense of ownership and responsibility towards forest conservation.

Identifying the State Behind the Scheme

This community-centric forest management scheme was initiated by the state government of **Himachal Pradesh**. Himachal Pradesh, known for its extensive forest cover and reliance on natural resources, introduced this program to foster sustainable development and enhance the livelihoods of its residents through effective forest management.

Analysis of Options

Let's look at the provided options:

- Uttar Pradesh
- Madhya Pradesh
- **Himachal Pradesh**
- Arunachal Pradesh

Based on the understanding of the '**Apna Van Apna Dhan**' scheme and its implementation, **Himachal Pradesh** is the state that launched this initiative. The scheme aligns with Himachal Pradesh's policies focused on community participation in managing its rich forest wealth.

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31. **Answer: c**

Explanation:

The **Swabhiman Scheme** was a notable initiative launched in India aimed at improving financial access for the population. This scheme specifically focused on extending the reach of banking services to underserved areas.

Understanding the Swabhiman Scheme's Purpose

The primary objective of the **Swabhiman Scheme** was to promote financial inclusion across India. Financial inclusion means ensuring that all individuals and businesses have access to useful and affordable financial products and services – transactions, payments, savings, credit, and insurance – delivered in a responsible and sustainable way. The scheme specifically targeted the expansion of banking facilities into rural and remote locations.

Swabhiman Scheme and Rural Banking Enhancement

Key aspects of the **Swabhiman Scheme** directly relate to strengthening **rural banking**:

- **Expanding Access Points:** The initiative focused on establishing banking outlets or units in villages that previously lacked access to formal banking services.
- **Business Correspondents:** Often, these banking access points were managed by 'Business Correspondents' (BCs), who acted as representatives of banks, providing basic banking services at the village level.
- **Financial Inclusion Goals:** By bringing banking closer to the people, the scheme aimed to enable villagers to open savings accounts, access credit facilities, make payments, and utilize other essential financial services.
- **Boosting Rural Economy:** Facilitating access to banking services in rural areas helps in mobilizing savings and channeling credit, thereby supporting the local rural economy and improving the livelihoods of residents.

Therefore, the **Swabhiman Scheme** is fundamentally associated with the expansion and accessibility of **rural banking** services, forming a crucial part of India's broader financial inclusion strategy.

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32. **Answer: c**

Explanation:

GDP Contribution Largest Share in India

Gross Domestic Product (GDP) is a fundamental measure of a country's economic performance. It represents the total value of all final goods and services produced within a country's geographical boundaries over a specific period, typically a year. Understanding the composition of GDP by different economic sectors helps in analyzing the structure and growth drivers of an economy.

Analyzing India's Economic Sectors

The Indian economy is broadly divided into three main sectors:

- **Agriculture, Forestry, and Fishing:** This sector includes farming, animal husbandry, and related activities.
- **Industry:** This sector comprises manufacturing, mining, quarrying, electricity, gas, water supply, and construction.
- **Services:** This sector includes a wide array of activities like trade, hotels, transport, communication, financial services, real estate, public administration, defence, and other services (including IT, healthcare, education).

The Dominant Service Sector in India's GDP

When examining the contribution of these sectors to India's Gross Domestic Product (GDP), the **service sector** consistently emerges as the largest contributor. This reflects the ongoing structural transformation of the Indian economy from agriculture-based to a more service-oriented one.

Key factors contributing to the service sector's significant share include:

- Rapid growth in Information Technology (IT) and Information Technology Enabled Services (ITeS).
- Expansion of financial services, banking, and insurance.
- Growth in trade, logistics, and communication networks.
- Increased demand for healthcare, education, and hospitality services.

While agriculture remains a crucial sector for employment and food security, its share in the national GDP is relatively smaller compared to services. The industrial sector also plays a vital role, but the service sector's growth has outpaced others, making it the primary engine of India's GDP.

Therefore, the **service sector** holds the largest share of Gross Domestic Product (GDP) in India.

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33. **Answer: c**

Explanation:

Inflation Estimation Measures in India

Inflation refers to the rate at which the general level of prices for goods and services is rising, and subsequently, purchasing power is falling. Central banks and governments use various statistical measures to track and estimate inflation.

Understanding Key Price Indices

Several indices are used to measure price changes. The question asks for the most common measure used specifically for estimating inflation in India. Let's look at the options:

- **Price Index:** This is a general term and not a specific measure.
- **Wholesale Price Index (WPI):** This index tracks the changes in the prices of goods in the wholesale market. It reflects price levels at the producer/trader level.
- **Consumer Price Index (CPI):** This index measures the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services. It is often seen as more relevant to household budgets and everyday living costs.
- **Price Index of Industrial Goods:** This focuses only on a specific sector (industrial goods) and does not represent the overall inflation experienced by consumers or the economy broadly.

The Role of Consumer Price Index (CPI) in India

In India, the **Consumer Price Index (CPI)** is widely regarded as the primary metric for measuring inflation that affects households. The Reserve Bank of India (RBI) uses CPI to set its monetary policy targets. CPI captures the price changes of essential goods and services consumed by households, such as food, housing, clothing, transportation, and healthcare. This makes it a direct reflection of the cost of living for the average Indian consumer.

CPI vs. WPI for Inflation Monitoring

While both CPI and WPI are important, CPI is generally considered the more common measure for estimating inflation impact on consumers. WPI reflects inflation at the wholesale level, which may not always translate directly or immediately into consumer prices due to various factors like retail margins, taxes, and distribution costs. The government and the central bank increasingly rely on CPI for policy decisions related to inflation management and economic stability.

Conclusion: Most Common Inflation Measure

Considering its direct relevance to consumer costs and its prominent role in policy-making by institutions like the RBI, the **Consumer Price Index (CPI)** is the most common measure used for estimating inflation impacting the general population in India.

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34. **Answer: b**

Explanation:

Understanding India's World Population Share in 2011

This question requires identifying the estimated percentage of the global population that lived in India back in 2011. Such statistics are important for understanding global population distribution and demographics.

India's Population as a Percentage of World Population in 2011

Demographic data indicates that in the year 2011, India's population was a significant fraction of the total world population. Reliable estimates place India's population at approximately 1.25 billion people during that period.

Simultaneously, the total global population was estimated to be around 7 billion people.

To determine the percentage of the world's population residing in India in 2011, we can perform the following calculation:

$$\text{Percentage} = \left(\frac{\text{Population of India}}{\text{Total World Population}}\right) \times 100$$

Substituting the estimated figures for 2011:

$$\text{Percentage} = \left(\frac{1.25 \text{ billion}}{7 \text{ billion}}\right) \times 100$$

$$\text{Percentage} \approx 17.86\%$$

Reviewing the provided options:

- 15%
- 17.5%
- 20%
- 22.5%

Comparing the calculated approximate percentage ($\approx 17.86\%$) with the given options, the closest value is **17.5%**.

Contextualizing the Population Share

The figure of 17.5% highlights India's major role in the global population landscape. This demographic significance impacts various international factors, including economic trends, resource management, and global development initiatives.

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35. **Answer: a**

Explanation:

Understanding the 2011 Census Child Sex Ratio

The question asks us to identify the Indian state with the highest child sex ratio, specifically focusing on the data from the provisional 2011 Census of India. The child sex ratio is defined as the number of females per 1,000 males in the age group of 0-6 years. This ratio is a crucial indicator of gender bias and societal attitudes towards females in a region.

Comparing State Child Sex Ratios

To answer this question accurately, we need to examine the child sex ratio for each of the states provided in the options based on the 2011 Census data. Let's look at the figures:

State	Child Sex Ratio (0-6 years) - Census 2011
Chhattisgarh	964
Haryana	834
Uttar Pradesh	902
Punjab	846

Determining the Highest Child Sex Ratio

By comparing the child sex ratio data presented in the table above:

- Chhattisgarh recorded a child sex ratio of 964 females per 1,000 males.
- Haryana recorded a child sex ratio of 834 females per 1,000 males.
- Uttar Pradesh recorded a child sex ratio of 902 females per 1,000 males.
- Punjab recorded a child sex ratio of 846 females per 1,000 males.

Observing these numbers, Chhattisgarh has the highest value (964) among the listed states for the child sex ratio according to the 2011 Census.

Final Result: Highest Child Sex Ratio State

Therefore, based on the analysis of the 2011 Census data for the given options, Chhattisgarh stands out as the state with the highest child sex ratio.

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36. **Answer: c**

Explanation:

Understanding the Chipko Movement's Core Purpose

The **Chipko movement**, which gained prominence in the Indian Himalayas during the 1970s, was a significant grassroots environmental movement. The question asks about the main issue that this movement was opposing. Understanding the historical context and objectives of the **Chipko movement** helps clarify its primary focus.

The Central Issue: Combating Deforestation

The term 'Chipko' translates to 'to hug' in Hindi, reflecting the unique method employed by the protestors. The movement's participants, predominantly women from rural communities, would physically embrace trees to prevent them from being felled by forest contractors. This direct action was a protest against the widespread commercial logging that was causing extensive **deforestation** in the ecologically sensitive Himalayan region.

The villagers relied heavily on forest resources for their sustenance, including timber for fuel, fodder for livestock, and other essential materials. The government's policy of granting contracts for tree felling to commercial interests threatened these traditional livelihoods and disrupted the local ecosystem. Thus, the movement's primary goal was to halt **deforestation** and promote afforestation and sustainable forest management.

Analysis of Other Options

While environmental issues are often interconnected, the Chipko movement's specific actions and demands centered on tree felling:

- **Water pollution:** Although forests play a role in maintaining water quality, the Chipko movement did not directly campaign against industrial or agricultural water pollution.
- **Noise pollution:** This form of pollution was not the concern addressed by the Chipko activists. Their focus was on the physical destruction of forests.
- **Cultural pollution:** While the movement inherently involved preserving a way of life connected to the forest and empowered local communities, its core protest was against the tangible environmental damage caused by logging, not against abstract 'cultural pollution'.

Conclusion: Chipko Movement's Primary Opposition

In essence, the **Chipko movement** was a powerful stand against the destruction of forests and the associated environmental degradation and socio-economic impacts. The key issue it tackled was **deforestation**.

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37. **Answer: c**

Explanation:

Eco Mark: Identifying Environmentally Friendly Indian Products

The 'Eco Mark' is a certification label used in India. It is awarded to products that meet specific environmental criteria set by the government. The primary goal of this scheme is to encourage consumers to choose products that have a lower impact on the environment throughout their entire lifecycle.

Understanding the Eco Mark Criteria

The Bureau of Indian Standards (BIS) is responsible for implementing the Eco Mark scheme. Products are assessed to ensure they are environmentally conscious. The evaluation focuses on various aspects, including:

- **Resource Conservation:** Assessing the use of raw materials, energy, and water during production.
- **Pollution Prevention:** Evaluating the potential for pollution during manufacturing and the product's use phase.
- **Waste Management:** Considering the product's disposability, biodegradability, and potential for recycling.
- **Reduced Hazardous Content:** Limiting the presence of harmful substances in the product.

Essentially, the 'Eco Mark' signifies that a product is more environmentally sound compared to conventional alternatives in the same category.

Analyzing the Options for Eco Mark Products

Let's review the given options in the context of the 'Eco Mark' scheme:

- **Pure and unadulterated:** While desirable, purity is not the main focus of the 'Eco Mark'. The scheme prioritizes environmental sustainability over simple purity.
- **Rich in proteins:** This characteristic relates to nutritional value, typically for food items, and is unrelated to the environmental standards required for 'Eco Mark' certification.
- **Environment friendly:** This option directly reflects the purpose of the 'Eco Mark'. It certifies products that are designed to minimize harm to the environment.
- **Economically viable:** Economic feasibility is important for any product, but it's not the basis for awarding the 'Eco Mark'. The certification is strictly based on environmental performance.

Eco Mark's Focus on Environmental Friendliness

The 'Eco Mark' scheme is specifically designed to highlight products that are manufactured, used, and disposed of in a way that is considerate of the environment. Therefore, Indian products that are certified with the 'Eco Mark' are recognized for being

environment friendly.

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38. Answer: b

Explanation:

Locating the National Institute for the Visually Handicapped

This section provides information about the location of the **National Institute for the Visually Handicapped (NIVH)**. Understanding the locations of key national institutes is important for various academic and research purposes.

Significance of the National Institute for the Visually Handicapped

The **National Institute for the Visually Handicapped (NIVH)** is a crucial organization dedicated to the rehabilitation, education, and empowerment of individuals with visual impairments. Established to provide comprehensive services and promote opportunities, its location is a key piece of information regarding its accessibility and operational base.

Determining the Correct Location

The **National Institute for the Visually Handicapped** is primarily situated in **Dehradun**, the capital city of Uttarakhand. This institute plays a vital role in offering training, developing resources, and conducting research related to visual disabilities. Its establishment in Dehradun makes it a significant center for specialized services in Northern India.

Analysis of Options

Let's consider the provided options:

- **Kolkata:** While Kolkata is a major city with several prominent institutions, the National Institute for the Visually Handicapped is not located there.
- **Dehradun:** This is the correct location for the National Institute for the Visually Handicapped.
- **Mumbai:** Mumbai, a major financial hub, hosts many national organizations, but NIVH is not based in Mumbai.
- **Hyderabad:** Hyderabad is known for its educational and technological institutions, but it is not the location of the NIVH.

The institute's presence in **Dehradun** facilitates its mission to serve the community effectively.

---

39. Answer: a

Explanation:

Maintaining India's Foreign Exchange Reserve

Understanding who manages the **foreign exchange reserve** in India is crucial for comprehending the country's financial system and its interaction with the global economy. The **foreign exchange reserve** refers to the assets held by a nation's central bank (in India, the Reserve Bank of India) in foreign currencies. These reserves act as a buffer against economic shocks and are vital for maintaining stability.

Role of the Reserve Bank of India (RBI)

The **Reserve Bank of India (RBI)** is the principal institution responsible for maintaining and managing India's **foreign exchange reserve**. Key aspects of the RBI's role include:

- **Custodianship:** The RBI acts as the custodian of the country's forex reserves. It holds the reserves in various forms, including foreign currency assets, gold, special drawing rights (SDRs), and reserve tranche position in the International Monetary Fund (IMF).
- **Management:** The RBI manages these reserves to ensure price stability, maintain confidence in monetary policy, and facilitate international trade and payments.
- **Legal Mandate:** The RBI's authority to manage forex reserves stems from the Reserve Bank of India Act, 1934, and is further elaborated under the Foreign Exchange Management Act (FEMA), 1999.
- **Intervention:** The RBI uses the reserves to intervene in the foreign exchange market to manage the volatility of the Indian Rupee's exchange rate.

Analysis of Other Options

Let's look at why the other options are not the primary entities maintaining the overall foreign exchange reserve:

- **State Bank of India (SBI):** While SBI is the largest public sector bank and deals in foreign exchange transactions, it operates as a commercial bank. It does not maintain the nation's aggregate foreign exchange reserves; this role is exclusive to the central bank.
- **Ministry of Finance, Government of India:** The Ministry of Finance formulates economic policies, including those related to foreign exchange. However, the operational management and maintenance of the reserves are carried out by the RBI, acting on behalf of the government.
- **Export - Import Bank of India (Exim Bank):** Exim Bank focuses on providing financial assistance and services for India's foreign trade, including export credits and financing. Its operations are related to foreign exchange but it does not hold or manage the country's official foreign exchange reserves.

Conclusion

Based on its statutory duties and role within the Indian financial system, the **Reserve Bank of India** is solely responsible for the maintenance and management of the nation's **foreign exchange reserve**.

---

40. **Answer: c**

Explanation:

India's Pioneering Family Planning Programme Adoption

The question asks to identify the very first country to officially adopt a national family planning programme. This involves understanding the history of public health policies related to population and reproductive health worldwide.

Historical Context of Family Planning Programmes

Family planning programmes aim to provide individuals and couples with information and means to decide freely and responsibly the number and spacing of their children. Several countries have implemented policies related to family planning over time, but the official government adoption as a national programme marks a significant policy shift.

Analysis of Country Adoptions

Let's examine the timeline for the given options regarding the official adoption of family planning programmes:

- **India:** India holds the distinction of being the first country in the world to launch a state-sponsored, official **family planning programme** in 1952. This initiative was primarily driven by concerns about rapid population growth and its impact on national resources and public health, particularly maternal and child health. The programme was integrated into the First Five-Year Plan.

- **USA:** While the United States saw significant developments in private birth control movements and advocacy throughout the 20th century, and later government funding for family planning services (like Title X established in 1970), it did not officially adopt a national family planning programme as early as India. Early federal involvement was often indirect or focused on specific health contexts rather than a comprehensive national strategy from the 1950s.
- **Brazil:** Brazil's approach to family planning evolved significantly over the latter half of the 20th century. Official government support and widespread public programmes for family planning became more prominent later than India's initial adoption, often influenced by changing demographic trends and international discourse.
- **China:** China's widely known family planning policies, such as the "One-Child Policy", were implemented much later, starting around 1979-1980. While China has had policies influencing population dynamics for a long time, the official, large-scale national programme structure focused on limiting births came significantly after India's initiative.

Conclusion on Official Adoption

Based on historical records, India was the first nation to officially recognise the need for and implement a government-backed national family planning programme. This pioneering move in 1952 set a precedent for other countries grappling with similar population and health challenges.

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41. **Answer: c**

Explanation:

Understanding Electricity Generation Sources in India for Sustainable Development

The question asks us to identify the best source for generating electricity in India, specifically considering the goals of **sustainable development**. Sustainable development means meeting the needs of the present without compromising the ability of future generations to meet their own needs. When choosing an electricity source, we look at factors like resource availability, environmental impact (especially pollution and greenhouse gases), long-term viability, and economic feasibility.

Analyzing Options for Sustainable Electricity Generation

Let's examine each option provided:

- **Coal:** India relies heavily on coal for electricity. However, coal is a **fossil fuel** and is non-renewable. Burning coal releases significant amounts of greenhouse gases (like carbon dioxide, CO_2) contributing to climate change and other pollutants causing air pollution. This makes it unsustainable in the long run.
- **Mineral Oil and Gas:** Similar to coal, oil and natural gas are **fossil fuels**. They are also non-renewable resources. Their combustion releases greenhouse gases and pollutants. While cleaner than coal in some aspects, they are still not considered the best option for long-term sustainable development due to resource depletion and environmental concerns.
- **Hydroelectricity:** This method generates electricity using the power of moving water, typically from dams. Water is a renewable resource, replenished by the natural water cycle. Hydroelectric power plants do not emit greenhouse gases during operation, making them a cleaner alternative to fossil fuels. While building large dams can have environmental and social impacts (like ecosystem changes and displacement of people), the operational phase is relatively clean and the resource is renewable. This aligns well with the principles of **sustainable development**.
- **Atomic Energy:** Atomic energy, or nuclear power, generates electricity through nuclear reactions. It produces very low greenhouse gas emissions during operation, which is a benefit for climate change mitigation. However, concerns regarding the safe disposal of radioactive waste, the risk of accidents, and the finite supply of nuclear fuel (like uranium) raise questions about its long-term sustainability compared to truly renewable sources.

Best Source for Sustainable Development in India

Comparing the options based on sustainability:

- Fossil fuels (Coal, Oil, Gas) are non-renewable and have significant environmental impacts.

- Atomic energy offers low operational emissions but faces challenges with waste disposal and fuel availability.
- **Hydroelectricity** utilizes a renewable resource (water) and has minimal operational emissions. Despite potential environmental impacts from infrastructure, it represents a more sustainable pathway for energy generation in India compared to the other options listed, especially from a long-term environmental and resource perspective.

Therefore, from the viewpoint of **sustainable development**, **hydroelectricity** is considered the best option among those provided for generating electricity in India.

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42. Answer: a

Explanation:

Understanding Sustainable Development and Inter-Generational Sensibility

The question asks about the core aspect of **sustainable development**, specifically focusing on "inter-generational sensibility" regarding the **use of** certain resources. **Sustainable development** is a widely accepted approach to progress that aims to meet the needs of the present population without jeopardizing the ability of future generations to meet their own needs. This concept is deeply rooted in the idea of fairness across different generations, often referred to as "inter-generational equity" or, as stated in the question, "inter-generational sensibility."

Inter-generational sensibility means we must consider how our actions today, particularly our consumption and management of resources, will impact the environment and opportunities available for people in the future. This requires careful thought about resource depletion, environmental damage, and preserving ecological balance.

Analyzing Resource Use in Sustainable Development

Let's examine the different types of resources mentioned in the options to understand which one is most central to the concept of inter-generational sensibility in sustainable development:

- **Natural Resources:** These are resources that exist in nature and are essential for life and development. Examples include water, air, forests, soil, minerals, and fossil fuels. Many natural resources are finite, and even renewable ones (like forests and water) can be depleted or degraded if not managed properly. The use and management of these resources directly affect the environment and the availability of resources for future generations. Therefore, ensuring the sustainable use of **natural resources** is fundamental to achieving **sustainable development**.
- **Material Resources:** This is a broad category that includes both natural resources and manufactured goods. While important, the term is less specific than "natural resources" when discussing the core principle of inter-generational impact from nature's provisions.
- **Industrial Resources:** These refer specifically to resources used within industrial processes. While industry relies heavily on natural resources, focusing solely on "industrial resources" misses the broader scope of inter-generational impact on all aspects of the natural environment.
- **Social Resources:** These encompass aspects like community structures, social capital, institutions, and human well-being. While crucial for development, the primary focus of inter-generational *resource use* in the context of environmental limits relates more directly to the natural world.

Conclusion on Inter-Generational Resource Use

The principle of inter-generational sensibility in **sustainable development** is most directly concerned with the responsible management and use of **natural resources**. Our consumption patterns today, especially concerning non-renewable resources like fossil fuels or the over-exploitation of renewable resources like forests and fisheries, directly determine the environmental quality and resource availability for future generations. Preserving these **natural resources** ensures that future populations have the means to meet their own needs, embodying the core idea of inter-generational equity.

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43. **Answer: b**

Explanation:

Air Pollutant Matching Quiz

This question requires matching specific air pollutants presented in List - I with the primary body part they affect, as listed in List - II. Understanding the health impacts of these common **air pollutants** is key to environmental health knowledge.

Asbestos Dust and Lung Effects Explained

Asbestos dust (A) consists of microscopic fibers that, when inhaled, can penetrate deep into the lungs. Over time, this exposure can lead to severe lung diseases, including asbestosis (a condition characterized by lung scarring) and significantly increases the risk of developing lung cancer and mesothelioma. Therefore, the primary organ affected by **asbestos dust** is the **Lung (3)**.

Lead Exposure and Brain Impact Explained

Lead (B) is a toxic heavy metal known for its detrimental effects on the nervous system, particularly the brain. Lead exposure, especially in young children, can disrupt brain development, leading to lasting cognitive impairments, reduced IQ, learning difficulties, and behavioral problems. The **Brain (1)** is the main target organ for lead toxicity.

Mercury Effects on Stomach Detailed

Mercury (C) exposure can cause various health issues depending on the form and route of exposure. While mercury is widely recognized for causing neurological damage (affecting the brain and nervous system), the ingestion of certain mercury compounds can irritate the gastrointestinal tract and potentially affect the stomach lining or function. Following the provided matching options, mercury is linked to the **Stomach (2)**.

Carbon Monoxide and Bloodstream Interaction Explained

Carbon Monoxide (D) is a dangerous gas because it interferes with the oxygen-carrying capacity of the blood. It binds to hemoglobin molecules in red blood cells with much greater affinity than oxygen does, forming carboxyhemoglobin. This reduces the amount of oxygen delivered to the body's tissues and organs. The impact is primarily on the **Bloodstream (4)**, specifically impairing its oxygen transport function.

Correct Matches Summary

Summarizing the effects of each pollutant based on the lists provided:

- Asbestos dust (A) primarily affects the Lung (3).
- Lead (B) primarily affects the Brain (1).
- Mercury (C) has effects linked to the Stomach (2) in the context of this question's provided matches.
- Carbon Monoxide (D) primarily affects the Bloodstream (4) by impairing oxygen transport.

List - I (Air Pollutant)	List - II (Part Affected)
(A) Asbestos dust	(3) Lung
(B) Lead	(1) Brain
(C) Mercury	(2) Stomach
(D) Carbon Monoxide	(4) Bloodstream

These pairings confirm the correct option selection based on the established effects of these **air pollutants** on human health, matching **Asbestos dust** to the **Lung**, **Lead** to the **Brain**, **Mercury** to the **Stomach**, and **Carbon Monoxide** to the **Bloodstream**.

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44. **Answer: a**

Explanation:

Understanding the United Nations Convention on Climate Change Effective Date

The question asks for the date when the United Nations Convention on Climate Change (UNFCCC) became effective after being ratified by more than 50 countries. The UNFCCC is a landmark international environmental treaty negotiated at the Earth Summit in Rio de Janeiro in 1992.

Key Details of the UNFCCC

To understand when the convention became effective, let's look at the timeline:

- **Adoption:** The UNFCCC was adopted by consensus on May 9, 1992, in New York.
- **Opening for Signature:** It was opened for signature on June 20, 1992, at the Rio Earth Summit.
- **Entry into Force:** A crucial step for any treaty is its entry into force, which makes it legally binding. For the UNFCCC, this required ratification, acceptance, approval, or accession by at least 50 countries. After meeting this requirement, the convention officially became effective on **March 21, 1994**.

Determining the Effective Date

The convention needed a minimum number of countries to formally agree to be bound by its terms. Once the 50th country completed its ratification process, the treaty entered into force 90 days later. This milestone date was March 21, 1994. This date signifies the official start of the UNFCCC framework, guiding international efforts to combat climate change.

Therefore, the United Nations Convention on Climate Change became effective on **March 21, 1994**.

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45. **Answer: d**

Explanation:

Understanding Greenhouse Gases and Atmospheric Composition

This question asks us to identify which gas from the given list does **not** function as a greenhouse gas. Greenhouse gases are vital because they trap heat in Earth's atmosphere, maintaining a habitable temperature. However, an excess of these gases can lead to global warming.

Common Greenhouse Gases Explained

Let's examine the gases typically involved in the greenhouse effect:

- **Carbon dioxide** (CO_2): Carbon dioxide is a major greenhouse gas. While it occurs naturally, human activities like burning fossil fuels and deforestation have drastically increased its atmospheric concentration. It effectively absorbs and emits infrared radiation, contributing significantly to warming.
- **Methane** (CH_4): Methane is another potent greenhouse gas, much more effective at trapping heat than CO_2 over shorter periods. It originates from sources such as agriculture (livestock, rice paddies), natural gas leaks, and decomposing organic waste.

- **Nitrous oxide** (N_2O): This gas is released mainly through agricultural practices (like fertilizer use), industrial processes, and the burning of fossil fuels. Nitrous oxide is also a powerful greenhouse gas and has a long atmospheric lifetime.

Identifying the Gas That Is NOT a Greenhouse Gas

Now, let's consider the final option:

- **Nitrogen** (N_2): Nitrogen gas is the most abundant gas in Earth's atmosphere, making up roughly 78%. Despite its prevalence, it is **not** classified as a greenhouse gas. The reason lies in its molecular structure. Nitrogen exists as a diatomic molecule (N_2) with a very stable triple bond between the two nitrogen atoms ($N \equiv N$). This strong bond and molecular symmetry mean that N_2 molecules do not absorb thermal infrared radiation (heat) effectively. Greenhouse gases typically have molecular structures that allow them to vibrate in ways that absorb and re-emit infrared energy, thus trapping heat. Nitrogen gas does not possess this capability.

In summary, while CO_2, CH_4, and N_2O possess molecular structures that enable them to absorb and re-emit infrared radiation, N_2 does not, rendering it ineffective as a greenhouse gas.

Atmospheric Composition Overview

Major Atmospheric Gases and Greenhouse Properties

Gas	Formula	Approx. Atmospheric Percentage	Greenhouse Gas?
Nitrogen	N_2	78%	No
Oxygen	O_2	21%	No
Argon	Ar	0.9%	No
Carbon Dioxide	CO_2	~0.04%	Yes
Methane	CH_4	Trace	Yes
Nitrous Oxide	N_2O	Trace	Yes

Based on this analysis, **Nitrogen** is the correct answer as it is not a greenhouse gas.

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46. **Answer: b**

Explanation:

Naihati's Significance and the Rail Budget Announcement

The question links the town of **Naihati** to a specific announcement made in the **Rail Budget 2012-13** concerning the establishment of a rail coach factory and a museum. The core of the question, however, is to identify the renowned personality whose birthplace is **Naihati**.

Identifying the Birthplace of Key Figures

To answer this question correctly, we need to examine the birthplaces of the individuals mentioned in the options:

- **Rabindranath Tagore**: The celebrated poet and Nobel laureate was born in **Calcutta** (now Kolkata), specifically at the Jorasanko Thakur Bari.
- **Bankim Chandra Chattopadhyaya**: The distinguished novelist, poet, and composer of the national song 'Vande Mataram' was born in **Naihati**, North 24 Parganas district, West Bengal.
- **Subhas Chandra Bose**: The prominent leader of the Indian independence movement was born in **Cuttack**, Odisha.

- **Swami Vivekanand**: The influential spiritual leader and philosopher was born in **Calcutta** (now Kolkata).

Confirmation of Birthplace

Based on historical records and biographical information, **Bankim Chandra Chattopadhyaya** is the personality among the choices provided who was born in **Naihati**. Naihati is indeed recognized as his birthplace.

The context provided about the Rail Budget 2012-13 highlights Naihati's relevance in development plans, but the question specifically tests knowledge about famous personalities associated with the town through their birthplace.

Therefore, **Naihati** is famously known as the birthplace of **Bankim Chandra Chattopadhyaya**.

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47. **Answer: d**

Explanation:

Last Century Earth Temperature Increase

The Earth's climate has been undergoing changes, and a significant aspect of this is the rise in global average temperatures. This warming trend, often discussed in the context of climate change, is monitored closely by scientists worldwide. Understanding the extent of this temperature increase over specific time frames, such as the last century, helps us grasp the scale of the changes happening to our planet.

The "last century" typically refers to the period from the early 1900s to the early 2000s. During this time, various factors, including increased greenhouse gas emissions from human activities, have contributed to warming the planet's surface. This warming isn't uniform across the globe; some areas warm more than others, but scientists calculate a global average to represent the overall trend.

Average Temperature Rise: The Value

Based on comprehensive analysis of climate data collected over many decades, scientists have determined the average increase in Earth's surface temperature during the 20th century (the last century). This average synthesizes temperature readings from weather stations, ships, and satellites across the planet.

The consensus among climate scientists, supported by major scientific organizations, indicates that the average global temperature increase over the last century was approximately:

- 0.9 degrees Celsius

This figure of 0.9 degrees Celsius represents the overall warming trend observed when comparing the average global temperature of the last century to previous periods. It serves as a key indicator of the impact human activities and natural variations have had on the planet's climate system.

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48. **Answer: d**

Explanation:

Understanding Global Atmosphere Watch Stations

The question asks to identify which country among the options does not have a global atmosphere watch station specifically for collecting data on world temperatures. Let's explore the context of such stations.

The **Global Atmosphere Watch (GAW)** programme is a key initiative by the World Meteorological Organization (WMO). Its primary mission is to monitor and assess the state of and long-term trends in the Earth's atmosphere. This includes critical components like:

- Greenhouse gases (e.g., Carbon Dioxide - CO_2, Methane - CH_4)
- Ozone layer concentrations
- Atmospheric aerosols (small particles suspended in the air)
- Reactive gases
- Ultraviolet (UV) radiation

These measurements help scientists understand atmospheric changes, air pollution, and their impact on climate.

Role of Temperature Data in Atmospheric Monitoring

While the GAW programme's main focus is atmospheric composition, many GAW stations are located at sites that also perform standard meteorological observations. These often include measurements of surface temperature, humidity, air pressure, and wind speed. Collecting temperature data is vital for:

- Understanding climate variability and change
- Validating climate models
- Studying the interaction between atmospheric composition and climate

Therefore, stations involved in global atmospheric monitoring, including GAW sites, frequently contribute to the global network of temperature data collection.

Analysis of Countries Mentioned

We need to consider the involvement of Algeria, Brazil, Kenya, and India in global atmospheric monitoring networks:

- **Algeria:** Algeria participates in international atmospheric monitoring and hosts stations that contribute data to global networks.
- **Brazil:** Brazil has significant atmospheric monitoring activities, including GAW-related stations, particularly important for understanding atmospheric processes in the Amazon basin and their global impact.
- **Kenya:** Kenya is involved in global atmospheric monitoring efforts and operates stations that provide crucial data from the East African region.
- **India:** India, through the India Meteorological Department (IMD) and other research institutions, actively participates in global atmospheric and meteorological observation programs. India hosts several GAW stations and numerous meteorological observatories that collect temperature data as part of national and international efforts.

Context of the Question

The question specifically asks about a "global atmosphere watch station to collect data on world temperatures". While all the listed countries contribute to global atmospheric monitoring, and stations within these countries typically collect temperature data, the classification or designation of a station as specifically a "global atmosphere watch station" *for temperature* might be interpreted differently. India is a significant contributor to global climate and atmospheric data collection through various channels coordinated with international bodies like the WMO.

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49. **Answer: b**

Explanation:

World Environment Day Celebration Date Explained

World Environment Day is an important global observance dedicated to encouraging worldwide action to protect our environment. Identifying the correct date for its celebration is key to participating in and supporting environmental initiatives.

Understanding the Significance of June 5

The specific date chosen for World Environment Day is **June 5**. This date was established by the United Nations General Assembly in 1972 when the landmark Stockholm Conference on the Human Environment took place. This conference was the first major UN conference on international environmental issues and marked a significant step in raising global awareness about environmental problems.

Purpose of World Environment Day

The primary goal of World Environment Day is to:

- Raise awareness about environmental issues such as pollution, climate change, deforestation, and biodiversity loss.
- Encourage governments, businesses, and individuals worldwide to actively participate in environmental protection efforts.
- Promote sustainable practices and inspire positive change for a healthier planet.

Each year, the day focuses on a specific theme, drawing attention to pressing environmental concerns and mobilizing action. It serves as a reminder of our collective responsibility towards environmental stewardship.

Analyzing the Options

Let's look at why the other options are not the correct date for World Environment Day:

- **December 1:** This date is associated with World AIDS Day.
- **November 14:** This date is celebrated as Children's Day in India.
- **August 15:** This date is celebrated as Indian Independence Day.

Therefore, the correct date for celebrating World Environment Day is **June 5**.

---

50. **Answer: c**

Explanation:

This question requires identifying the incorrectly matched pair between a specific institute and its location. Let's examine each option to verify the correctness of the pairings.

CES Bengaluru Match Verification

The **Centre for Ecological Sciences (CES)** is a research center located at the Indian Institute of Science (IISc) in **Bengaluru**, India. This pairing is correct.

Wildlife Institute Dehradun Match Verification

The **Wildlife Institute of India (WII)** is a premier autonomous institution funded by the Ministry of Environment, Forest and Climate Change, Government of India. It is located in **Dehradun**, Uttarakhand. This pairing is correct.

Indian Institute of Forest Kolkata Match Verification

The question lists the **Indian Institute of Forest** matched with **Kolkata**. This appears to be an incorrect match. The prominent institute focusing on forest management is the **Indian Institute of Forest Management (IIFM)**, which is located in **Bhopal**, Madhya Pradesh. While Kolkata hosts important organizations like the Botanical Survey of India and Zoological Survey of India, it does not host the primary Indian Institute of Forest Management. Therefore, this specific pairing is incorrect.

G.B. Pant Institute Almora Match Verification

The **G.B. Pant Institute of Himalayan Environment and Development (GBPIHED)** is an autonomous research institute established by the Ministry of Environment, Forest and Climate Change. Its main campus is located in **Kosi-Katarmal, Almora**, Uttarakhand. This pairing is correct.

Conclusion on Incorrect Match

Based on the verification of each option, the pairing of the **Indian Institute of Forest** with **Kolkata** is the one that is not correctly matched. The correct location for the main institute of this type (Indian Institute of Forest Management) is Bhopal.

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51. **Answer: b**

Explanation:

Matching Biosphere Sites with Establishment Years

This question requires matching specific **Biosphere sites** from List-I with their respective **Year of setting up** from List-II. Understanding the establishment timeline for these significant ecological zones is key to selecting the correct option.

Key Establishment Years for Biosphere Sites

We will go through each Biosphere site mentioned in List-I and identify its corresponding establishment year from List-II to establish the correct pairings.

- **Nilgiri Biosphere Reserve**: This region, known for its biodiversity in the Western Ghats, was established as a Biosphere Reserve in **1986**.
- **Nanda Devi Biosphere Reserve**: Located in the Himalayas, the Nanda Devi Biosphere Reserve was set up in **1988**.
- **Sunderban Biosphere Reserve**: This unique mangrove ecosystem was designated as a Biosphere Reserve in **1989**.
- **Kanchanjunga Biosphere Reserve**: Situated in Sikkim, the Kanchanjunga Biosphere Reserve was established in the year **2000**.

Summary Table of Biosphere Site Matches

The correct matches between the Biosphere sites and their establishment years are as follows:

List - I (Biosphere Site)	List - II (Year of Setting Up)
(A) Nilgiri	1986
(B) Nanda Devi	1988
(C) Sunderban	1989
(D) Kanchanjunga	2000

Determining the Correct Option for Biosphere Sites

Based on the established pairings:

- (A) Nilgiri matches with the year 1986.
- (B) Nanda Devi matches with the year 1988.
- (C) Sunderban matches with the year 1989.
- (D) Kanchanjunga matches with the year 2000.

Translating these matches into the given codes:

- (A) corresponds to 1986 (which is option 4 in List-II).
- (B) corresponds to 1988 (which is option 3 in List-II).
- (C) corresponds to 1989 (which is option 2 in List-II).
- (D) corresponds to 2000 (which is option 1 in List-II).

Therefore, the correct sequence is A - 4, B - 3, C - 2, D - 1.

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52. **Answer: d**

Explanation:

Wetlands: Key Ecosystem Functions

Wetlands serve as highly valuable ecosystems, performing essential functions that benefit the environment. This explanation explores the various uses of wetlands, focusing on nutrient management, heavy metal processing, and sediment control.

Nutrient Recovery and Cycling in Wetlands

Wetlands play a critical role in managing water quality through nutrient recovery and cycling.

- **Filtering Nutrients:** Wetlands act as natural filters, intercepting excess nutrients like nitrogen and phosphorus often found in runoff from agricultural land or urban areas.
- **Biological Uptake:** The plants, algae, and microorganisms within wetlands absorb these excess nutrients. They utilize them for growth or transform them through natural processes, effectively removing them from the water column. This contributes to preventing eutrophication (excessive nutrient enrichment) in downstream rivers and lakes.

Heavy Metal Absorption by Wetland Plants

Wetlands contribute to environmental remediation, including the management of heavy metals.

- **Phytoremediation Potential:** Specific plants found in wetlands possess the ability to absorb and accumulate heavy metals from contaminated water and soil. This natural process is known as phytoremediation.
- **Metal Sequestration:** While plants absorb heavy metals, removing them from the water, the metals are stored within the plant tissues. Upon the plant's decomposition, these metals can be retained in the wetland soil, effectively sequestering them within the ecosystem. This absorption process helps to immobilize the metals and prevent their immediate release into flowing water systems, thus mitigating pollution.

Reducing Siltation by Retaining Sediments

Wetlands are essential for maintaining the health and navigability of rivers and streams by controlling sediment loads.

- **Natural Sediment Traps:** The vegetation and structure of wetlands slow down the flow of water. This reduction in water speed causes suspended sediments, such as silt, sand, and mud, to settle out of the water and become trapped within the wetland.
- **Preventing River Siltation:** By effectively **retaining sediments**, wetlands significantly reduce the amount of silt that reaches rivers. This process is crucial for **reducing siltation**, which is the gradual filling of riverbeds with sediment, potentially leading to reduced water depth, altered flow patterns, and habitat degradation.

Comprehensive Benefits of Wetlands

In summary, wetlands offer multiple essential ecosystem services. They are vital for nutrient recovery and cycling, contribute to managing heavy metals through plant absorption, and play a key role in reducing river siltation by trapping sediments. These

combined functions highlight the significant utility of wetlands as ecosystems.

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53. **Answer: b**

Explanation:

Understanding India's Biodiversity Hot Spots

A biodiversity hot spot is a biogeographic region that is both a significant reservoir of biodiversity and is threatened with destruction. These regions are critical for conservation efforts worldwide. India is home to several such ecologically vital areas.

The question asks us to identify which regions of India among the given options have been designated as biodiversity hot spots. Let's examine each region:

Analysis of Indian Biodiversity Hot Spots

- **Eastern Himalaya:** This region is renowned for its exceptional biodiversity and high levels of endemism. It covers a vast area encompassing the northeastern states of India, Bhutan, Nepal, and parts of southern China. The Eastern Himalaya is globally recognized as one of the major biodiversity hot spots due to its unique flora and fauna and the significant threats it faces.
- **Eastern Ghat:** The Eastern Ghats are an ancient mountain range running parallel to the eastern coast of India. While they possess unique ecological characteristics and harbor specific endemic species, they are generally not classified among the primary, globally recognized biodiversity hot spots in the same category as the Western Ghats or the Eastern Himalaya.
- **Western Ghat:** The Western Ghats form a mountain range along the western coast of India, spanning approximately 1,600 kilometers. This region is celebrated for its extraordinary biodiversity, including a large number of endemic species of plants, animals, and fungi. The Western Ghats are a well-established and internationally recognized biodiversity hot spot, facing significant anthropogenic pressures.
- **Western Himalaya:** The Himalayan mountain range as a whole is considered a significant biogeographical zone with rich biodiversity. However, in the context of specific hot spot designations often used in India, the focus is typically on the Western Ghats and the Eastern Himalaya (Northeast India). While parts of the Western Himalaya are included in the broader Himalayan hotspot definition, the question likely refers to the commonly cited distinct hot spots within India.

Conclusion on Designated Hot Spots

Based on the established definitions and recognition of biodiversity hot spots, the Eastern Himalaya and the Western Ghats are the two regions listed that are prominently designated as such.

Therefore, the correct combination includes the Eastern Himalaya (1) and the Western Ghats (3).

Identifying the Correct Option

Considering the analysis:

- Region 1 (Eastern Himalaya) is a biodiversity hot spot.
- Region 2 (Eastern Ghat) is generally not classified as a primary hot spot.
- Region 3 (Western Ghat) is a biodiversity hot spot.
- Region 4 (Western Himalaya) is part of a larger hotspot system but often distinguished from the specific Indian regions commonly cited.

The option that correctly identifies the designated biodiversity hot spots from the list is the one including Region 1 and Region 3.

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54. **Answer: c**

Explanation:

Understanding Non-Biotic Pollutants in Underground Water

Water pollution occurs when harmful substances contaminate water bodies, impacting their usability and the health of ecosystems. **Underground water**, also referred to as groundwater, is a crucial resource for drinking and irrigation. Pollutants can infiltrate groundwater from surface activities or geological sources. These contaminants are broadly categorized as either **biotic** or **non-biotic**.

Biotic pollutants are contaminants that consist of or originate from living organisms. These primarily include microorganisms such as bacteria, viruses, protozoa, and sometimes larger organisms like algae. Their presence often indicates contamination from sewage, agricultural waste, or decaying organic matter and can lead to various waterborne diseases.

Non-biotic pollutants, conversely, are contaminants that are not living organisms. They are typically chemical substances, heavy metals, radioactive elements, sediments, or other inorganic materials. These can enter groundwater naturally through rock formations or be introduced through human activities like industrial discharges, mining operations, agriculture (pesticides, fertilizers), and improper waste disposal.

Detailed Analysis of Options for Underground Water Pollutants

To identify the non-biotic pollutant, let's evaluate each option provided:

- **Bacteria**: Bacteria are single-celled microorganisms, which are living entities. Therefore, bacteria are classified as **biotic pollutants** when found in water, often associated with fecal contamination and causing health issues.
- **Algae**: Algae are a group of aquatic photosynthetic organisms, ranging from single-celled to multicellular forms. They are living organisms and thus fall under the category of **biotic pollutants**. Excessive algal growth, often stimulated by nutrient pollution, can degrade water quality.
- **Arsenic**: Arsenic is a chemical element with the symbol As. It is a naturally occurring metalloid found in the Earth's crust. When present in groundwater, it acts as a chemical contaminant. Since Arsenic is an element and not a living organism, it is classified as a **non-biotic pollutant**. Groundwater contamination by Arsenic is a serious health concern due to its toxicity.
- **Viruses**: Viruses are infectious biological entities, significantly smaller than bacteria. They are considered living organisms (or at least biological agents) and are thus classified as **biotic pollutants**. They can cause diseases when ingested through contaminated water.

Conclusion: Identifying the Non-Biotic Pollutant

Based on the definitions and analysis:

- Bacteria: Biotic
- Algae: Biotic
- Arsenic: Non-Biotic
- Viruses: Biotic

The question asks for the **non-biotic pollutant** of underground water. Among the choices provided, **Arsenic** is the only non-biotic (chemical) pollutant. The others, Bacteria, Algae, and Viruses, are all living organisms or biological entities.

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55. **Answer: a**

Explanation:

Lichens as Bioindicators of Air Pollution

Lichens are fascinating organisms, known scientifically as composite organisms arising from algae or cyanobacteria living among filaments of multiple fungi species in a symbiotic relationship. They are crucial in ecology and serve as excellent biological indicators, particularly for environmental changes.

Understanding Lichens and Their Environment

Unlike plants that have roots to absorb water and nutrients from the soil and leaves to protect themselves, lichens lack these structures. Instead, they absorb water and nutrients directly from the atmosphere through their entire surface. This unique characteristic makes them extremely vulnerable to airborne substances, including pollutants.

Why Lichens Indicate Air Pollution

The sensitivity of lichens to air quality makes them effective monitors of **air pollution**. Here's why:

- **Direct Absorption:** Lichens absorb water and nutrients directly from rainfall and atmospheric particles. This means any pollutants present in the air are readily absorbed by the lichen.
- **Sensitivity to Pollutants:** Certain atmospheric pollutants, such as sulfur dioxide (SO_2), nitrogen oxides (NO_x), and heavy metals, can severely damage or kill lichens even at low concentrations.
- **Lack of Protective Structures:** They lack the protective layers (like a waxy cuticle found on plant leaves) or root systems that might filter out or mitigate the effects of pollutants.
- **Visible Impact:** Air pollution negatively affects lichens in several ways:
  - Changes in colour (discoloration).
  - Reduced growth rate.
  - Damage to the fungal or algal partners.
  - In severe cases, the death of the lichen.
- **Species Distribution:** Different lichen species have varying sensitivities. In areas with high air pollution, sensitive species tend to disappear, while only the more tolerant species may survive. Monitoring the diversity and abundance of lichen species can therefore indicate the level of air pollution.

Lichens and Other Pollutions

While lichens are excellent indicators of air quality, they are not typically used as primary indicators for other types of pollution:

- **Water Pollution:** Lichens interact mainly with the atmosphere. Their direct exposure to water bodies is limited, making them less suitable for indicating water pollution compared to aquatic organisms.
- **Soil Pollution:** Although lichens can grow on soil, their primary dependence on atmospheric inputs means they reflect air quality more directly than soil conditions. Organisms living within the soil are better indicators of soil pollution.
- **Noise Pollution:** Lichens do not possess any biological mechanism to sense or react to sound waves. Therefore, they cannot serve as indicators of noise pollution.

Conclusion

Based on their physiology and direct reliance on atmospheric conditions, lichens are widely recognized as the best bioindicators specifically for **air pollution**. Their presence, abundance, and health status provide valuable information about the quality of the air in a given environment.

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56. **Answer: b**

Explanation:

Biogeochemical Cycles: Understanding Element Cycling in Ecosystems

The question asks for the specific term used to describe the movement or **cycling of elements** through an **ecosystem**. This process involves how essential elements are exchanged between the biotic (living) and abiotic (non-living) components of the

Earth.

Defining Biogeochemical Cycles

The most accurate term for the **cycling of elements** in an **ecosystem** is **Biogeochemical cycles**. Let's break down this term:

- **Bio-**: Refers to the living organisms within the ecosystem. Life plays a crucial role in transforming and moving elements.
- **Geo-**: Refers to the Earth's physical components, such as rocks, soil, water, and air. These are the reservoirs where elements are stored and the pathways through which they move.
- **Chemical**: Refers to the chemical transformations and reactions that elements undergo as they cycle through the ecosystem.

Therefore, **Biogeochemical cycles** encompass the entire journey of elements, involving biological, geological, and chemical processes that ensure the continuous availability of essential nutrients like carbon, nitrogen, phosphorus, and water for life.

Comparing Options for Element Cycling

Let's look at why **Biogeochemical cycles** is the best fit compared to the other options:

- **Chemical cycles**: This is a broader term and might not specifically include the biological and geological aspects essential in an ecosystem context.
- **Geological cycles**: These primarily deal with the processes involving the Earth's crust and mantle, like rock formation and mountain building, not necessarily the cycling of elements through living organisms.
- **Geochemical cycles**: While related, these focus more on the chemical transformations and transport of elements within the Earth's crust and waters, often without emphasizing the biological component as strongly as biogeochemical cycles do.

The term **Biogeochemical cycles** uniquely captures the interplay between life (biosphere), Earth (geosphere), and chemical processes that define how elements move and are reused within an **ecosystem**.

Importance of Biogeochemical Cycles

These cycles are fundamental for maintaining the balance of ecosystems. They ensure that elements are not depleted but are instead recycled, making them available for producers (like plants) and subsequently consumers (like animals). Understanding these cycles is key to comprehending ecological processes and the impact of human activities on the environment.

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57. **Answer: a**

Explanation:

National Environment Engineering Research Institute (NEERI) Location

The question asks for the location of the **National Environment Engineering Research Institute**, commonly known as NEERI. NEERI is a prominent research institute in India, contributing significantly to environmental science and engineering.

Understanding NEERI's Headquarters

NEERI was established in 1958 by the Council of Scientific and Industrial Research (CSIR). Its primary mission is to conduct research and development in environmental engineering and pollution control, supporting sustainable development goals.

Analyzing the Options for NEERI's Location

The options provided are specific cities in India:

- Nagpur
- Pune

- Lucknow
- New Delhi

Let's examine the location of NEERI's main campus:

- **Nagpur:** The headquarters and primary research campus of the National Environment Engineering Research Institute is located in Nagpur, Maharashtra. This location serves as the central hub for its extensive research activities.
- **Pune:** While Pune is a major educational and research hub, it is not the primary location for NEERI's headquarters.
- **Lucknow:** Lucknow is the capital of Uttar Pradesh and hosts various research institutions, but NEERI's main campus is not situated here.
- **New Delhi:** New Delhi, the national capital, houses many central government offices and research organizations, but NEERI's principal base is elsewhere.

Identifying the Correct Location

Based on the established presence and administrative functions of the institute, the main campus and headquarters of the **National Environment Engineering Research Institute (NEERI)** is situated in **Nagpur**.

Therefore, the correct option is Nagpur.

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58. **Answer: d**

Explanation:

Understanding Ozone Depleting Substances

The ozone layer in Earth's stratosphere plays a crucial role in protecting life on Earth by absorbing most of the Sun's harmful ultraviolet (UV) radiation. Certain chemical substances, when released into the atmosphere, can reach the stratosphere and damage this protective layer. Identifying these **ozone-depleting substances** is vital for environmental protection efforts.

The question asks to identify which of the listed substances are ozone-depleting. Let's examine each one:

Chlorofluorocarbons (CFCs) and Ozone Depletion

Chlorofluorocarbons, commonly known as CFCs, are a group of man-made compounds containing chlorine, fluorine, and carbon atoms. They were widely used in the past as refrigerants, aerosol propellants, and solvents because they are non-toxic and stable. However, this very stability allows them to persist in the atmosphere and eventually reach the stratosphere.

In the stratosphere, CFCs are broken down by intense UV radiation, releasing highly reactive chlorine atoms. These chlorine atoms act as catalysts in a destructive cycle that depletes the ozone layer. The process can be summarized as:

- A chlorine atom (Cl) reacts with an ozone molecule (O_3) to form chlorine monoxide (ClO) and a regular oxygen molecule (O_2). The reaction is: $Cl + O_3 \rightarrow ClO + O_2$.
- The chlorine monoxide (ClO) then reacts with a free oxygen atom (O), which is naturally present in the stratosphere, regenerating the chlorine atom (Cl) and forming another oxygen molecule (O_2). The reaction is: $ClO + O \rightarrow Cl + O_2$.

Crucially, the chlorine atom is regenerated in the second step, allowing it to destroy many more ozone molecules. It's estimated that a single chlorine atom can destroy thousands of ozone molecules before being removed from the stratosphere.

Halons and Their Role in Ozone Depletion

Halons are compounds that contain bromine and carbon, often along with chlorine and fluorine. They have been primarily used as highly effective fire suppressants in applications like fire extinguishers for sensitive equipment (e.g., in aircraft and data centers).

Similar to CFCs, Halons are stable enough to reach the stratosphere. There, UV radiation breaks them down, releasing bromine atoms. Bromine atoms are even more efficient at destroying ozone than chlorine atoms. The catalytic cycle involving bromine is similar to that of chlorine, but bromine's ozone-destroying potential is significantly higher.

Carbon Tetrachloride (CCl_4) as an Ozone Depleting Substance

Carbon tetrachloride, with the chemical formula CCl_4, is an industrial solvent and has also been used as a fire extinguisher and in refrigeration. Like CFCs and Halons, it is a stable compound that can survive transport to the stratosphere.

Once in the stratosphere, UV radiation causes carbon tetrachloride to decompose, releasing chlorine atoms. These chlorine atoms then participate in the same catalytic ozone destruction cycles described for CFCs, contributing significantly to the depletion of the ozone layer.

Conclusion

Based on the scientific understanding of their atmospheric effects:

- Chlorofluorocarbons (CFCs) are potent ozone-depleting substances.
- Halons are potent ozone-depleting substances, primarily due to the bromine content.
- Carbon tetrachloride (CCl_4) is also an ozone-depleting substance due to the release of chlorine atoms.

Therefore, all three substances listed – Chlorofluorocarbons, Halons, and Carbon tetrachloride – are identified as **ozone-depleting substances**.

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59. **Answer: d**

Explanation:

Understanding the Transitional Zone in Ecology

In ecology, the area where two different ecological communities meet and interact is often referred to by a specific term. This zone represents a transition, potentially featuring characteristics of both adjacent communities and sometimes unique species that thrive in the mixed conditions.

Analyzing Ecological Boundary Terms

Let's examine the options provided to identify the correct term for this transitional zone:

- **Ecotype**: An ecotype refers to a specific population within a species that is adapted to a particular local environment. It's about genetic adaptation to local conditions, not a boundary zone between different communities.
- **Ecade**: This term is not a standard or widely recognized term in ecology for a transitional zone.
- **Ecosphere**: The ecosphere encompasses the entire global ecological system, including all living organisms (biosphere) and their interactions with the physical environment (lithosphere, atmosphere, hydrosphere). It's a much broader concept than a specific transitional area between communities.
- **Ecotone**: An ecotone is precisely defined as a transitional area or zone between two or more different ecosystems or ecological communities. These areas often exhibit high biodiversity because they contain species from both adjacent ecosystems, as well as species unique to the ecotone itself. Examples include the transition between a forest and a grassland (ecotone called savanna) or between freshwater and terrestrial ecosystems (like a marsh).

Identifying the Correct Term for Communities Transition

Based on the definitions, the term that specifically describes the transitional zone between two distinct communities is 'Ecotone'. This ecological concept highlights the interface where different habitats or ecosystems meet, creating unique conditions and supporting a distinct mix of life.

60. **Answer: b**

Explanation:

Understanding the Ecological Footprint

The question asks for the specific term that represents the minimum area of land needed to sustainably support the life of a single individual. This concept relates directly to resource consumption and the environmental impact of human activities.

What is an Ecological Footprint?

The term that accurately defines the minimum land area required to sustain one person's life is the **Ecological footprint**.

The **Ecological footprint** is a widely used indicator that measures how much biologically productive land and water area a population requires to produce the resources it consumes (such as food, fiber, timber, and energy) and to absorb the waste it generates (like carbon dioxide emissions). It essentially quantifies humanity's demand on nature.

Key aspects of the **Ecological footprint** include:

- It measures the demand on resources like cropland, grazing land, forest land, fishing grounds, and built-up land.
- It also accounts for the area needed to absorb waste, particularly carbon emissions from burning fossil fuels.
- It helps compare the consumption patterns of different individuals, communities, or nations against the planet's biocapacity (its ability to regenerate resources and absorb waste).

Therefore, when considering the land required to completely sustain a person's life, the **Ecological footprint** is the appropriate measure.

Evaluating Other Options

Let's examine the other terms provided:

- **Biota**: This term refers to the total collection of plants, animals, fungi, and other living organisms within a specific region or habitat. It describes the living components of an ecosystem, not the area needed to support human life.
- **Biome**: A biome is a large geographical area characterized by specific climate conditions and dominant plant and animal life, such as a desert, tundra, or tropical rainforest. It represents a type of ecosystem, not a measure of individual resource needs.
- **Niche**: An ecological niche describes the specific role and position a species occupies within its ecosystem. It includes how the species interacts with its environment, its food sources, and its place in the food web. It defines a species' function, not the land area for human sustenance.

Based on these definitions, the **Ecological footprint** is the only term that directly addresses the question of the land area required to sustain an individual's life.

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61. **Answer: c**

Explanation:

Identifying the Most Populated Desert

The question asks to identify which desert holds the title of the most populated desert in the world among the given options: Sahara, Gobi, Thar, and Kalahari. Deserts are often perceived as barren lands with very few inhabitants, but this is not entirely true. Some deserts support significant human populations, primarily due to available water resources or specific economic activities.

Population Distribution in Major Deserts

Let's examine the population characteristics of each desert mentioned:

- **Sahara Desert:** As the largest hot desert in the world, the Sahara has a large area but a relatively low population density. Inhabitants are mostly concentrated in oases or along river valleys, such as the Nile River valley, and include nomadic groups.
- **Gobi Desert:** Located in Central Asia, the Gobi Desert is known for its extreme temperatures and arid conditions. Its population consists mainly of nomadic herders who move with their livestock in search of pasture and water. It is very sparsely populated.
- **Kalahari Desert:** Situated in Southern Africa, the Kalahari is a large semi-arid sandy savanna. While it supports wildlife, its human population is sparse, consisting mainly of indigenous groups like the San people, who are traditionally hunter-gatherers or pastoralists.
- **Thar Desert:** Also known as the Great Indian Desert, the Thar Desert stretches across northwestern India and southeastern Pakistan. It is unique among major deserts for supporting a substantial human population. Numerous villages and even some larger towns are located within or on the fringes of the desert. Activities like agriculture (especially rain-fed agriculture) and animal husbandry are practiced, sustaining a higher population density compared to other large deserts.

Why Thar Desert is the Most Populated

The **Thar Desert** stands out because its geographical and climatic conditions, although challenging, allow for a greater concentration of human settlements and activities than the other options. Factors contributing to the population in the **Thar Desert** include:

- Availability of groundwater in certain areas.
- Practices like traditional water harvesting.
- Areas suitable for agriculture, especially during monsoon seasons.
- Significant livestock populations supported by grazing lands.
- The presence of historical trade routes and settlements within the region.

These factors allow communities to thrive, making the **Thar Desert** the most populated desert globally when compared to the Sahara, Gobi, and Kalahari.

Conclusion

Based on the analysis of population distribution and settlement patterns, the **Thar Desert** has the highest population density among the major deserts listed. Its ability to support agriculture and numerous communities makes it the most populated desert in the world.

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62. **Answer: c**

Explanation:

Understanding Coral Bleaching: Identifying the Key Factor Coral reefs are vibrant underwater ecosystems facing numerous threats. One significant issue is coral bleaching, a process where corals lose their color and can eventually die if the stress persists. Understanding the primary causes of this phenomenon is crucial for conservation efforts.

What Causes Coral Bleaching?

Coral bleaching occurs when the symbiotic relationship between corals and the microscopic algae (zooxanthellae) living in their tissues breaks down. These algae provide corals with most of their food and their vibrant colors. When corals experience stress, they expel these algae, turning white or "bleached." Several environmental factors can cause this stress.

Analyzing Potential Factors Affecting Corals

Let's examine the options provided to determine the most effective cause of coral bleaching:

- **Marine pollution:** While pollution from chemicals, sewage, or sediment runoff can harm corals and make them more vulnerable to stress, it's generally not the primary trigger for widespread, mass bleaching events affecting large areas of reef. Pollution often causes localized damage or disease.
- **Increase of salinity of seas:** Corals have specific salinity requirements. Significant changes, especially increases, can stress them. However, major global shifts in ocean salinity are not the main driver behind the widespread coral bleaching observed globally. Localized factors might cause salinity stress, but it isn't the most effective *global* factor.
- **Rise in normal temperature of sea-water:** This is widely recognized by scientists as the most significant and widespread cause of coral bleaching. When ocean temperatures rise even slightly (1-2°C or 1.8-3.6°F) above the usual summer maximum for an extended period (several weeks), the symbiotic algae become stressed and are expelled by the coral. This is closely linked to global warming and climate change.
- **Outbreak of diseases and epidemics:** Diseases can certainly damage coral reefs and cause mortality. However, disease outbreaks are often secondary issues. Corals that are already weakened by other stressors, like elevated water temperatures, are more susceptible to diseases. Therefore, disease is usually a consequence rather than the primary initiating factor for mass bleaching.

The Most Effective Factor: Elevated Sea Temperatures

Based on scientific research and observed global trends, the most potent and widespread factor causing coral bleaching is the **rise in the normal temperature of sea-water**. This warming trend, driven largely by climate change, stresses corals worldwide, leading to the expulsion of their vital symbiotic algae and causing the characteristic bleaching. While other factors like pollution and disease play roles in coral health, increased water temperature is the principal trigger for the mass bleaching events devastating coral reefs globally.

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63. **Answer: c**

Explanation:

Missile and Defence System Matching

This question requires identifying the correct pairing between specific Indian defence systems and their classification. Let's examine each option to understand the nature of these military assets.

Understanding the Defence Systems

We need to determine the correct classification for Trishul, Prithvi, NAG, and Pinaka based on their intended role in defence operations.

Analysis of Options:

- **Option (a): Trishul - Surface to surface missile**
  Trishul is actually a quick-reaction *surface-to-air missile (SAM)*. It is designed to intercept low-flying aerial targets. Therefore, matching it with 'Surface to surface missile' is incorrect.
- **Option (b): Prithvi - Surface to air missile**
  The Prithvi missile system is classified as a *surface-to-surface missile (SSM)*. It is developed for striking targets on the ground. Matching it as 'Surface to air missile' is incorrect.
- **Option (c): NAG - Anti - tank missile**
  The NAG missile is a third-generation, fire-and-forget weapon system specifically developed as an *anti-tank guided missile (ATGM)*. Its primary role is to destroy armoured vehicles and tanks. This classification is correct.
- **Option (d): Pinaka - Light combat aircraft**
  Pinaka is an advanced indigenous *multi-barrel rocket launcher (MBRL)* system. It is used for area saturation attacks. A Light

Combat Aircraft (LCA) is an entirely different type of defence platform, such as the Tejas. Therefore, this matching is incorrect.

Correct Classification Table

The following table summarizes the accurate classifications for the defence systems mentioned in the question:

Defence System	Correct Classification
Trishul	Surface-to-Air Missile (SAM)
Prithvi	Surface-to-Surface Missile (SSM)
NAG	Anti-Tank Guided Missile (ATGM)
Pinaka	Multi-Barrel Rocket Launcher (MBRL)

Conclusion on Matching

After reviewing the classifications, the option that correctly matches a defence system with its type is 'NAG - Anti - tank missile'. This aligns with the known capabilities of the NAG missile system.

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64. **Answer: d**

Explanation:

Mirage: The Cause Explained by Total Internal Reflection

A mirage is a naturally occurring optical phenomenon in which light rays are bent to produce a displaced image of distant objects or the sky. This fascinating illusion is commonly observed in hot environments, such as deserts or over hot asphalt roads.

The primary reason behind the formation of a mirage is the **total internal reflection of light**. This phenomenon happens due to the variation in the refractive index of air caused by differences in temperature.

Temperature and Refractive Index of Air

- In hot environments, the air near the surface (like hot sand or road) gets heated up much more than the air layers above it.
- Hot air is less dense than cool air.
- The refractive index of air depends on its density. Denser air has a higher refractive index, and less dense air has a lower refractive index.
- Therefore, in hot conditions, there is a gradient of refractive index: the refractive index is lowest near the hot surface and gradually increases as you move upwards into cooler air layers.

How Light Bends and Leads to Total Internal Reflection

Consider a ray of light from a distant object (like the sky) traveling downwards towards the hot surface. As the light ray passes from a layer of cooler air (higher refractive index) to a layer of hotter air below it (lower refractive index), it bends away from the normal.

This continuous bending occurs as the light travels through progressively hotter and rarer layers of air closer to the ground. The angle of incidence increases at each boundary between the layers.

If the angle of incidence in a denser layer becomes greater than the critical angle for the boundary with the rarer layer below it, the light ray undergoes **total internal reflection**. Instead of passing into the lower, hotter layer, it is reflected back upwards.

When these reflected rays reach the observer's eyes, they appear to be coming from the ground. Because the rays originated from the sky, the observer sees an inverted image of the sky on the ground, which looks like a pool of water reflecting the sky. This is the optical illusion known as a mirage.

Why Other Options Are Incorrect

- **Interference of light:** Interference involves the superposition of waves and is responsible for phenomena like thin-film colours or Newton's rings, not mirages.
- **Diffraction of light:** Diffraction is the bending of light around obstacles or through narrow openings and explains phenomena like the spreading of light from a slit, not mirages.
- **Polarisation of light:** Polarisation relates to the orientation of light waves' oscillations and is involved in phenomena like glare reduction by sunglasses, not mirages caused by atmospheric refraction.

Thus, the primary reason for a mirage is the **total internal reflection of light** caused by the variation in the refractive index of air due to temperature gradients.

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65. **Answer: b**

Explanation:

Understanding What Determines the Color of Light

Light, a fundamental part of our universe, travels as electromagnetic waves. We see the world around us because of light. Different characteristics of these light waves influence how we perceive them. This explanation focuses on identifying the specific property of light that our eyes interpret as color.

The Physics of Light and Color Perception

Light exists across a wide spectrum of electromagnetic radiation. The portion of this spectrum that our eyes can detect is called the visible spectrum. Within this visible spectrum, different colors that we see, such as red, orange, yellow, green, blue, and violet, correspond to specific wavelengths of the light waves. Shorter wavelengths are perceived as colors towards the violet end of the spectrum, while longer wavelengths are perceived as colors towards the red end.

Analysis of Light Properties

Let's examine the properties mentioned in the options to understand why one determines the color of light:

- **Amplitude:** The amplitude of a light wave relates to its intensity or brightness. A wave with a larger amplitude carries more energy, making the light appear brighter. However, amplitude does not determine the color we perceive. For instance, you can have a bright red light and a dim red light; both are red because their wavelength is the same, but their amplitudes differ.
- **Wavelength:** This is the distance between successive crests of a light wave. Wavelength (λ) is the key property that our eyes and brain interpret as color. Each distinct color within the visible spectrum has a unique range of wavelengths. For example, red light typically has a wavelength around 620-750 nanometers (nm), while violet light has a shorter wavelength, around 380-450 nm.
- **Intensity:** Similar to amplitude, intensity refers to the brightness of the light. It's related to the amount of energy the light wave carries per unit area per unit time. Higher intensity means brighter light, but it doesn't change the perceived color. A light source can be intense (bright) or less intense (dim) while maintaining the same color.
- **Velocity:** The velocity of light (denoted as c in a vacuum) is a constant speed, approximately $299,792,458$ meters per second. While the speed of light can change when it passes through different mediums (like water or glass), this change in velocity is related to the medium's refractive index, not the light's intrinsic color. The color itself is determined by the wavelength (and frequency, f, related by $c = \lambda f$), which remains constant when light enters a new medium, while its speed and wavelength change.

Conclusion on Light's Color Property

Based on the analysis, the property of light that directly determines the color we perceive is its wavelength. Different wavelengths within the visible spectrum correspond to different colors.

Final Answer: The final answer is $**Wavelength**$

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66. **Answer: a**

Explanation:

Understanding Ultrasonic Sound Waves Frequency

Ultrasonics refers to sound waves with frequencies that are higher than the upper limit of human hearing. These high-frequency sound waves are essential in many fields, including medical imaging, industrial cleaning, and animal communication.

Defining Ultrasonics and Their Frequency Range

The range of frequencies that humans can typically perceive is between approximately 20 Hertz (Hz) and 20,000 Hertz (Hz). Sound waves occurring at frequencies beyond this range are specifically termed **ultrasonics**.

In mathematical terms, the frequency (f) of ultrasonic waves is defined as:

- $f > 20,000$ Hz

Exploring Different Sound Wave Frequency Categories

Sound waves are broadly categorized based on their frequency relative to the human hearing spectrum:

- **Infrasound:** These waves have frequencies below the lower limit of human hearing, meaning $f < 20$ Hz. Examples include seismic waves and sounds produced by large animals like elephants.
- **Audible Sound:** This is the range of frequencies humans can hear, typically between 20 Hz and 20,000 Hz. Music and speech fall within this range.
- **Ultrasound:** These waves possess frequencies higher than the upper limit of human hearing, specifically $f > 20,000$ Hz. Many animals, like bats and dolphins, use ultrasound for navigation and communication.

The following table summarizes these categories:

Sound Category	Frequency Range
Infrasound	Below 20 Hz
Audible Sound	20 Hz to 20,000 Hz
Ultrasound	Above 20,000 Hz

Analyzing the Options for Ultrasonic Frequency

We can now evaluate the provided options based on the definition of ultrasonics:

- **Option 1: Greater than 20,000 Hz** - This option correctly identifies the frequency range characteristic of ultrasonic waves.
- **Option 2: Less than 10,000 Hz** - Sound waves with frequencies below 20,000 Hz are part of the audible range or infrasound, not ultrasonics.
- **Option 3: Equal to 1000 Hz** - A frequency of 1,000 Hz is firmly within the audible range for humans.
- **Option 4: None of these** - Since Option 1 accurately describes the frequency of ultrasonics, this choice is incorrect.

In conclusion, sound waves are classified as ultrasonic when their frequency exceeds the upper limit of human hearing, which is commonly set at 20,000 Hz.

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67. **Answer: a**

Explanation:

Kaziranga National Park: Wildlife Significance

Kaziranga National Park, situated in the northeastern Indian state of Assam, is a globally recognized wildlife habitat. It is distinguished by its successful conservation of a particular species, which forms the core of its fame.

The Rhinoceros Sanctuary of Kaziranga

Kaziranga is most famously known as the home of the **Greater One-Horned Rhinoceros** (*Rhinoceros unicornis*). This national park holds the distinction of having the largest wild population of this endangered species anywhere in the world.

- The park's extensive grasslands and wetlands provide an ideal environment supporting a high density of rhinoceros.
- Decades of dedicated conservation programs have been instrumental in safeguarding and increasing the numbers of these iconic animals within Kaziranga's boundaries.
- The remarkable success in protecting the one-horned rhinoceros is a key reason for Kaziranga's status as a UNESCO World Heritage Site.

Biodiversity Beyond the Rhinoceros

In addition to its famous rhinoceros population, Kaziranga National Park supports a rich variety of other wildlife:

- **Tigers:** The park is also known for having one of the highest densities of Bengal Tigers.
- **Asian Elephants:** A substantial population of wild Asian elephants resides here.
- **Birds:** Kaziranga is a vital habitat for numerous bird species, including many migratory birds, making it an important area for birdwatching and avian conservation.
- Other significant fauna include the wild water buffalo, swamp deer, hog deer, and various species of reptiles.

Kaziranga's Primary Recognition

While Kaziranga is rich in biodiversity, its most prominent claim to fame and its primary conservation focus remains the **Rhinoceros**, making it the defining species associated with the park.

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68. **Answer: a**

Explanation:

Tropical Rain Forest Biodiversity: Why It's the Highest

Biodiversity refers to the variety of life found in a particular ecosystem or on Earth. It encompasses the diversity of species, the genetic variation within those species, and the variety of ecosystems themselves. Understanding where this **maximum biodiversity** occurs is key to understanding ecological patterns.

Factors Driving High Biodiversity in Tropical Rain Forests

Tropical rain forests are renowned for having the highest levels of biodiversity on land. This abundance of different plants, animals, fungi, and microorganisms is due to a unique combination of environmental factors:

- **Stable Climatic Conditions:** Unlike temperate or arctic regions, tropical areas generally experience minimal temperature fluctuations throughout the year. They typically receive high amounts of rainfall consistently. This stable, warm, and wet climate creates ideal conditions for life to flourish year-round, allowing species to evolve and specialize over long periods without facing harsh seasonal challenges like extreme cold or drought.
- **High Solar Energy Input:** Being close to the equator, tropical rain forests receive intense sunlight. This abundant solar energy fuels high rates of photosynthesis, providing a substantial energy base for the entire ecosystem and supporting a complex food web with many different organisms.
- **Complex Habitat Structure:** Tropical rain forests possess a multi-layered structure, including the forest floor, understory, canopy, and emergent layer. Each layer offers different microclimates, resources, and protection, creating a vast number of ecological niches. Species can specialize to occupy specific niches, reducing direct competition and allowing more species to coexist.
- **Long Evolutionary History:** Many tropical rainforests are ancient ecosystems that have persisted through various geological eras, including ice ages, with relatively less disruption compared to higher latitude forests. This long, stable history has provided ample time for evolutionary processes like speciation to occur, leading to the accumulation of a vast number of species.

Comparing Biodiversity Levels in Other Forest Types

The other forest types listed have significantly lower biodiversity due to their environmental constraints:

- **Temperate Forests:** These forests experience distinct seasons, including cold winters and varying rainfall patterns. The shorter growing season and colder temperatures limit the types of species that can survive and reproduce, resulting in lower species richness compared to tropical rain forests.
- **Coniferous Forests:** Often found in cooler climates or mountainous regions, these forests are dominated by a few species of hardy coniferous trees. Factors like lower temperatures, shorter growing seasons, and sometimes acidic soil conditions (from decomposing needles) limit the diversity of understory plants and associated animal life.
- **Arctic Forests:** These are found in extremely cold regions with very short growing seasons, often bordering tundra. The harsh conditions, including low temperatures, limited sunlight for much of the year, and often frozen ground (permafrost), severely restrict the types and numbers of species that can survive, resulting in the lowest biodiversity among these options.

In conclusion, the consistent warm temperatures, abundant rainfall, high solar energy, complex structure, and long evolutionary stability make **tropical rain forests** the most biodiverse biome.

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69. **Answer: a**

Explanation:

Dengue Fever and Deficiency in the Human Body

Dengue fever is a disease caused by the Dengue virus, primarily spread through the bite of infected mosquitoes (Aedes species). When a person contracts Dengue fever, the virus affects various parts of the body, leading to a range of symptoms. Understanding the specific components that become deficient is key to managing the illness.

Identifying the Deficiency Caused by Dengue

The question asks which component gets deficient in the human body due to Dengue fever. Let's analyze the options provided:

- **Platelets**: Also known as thrombocytes, these are small, irregular-shaped cells produced in the bone marrow. Their main function is to help the blood clot to stop bleeding.
- Haemoglobin: This is an iron-rich protein in red blood cells that carries oxygen from the lungs to the rest of the body.
- Sugar: This typically refers to glucose, the body's main source of energy, regulated by hormones like insulin.
- Water: Essential for numerous bodily functions, including temperature regulation and nutrient transport.

Medical studies and clinical observations show that Dengue fever commonly causes a significant drop in the number of **platelets** circulating in the blood.

Why Platelets Decrease During Dengue Fever

The reduction in **platelets**, a condition termed thrombocytopenia, is a hallmark characteristic of Dengue infection. This occurs due to several factors related to how the Dengue virus interacts with the body:

- **Bone Marrow Effects**: The Dengue virus can sometimes affect the bone marrow, the site where **platelets** are produced. This can lead to decreased production of new platelets.
- **Immune System Response**: The body's immune system, while trying to fight the virus, may produce antibodies. These antibodies can sometimes mistakenly target and help destroy **platelets** or the megakaryocytes (platelet-producing cells) in the bone marrow.
- **Increased Platelet Consumption**: In some cases, the inflammatory processes triggered by the infection might lead to a faster clearance or destruction of **platelets** from the bloodstream.

Impact of Low Platelet Count (Thrombocytopenia)

When the number of **platelets** falls significantly, the blood's ability to clot is impaired. This can result in symptoms such as:

- Easy bruising
- Nosebleeds
- Bleeding gums
- In severe cases, Dengue can lead to serious haemorrhagic complications, where internal bleeding occurs.

Evaluating Other Options in Dengue Fever

While other changes can occur during Dengue fever, they are not the primary deficiency:

- **Haemoglobin**: Dengue doesn't directly cause a deficiency in haemoglobin. Anaemia (low haemoglobin) might develop later, possibly due to significant blood loss from haemorrhage or effects on red blood cell production, but it's not the immediate or defining deficiency.
- **Sugar**: Blood sugar levels are not typically deficient as a primary consequence of Dengue. While the body's metabolism changes during fever and illness, a specific lack of sugar isn't the characteristic deficiency caused by the virus itself.
- **Water**: Dehydration can be a serious complication of Dengue, often resulting from high fever, vomiting, or decreased fluid intake. However, it represents a lack of body fluid rather than a deficiency of a specific blood cell type or component manufactured by the body's systems in response to the virus.

Therefore, the most accurate answer regarding a deficiency directly caused by Dengue fever is **platelets**.

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70. **Answer: a**

Explanation:

Computer Component Importance Analysis

Understanding the core components of a computer is essential for grasping how it functions. This explanation focuses on identifying the most critical part among the options provided: C.P.U., Key Board, Disc, and Printer.

Defining the Central Processing Unit (CPU)

The **C.P.U.**, or Central Processing Unit, is often referred to as the 'brain' of the computer. Its primary role is to execute instructions and perform calculations necessary for the computer to operate. It processes data, manages operations, and controls other

hardware components. All the essential computing tasks, like running software and processing information, happen within the CPU.

Evaluating Other Computer Parts

Let's look at the roles of the other listed components to understand their importance relative to the CPU:

- **Key Board:** The keyboard is a crucial input device. It allows users to enter data and commands into the computer. Without an input device like a keyboard, interacting with the computer would be very difficult, but it doesn't perform the actual processing.
- **Disc:** Discs, such as Hard Disk Drives (HDDs) or Solid-State Drives (SSDs), serve as storage devices. They are used to store the operating system, applications, and files permanently (or until deleted). While vital for storing data and programs, the disc itself doesn't execute them.
- **Printer:** A printer is an output peripheral. It takes information from the computer and creates a physical copy, like a printed document. It's useful for specific tasks but isn't involved in the fundamental processing that makes a computer work.

CPU as the Most Critical Computer Part

Comparing the functions, the **C.P.U.** is undeniably the most important part. It's the component that actually performs the calculations and executes the commands given through input devices like the keyboard. While storage (Disc) is necessary to hold the instructions and data, and input/output devices (Key Board, Printer) are needed for interaction, the CPU is central to the computer's ability to function at all. Without a CPU, a computer cannot process information or run any programs.

Therefore, the Central Processing Unit is the component that enables the computer to perform its core tasks and is considered its most vital part.

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71. **Answer: b**

Explanation:

Explaining How Earthen Pitchers Keep Water Cool

The reason water remains cool inside an earthen pitcher is mainly due to the natural process of **evaporation**. Earthen pots are special because of their material and how they are made.

The Science Behind the Cooling

Here's a breakdown of how this cooling happens:

- **Earthenware Porosity:** Earthen pots are made from clay, which has many tiny, microscopic holes. This makes the pot porous.
- **Water Seepage:** Due to this porosity, a small amount of water constantly seeps from the inside of the pitcher through these pores onto the outer surface.
- **Evaporation:** When this water reaches the outer surface, it gets exposed to the surrounding air. The heat from the environment causes this water on the surface to turn into water vapor and rise into the air. This process is called **evaporation**.
- **Heat Removal:** Evaporation requires energy. To evaporate, the water molecules need heat. They absorb this necessary heat energy from the surface of the pitcher and, consequently, from the water stored inside.
- **Temperature Drop:** As the water molecules evaporate and leave the surface, they take heat energy with them. This continuous loss of heat energy from the water inside the pitcher leads to a decrease in its temperature, making it feel cool.

Comparing Evaporation with Other Processes

It's helpful to understand why other options aren't the main cause:

- **Condensation:** This is when water vapor in the air turns into liquid water. Condensation might form on the *outside* of a cold pitcher, but it's a result of the cooling, not the cause.
- **Sublimation:** This is the process where a solid turns directly into a gas (like dry ice). It doesn't apply to liquid water cooling in a pitcher.

Why Evaporation is Key

The consistent **evaporation** of water from the porous surface acts like a natural cooling system. It effectively removes heat from the water inside, keeping it at a lower temperature than the ambient temperature, especially during warm weather. Thus, **evaporation** is the correct scientific principle explaining why water stays cold in an earthen pitcher.

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72. **Answer: d**

Explanation:

Laser: Producing Stimulated Radiation

A laser is a unique device that produces a very specific type of light or radiation. Understanding how it works involves looking at the different ways radiation can be generated. The question asks us to identify the type of radiation produced by a laser.

Understanding Radiation Types

Let's examine the options provided:

- **Spontaneous Radiation:** This occurs when an atom or molecule in an excited state releases energy randomly, emitting a photon without any external trigger. While spontaneous emission happens in lasers too, it's not the primary mechanism responsible for the laser beam's unique properties.
- **Dispersed Radiation:** This refers to radiation that has been spread out or separated into its constituent wavelengths, like when light passes through a prism. Lasers, conversely, produce concentrated, non-dispersed light.
- **Scattered Radiation:** This happens when radiation bounces off particles or surfaces, changing its direction. Laser light is highly directional and not typically scattered in the way this term implies.
- **Stimulated Radiation:** This is the core principle behind lasers. It occurs when an incoming photon triggers an excited atom or molecule to emit a second photon that is identical to the first one (same frequency, phase, and direction). This process, known as stimulated emission, leads to the amplification of light.

The LASER Principle Explained

The name LASER itself is an acronym that reveals its function: **L**ight **A**mplification by **S**timulated **E**mission of **R**adiation.

Here's a breakdown of why **stimulated radiation** is the correct answer:

- **Excited State:** Atoms within the laser medium are "pumped" to a higher energy level, becoming excited.
- **Stimulating Photon:** A photon with the specific energy corresponding to the transition between the excited state and a lower energy state is introduced.
- **Stimulated Emission:** This incoming photon 'stimulates' the excited atom to drop to the lower energy level, emitting a *second* photon. Crucially, this emitted photon is identical to the stimulating photon – it travels in the same direction, has the same phase, and the same frequency (color).
- **Amplification:** This process repeats, creating more identical photons, leading to a cascade or amplification of light. This amplified, coherent, and directional light forms the laser beam.

Conclusion on Laser Radiation

Therefore, the distinctive feature of a laser is its production of **stimulated radiation**, which results in the highly organized and intense beam characteristic of laser light. The other types of radiation do not accurately describe the primary mechanism or the output of a laser device.

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73. **Answer: c**

Explanation:

Understanding Why Pendulum Clocks Slow Down in Summer

Pendulum clocks rely on the regular swing of a pendulum to keep time. The time it takes for a pendulum to complete one full swing (its period) is a critical factor in the clock's accuracy. This period is affected by several factors, including the length of the pendulum.

The Period of a Simple Pendulum

The period (T) of a simple pendulum is given by the formula:

$T = 2\pi\sqrt{\frac{L}{g}}$

Where:

- T is the period (time for one complete swing).
- L is the length of the pendulum (from the point of suspension to the center of mass of the bob).
- g is the acceleration due to gravity.

From this formula, we can see that the period T is directly proportional to the square root of the length L. This means if the length of the pendulum increases, the period also increases. An increased period means each swing takes longer, causing the clock to run slower.

Thermal Expansion and Pendulum Length

Materials expand when heated. This property is called thermal expansion. The rod of a pendulum is typically made of a metal like brass or steel. In summer, the ambient temperature is higher than in other seasons.

When the temperature increases, the metal rod of the pendulum expands, causing its length (L) to increase slightly.

Impact on Pendulum Clock Speed

Since the period T is proportional to $\sqrt{L}$, an increase in L leads to an increase in T. If the period of the pendulum increases, the clock mechanism regulated by the pendulum will tick slower. This is why pendulum clocks tend to lose time or become slow in summer.

Analyzing the Given Options

- **Option 1: Days in summer are large.** The length of the day does not directly affect the physical properties of the pendulum or the mechanics of the clock. This is irrelevant.
- **Option 2: Of the friction in the coil.** Pendulum clocks primarily use a pendulum and escapement mechanism, not a coil that causes friction in this context. While friction exists in any mechanical device, a seasonal change in friction is not the primary reason for the observed slowing in summer.
- **Option 3: The length of the pendulum increases.** Due to thermal expansion, the metal rod of the pendulum expands in the heat of summer, increasing its length. As explained by the pendulum period formula, this increase in length directly causes the period to increase, making the clock run slower.
- **Option 4: The weight of the pendulum changes.** The weight of the pendulum bob is determined by its mass and gravity ($W = mg$). Neither the mass of the bob nor the local acceleration due to gravity changes significantly with seasonal

temperature variations in a way that would explain the clock slowing down.

Therefore, the increase in the length of the pendulum due to thermal expansion in summer is the correct explanation for why pendulum clocks become slow.

Factors Affecting Pendulum Clock Accuracy

Factor	Summer Effect	Impact on Length (L)	Impact on Period (T)	Impact on Clock Speed
Temperature	Increases	Increases (Thermal Expansion)	Increases ($T \propto \sqrt{L}$)	Slows Down
Gravity (g)	Not significantly changed by season	N/A	Affected ($T \propto 1/\sqrt{g}$)	N/A (for this question)
Amplitude (swing angle)	Small angle approximation holds	N/A	Slightly affected at large angles	N/A (for this primary reason)

Revision Table: Pendulum Clock Slowing in Summer

Concept	Explanation
Pendulum Period Formula	$T = 2\pi\sqrt{\frac{L}{g}}$
Thermal Expansion	Materials expand when temperature increases.
Summer Effect on Pendulum	Higher temperature causes the pendulum rod's length (L) to increase.
Effect on Period	Increased L leads to increased period (T).
Effect on Clock Speed	Increased T means each swing takes longer, making the clock run slower.

Additional Information: Compensating Pendulums and Time Keeping

Clockmakers developed ingenious ways to compensate for the effect of temperature changes on pendulum length to maintain accurate timekeeping. Two common types of compensating pendulums are:

- **Gridiron Pendulum:** Uses a combination of rods made of metals with different coefficients of thermal expansion (like brass and steel) arranged so that the expansion of one metal cancels out the expansion of the other, keeping the effective length constant.
- **Mercury Pendulum:** The bob is a container filled with mercury. When the temperature rises, the rod expands downwards, increasing the length. However, the mercury also expands and rises in the container. By carefully choosing the dimensions and amount of mercury, the center of mass of the bob can be kept at the same effective distance from the point of suspension, thus keeping the effective length constant.

These examples highlight the importance of understanding thermal expansion in precision timekeeping devices like pendulum clocks.

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74. **Answer: b**

Explanation:

Homi Bhabha Award: Recognizing Special Contributions

The question asks about the specific field for which the Homi Bhabha award is presented, highlighting a **special contribution** in that area. This award honors the legacy of Dr. Homi J. Bhabha, a visionary scientist renowned for his foundational role in India's nuclear science and energy programs.

Analyzing the Fields of Contribution

To determine the correct field, it's essential to understand Dr. Homi Bhabha's primary scientific pursuits and their impact:

Nuclear Energy: Homi Bhabha's Foundational Domain

Dr. Homi J. Bhabha is widely celebrated as the chief architect of the Indian atomic energy program. His contributions were pivotal in:

- Establishing the **Atomic Energy Establishment, Trombay (AEET)** in 1954, which was later renamed the Bhabha Atomic Research Centre (BARC) in his honor.
- Founding the **Tata Institute of Fundamental Research (TIFR)** in 1945, laying the groundwork for nuclear science research in India.
- Championing the development and application of **nuclear energy** for peaceful purposes, including power generation and scientific research.
- His vision extended to creating a self-reliant nuclear capability for India.

Given his immense and foundational work, the Homi Bhabha award directly reflects his deep involvement and pioneering spirit in the field of **Nuclear Energy**.

Theoretical Physics: Bhabha's Academic Roots

While Dr. Bhabha initially gained international recognition for his significant work in **Theoretical Physics**, particularly in the area of cosmic rays and quantum electrodynamics (like Bhabha scattering), his most impactful and lasting legacy in India is undeniably linked to the development of nuclear science and technology.

Laser Physics and Space Research: Other Scientific Fields

Although India has made significant strides in **Laser Physics** and **Space Research** through organizations like ISRO, these fields were not the primary focus of Dr. Homi J. Bhabha's pioneering efforts or the core of his institutional building in India. While TIFR also conducts research in various fields, Bhabha's defining contribution remains in the nuclear domain.

Conclusion: The Award's Focus

The Homi Bhabha award specifically recognizes outstanding contributions that align with the scientific domain most profoundly shaped by Dr. Homi J. Bhabha himself. His unparalleled vision and leadership in establishing and advancing India's nuclear energy capabilities make **Nuclear Energy** the undisputed field for which this prestigious award is given.

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75. **Answer: a**

Explanation:

Identifying the Proposers of the DNA Double Helix Model

The question asks to identify who proposed the **double helix model** of DNA for the first time. Understanding the structure of DNA, the molecule that carries genetic information, was a fundamental quest in biology. The specific structure, the **double helix model**, explains how genetic information is stored and replicated.

Key Contributions to DNA Structure Discovery

Several scientists worked on understanding DNA's structure, but the breakthrough identification of its shape came from specific research in the mid-20th century.

Watson and Crick's Role in the Double Helix Model

Watson and Crick are credited with proposing the first successful and accurate model of the DNA structure as a **double helix** in 1953. Their groundbreaking work was published in the journal *Nature*.

- Their model depicted DNA as two polynucleotide chains coiled around a central axis, forming a spiral staircase-like structure.
- This model incorporated the findings of other researchers, including the X-ray diffraction data produced by Rosalind Franklin and Maurice Wilkins, which provided crucial insights into the helical nature and dimensions of DNA.
- Watson and Crick's proposal also explained the base-pairing rules (A with T, and G with C), which underpinned DNA's ability to store genetic information and replicate faithfully.

Their proposal is considered a landmark achievement in the field of molecular biology.

Assessing Other Scientific Contributions

It's important to distinguish the proposal of the **double helix model** from other significant contributions in biology:

- **Hugo de Vries**: A pioneer in genetics, Hugo de Vries is renowned for his work on mutation theory and the concept of the gene, but he did not propose the **double helix model** of DNA.
- **Lamark and Darwin**: Jean-Baptiste Lamarck and Charles Darwin were influential evolutionary theorists. Lamarck proposed the inheritance of acquired characteristics, while Darwin developed the theory of evolution by natural selection. Their work predates the understanding of DNA structure and focused on broader evolutionary mechanisms.
- **Fisher and Haldoni**: These names are not associated with the discovery or proposal of the DNA **double helix model**. Ronald Fisher was a key figure in statistics and population genetics, but not directly in DNA structure determination.

Finalizing the Discovery of the Double Helix Model

In summary, the proposal of the **double helix model** of DNA structure, which correctly described its physical form and functional implications, was first put forth by **Watson and Crick**, building upon the experimental work of colleagues.

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76. **Answer: a**

Explanation:

Understanding the SIM Full Form

The question asks for the full form of SIM. SIM is a very common component found in mobile phones and other communication devices.

Let's break down what a SIM card is and what it does to understand its full form.

A SIM card is a small card that contains information necessary for a mobile device to connect to a cellular network. This information uniquely identifies the subscriber (the person using the service) to the network provider. It also stores contact information and messages.

Analyzing the Given Options for SIM

We are given four options for the full form of SIM:

1. Subscriber's Identity Module
2. Subscriber's Identity Machine

3. Self Identity Machine
4. Identity Module

Let's evaluate each option based on our understanding:

- **Option 1: Subscriber's Identity Module** - This option includes "Subscriber's Identity," which relates to identifying the user, and "Module," which accurately describes the SIM as a component or module within the phone. This seems correct.
- **Option 2: Subscriber's Identity Machine** - While it mentions "Subscriber's Identity," calling it a "Machine" is not accurate. A SIM is a card with integrated circuits, not a machine in the typical sense.
- **Option 3: Self Identity Machine** - This option is incorrect because the SIM identifies the user (subscriber) to the *network*, not just the device's "self." Also, "Machine" is inaccurate.
- **Option 4: Identity Module** - This is partially correct as it is an "Identity Module," but it lacks the crucial part: whose identity? It's the *Subscriber's* Identity. So, this is incomplete.

The Correct Full Form of SIM

Based on the function and nature of the SIM card, the letters S, I, and M stand for:

- **S** stands for **Subscriber's**
- **I** stands for **Identity**
- **M** stands for **Module**

Therefore, the full form of SIM is **Subscriber's Identity Module**.

Revision Table: Key Terms

Term	Explanation
SIM	Subscriber's Identity Module
Subscriber	The user of the mobile network service.
Identity	Unique information that identifies the subscriber to the network.
Module	A self-contained component or unit (like the SIM card itself).

Additional Information on SIM Technology

SIM cards are essential for GSM (Global System for Mobile Communications) networks. They contain an International Mobile Subscriber Identity (IMSI) number, which is a unique identifier for the mobile subscriber. This IMSI is used by the network operator to authenticate the subscriber and provide services. Over time, SIM technology has evolved, leading to different physical sizes (like Mini-SIM, Micro-SIM, Nano-SIM) and even embedded SIMs (eSIMs).

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77. **Answer: c**

Explanation:

Understanding Chlorophyll's Core Element

Chlorophyll is the essential green pigment found in plants and other photosynthetic organisms. Its primary role is to absorb sunlight, providing the energy needed for photosynthesis – the process plants use to convert light energy into chemical energy (food). Understanding the chemical makeup of chlorophyll reveals which elements are key to its function.

Detailed Analysis of Chlorophyll Composition

Chlorophyll is a complex molecule composed of carbon, hydrogen, oxygen, nitrogen, and importantly, a central metal atom. This metal atom sits within the core structure, a ring system called a porphyrin ring. The specific metal ion incorporated into this ring is crucial for chlorophyll's ability to absorb light energy effectively.

Key Elements Associated with Chlorophyll

Let's review the options provided in the context of chlorophyll's known structure:

- **Iron (Fe)**: Iron is essential for plant health and is a component of various enzymes and proteins involved in biological processes, including some aspects of photosynthesis. However, it is not the central metal atom within the chlorophyll molecule.
- **Copper (Cu)**: Copper is an important micronutrient for plants, participating in enzyme functions and processes like respiration. It does not form part of the chlorophyll structure.
- **Magnesium (Mg)**: The structure of chlorophyll molecules definitively includes a central **Magnesium** ion (Mg^{2+}). This magnesium atom is positioned within the center of the porphyrin ring structure. Its presence is vital for chlorophyll's light-absorbing capabilities and its role in photosynthesis.
- **Manganese (Mn)**: Manganese plays a critical role in photosynthesis, specifically in the water-splitting complex associated with photosystem II, which releases oxygen. However, manganese is not found as the central atom in chlorophyll.

The Significance of Magnesium in Chlorophyll Structure

The central **Magnesium** ion is a defining feature of chlorophyll. This specific metal ion is responsible for coordinating the electrons within the porphyrin ring system in a way that allows for efficient absorption of light energy, particularly in the blue and red wavelengths of the visible spectrum. This absorption initiates the entire process of photosynthesis, making magnesium an indispensable element for chlorophyll's function.

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78. **Answer: a**

Explanation:

Funk's Landmark Contribution: The Discovery of Vitamins

Casimir Funk, a Polish biochemist, made a significant contribution to nutritional science by introducing the concept of 'vitamines' in 1912. His pioneering work focused on understanding the cause of deficiency diseases.

Understanding Vitamin Discovery

- **Casimir Funk's Hypothesis:** Funk proposed that diseases like beriberi, scurvy, pellagra, and rickets were caused by the absence of specific essential organic compounds in the diet. He termed these compounds "vitamines," derived from the Latin word 'vita' (life) and 'amine' (a chemical group), believing they were all amines.
- **Isolation Efforts:** Funk is credited with isolating nicotinic acid (a component of Vitamin B3) and attempting to isolate thiamine (Vitamin B1) from rice bran polishings. Although his isolation methods were rudimentary by today's standards, his theoretical framework was groundbreaking.
- **Term Coined:** The term "vitamine" itself was coined by Funk, laying the foundation for the field of vitamin research. The 'e' was later dropped to form "vitamin" as it was realized that not all these compounds were amines.

Evaluating Other Options

While other biological molecules are crucial for health, Funk is primarily associated with the concept and naming of vitamins:

- **Hormones:** Hormones are chemical messengers produced by glands. Their existence and function were explored by scientists like Ernest Starling and William Bayliss, predating and running parallel to Funk's work, but Funk did not 'invent' or discover hormones.

- **Proteins:** Proteins are fundamental biomolecules essential for structure and function. The study of proteins dates back much further, with significant work done in the 19th century. Funk's contribution was not related to proteins.
- **Enzymes:** Enzymes are proteins that act as biological catalysts. Knowledge of enzymes existed well before Funk's work, with early discoveries tracing back to the study of fermentation in the 19th century.

Conclusion on Funk's Invention

Therefore, Casimir Funk's most recognized and significant contribution, often referred to as his 'invention' in this context, is the concept and term **vitamins**, revolutionizing the understanding of nutrition and deficiency diseases.

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79. **Answer: b**

Explanation:

Explaining the Change When Ice Melts

This question asks about the changes that occur to the **volume** and **mass** when **ice melts**. Let's break down the process of melting and what happens to these properties.

Understanding the Melting Process

Melting is a phase transition where a substance changes from a solid state (like ice) to a liquid state (like water). This happens when the temperature increases, providing enough energy for the molecules to overcome the rigid structure of the solid.

Mass Conservation During Melting

An important principle in physics is the conservation of mass. This means that during a physical change like melting, the total amount of matter remains the same. No atoms are lost or created.

- When **ice melts**, it turns into water.
- The water molecules that made up the ice are still present in the liquid water.
- Therefore, the **mass** of the substance does not change. It remains constant.

This rules out options suggesting the mass increases or decreases.

Volume Change During Melting: Ice vs. Water

The key to this question lies in the difference between the solid (ice) and liquid (water) states of H_2O.

- **Ice Structure**: In ice, water molecules form a crystal lattice structure (specifically, hexagonal ice Ih). This structure has open spaces, holding the molecules relatively far apart compared to the liquid state.
- **Liquid Water Structure**: When ice melts, this rigid crystalline structure breaks down. The molecules can move more freely, and importantly, they pack closer together on average than they do in the ice lattice.
- **Density Relationship**: Density is defined as mass per unit volume, often represented by the formula:

$$\rho = \frac{m}{V}$$

  Where 'ρ' is density, 'm' is mass, and 'V' is volume.
- **Comparison**: Ice is less dense than liquid water (this is unusual, as most substances are denser in their solid state). Since the **mass** (m) remains the same during melting, and the density (ρ) of liquid water is greater than that of ice, the **volume** (V) must decrease according to the formula.

Because the molecules pack more tightly in liquid water than in ice, the same amount of matter (the mass) occupies a smaller space (volume).

Conclusion on Ice Melting

Based on the principles of mass conservation and the unique property of water/ice density:

- The **mass** remains the same.
- The **volume decreases** when ice melts into water.

Therefore, the correct statement is that when **ice melts**, the **volume decreases**.

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80. **Answer: d**

Explanation:

Explaining the White Color of Milk

Milk appears white because of the way light interacts with the substances suspended within it. These suspended particles scatter light, preventing it from passing straight through and giving milk its characteristic opaque, white look.

Key Components Affecting Milk Color

Several components are present in milk, but one plays a primary role in its white appearance:

- **Caseins**: These are the main proteins found in milk, making up about 80% of the total protein content. Caseins exist in milk as tiny particles called micelles. These micelles are large enough to scatter light effectively across the visible spectrum, resulting in the opaque white color we associate with milk. The way these micelles interact with light is the principal reason for milk's whiteness.
- *Fats*: Milk also contains fat globules. While these contribute to the overall opacity and richness of milk, the fat itself can sometimes have a slightly yellowish tint due to the presence of pigments like carotenes. However, the fundamental white color comes from the proteins.
- *Lactose*: This is the primary sugar in milk. Lactose is dissolved in the watery part (whey) of milk and does not significantly contribute to its color or opacity.
- *Albumins and Globulins*: These are other types of proteins found in milk, often referred to as whey proteins. They are soluble in water and do not form large scattering particles like caseins, hence they don't cause the white color.
- *Carotenes*: These are yellow-orange pigments derived from a cow's diet (found in grasses). Carotenes are fat-soluble and are found within the fat globules in milk. They can give milk fat, and consequently milk itself, a slightly yellowish hue, especially noticeable when the milk is richer in fat or from cows grazing on fresh pasture. They are responsible for yellowness, not whiteness.

Therefore, the **white color of milk** is predominantly due to the light-scattering properties of **casein** proteins suspended within it.

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81. **Answer: d**

Explanation:

Matching Diseases with Causative Agents

This solution explains the matching of diseases listed in List - I with their corresponding causative agents from List - II. Understanding the causative agents of various diseases is crucial in biology and medicine.

Understanding the Disease-Causative Agent Matches

We need to correctly associate each disease with the type of organism (Bacteria, Virus, Fungus, Protozoa) responsible for it.

Disease Matching Table

List - I (Disease)	List - II (Causative Agent)
(A) Plague	(4) Bacteria
(B) AIDS	(3) Virus
(C) Baldness	(2) Fungus
(D) Malaria	(1) Protozoa

Detailed Explanation of Matches

(A) Plague and Bacteria

Plague is a serious infectious disease that can be deadly to humans. It is caused by the bacterium known as *Yersinia pestis*. This bacterium is typically found in rodents and is transmitted to humans through fleas. Therefore, Plague is correctly matched with **Bacteria**.

(B) AIDS and Virus

AIDS, which stands for Acquired Immunodeficiency Syndrome, is a chronic condition that affects the immune system. It is caused by the Human Immunodeficiency Virus (HIV). HIV attacks the body's immune cells, making individuals more vulnerable to infections and diseases. Thus, AIDS is correctly matched with **Virus**.

(C) Baldness and Fungus

While **Baldness**, particularly common male-pattern baldness, is often linked to genetics and hormones, certain types of hair loss can be caused by infections. Fungal infections of the scalp, such as tinea capitis (ringworm of the scalp), can lead to hair loss and bald patches. Considering the options provided, matching baldness with **Fungus** refers to these types of infectious hair loss.

(D) Malaria and Protozoa

Malaria is a life-threatening disease caused by Plasmodium parasites, which are a type of **Protozoa**. These parasites are transmitted to people through the bites of infected female Anopheles mosquitoes. The parasites multiply in the liver and then infect red blood cells. Hence, Malaria is correctly matched with **Protozoa**.

Conclusion

Based on the detailed explanations, the correct matching is (A) - (4), (B) - (3), (C) - (2), and (D) - (1). This corresponds to the option that lists these pairs.

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82. **Answer: c**

Explanation:

MRI is a crucial diagnostic tool used in modern medicine to visualize the inside of the human body.

MRI Full Form Explained

The acronym **MRI** officially stands for **Magnetic Resonance Imaging**. This is the correct and standard terminology for this widely used medical imaging modality.

Magnetic Resonance Imaging Technology

Magnetic Resonance Imaging is a sophisticated medical imaging technique that uses powerful magnetic fields and radio waves to create detailed images of organs, soft tissues, bone, and virtually all other internal body structures. It works by utilizing the principles of magnetic resonance. When a patient is placed inside a strong magnetic field, the protons within the body's water molecules align with this field. Radiofrequency pulses are then applied, which knock these protons out of alignment. As the protons realign themselves with the magnetic field, they emit radio signals that are detected by the MRI scanner. A computer processes these signals to generate comprehensive cross-sectional images, offering exceptional detail without the use of ionizing radiation.

Analysis of MRI Terminology

When evaluating the options provided for the meaning of **MRI**:

- **Magnetic Resonance Imaging** is the accurate and established term that describes the technology and its function in medical diagnostics.
- The alternatives, such as "Magnetic Record of Intestines," "Magnetic Recording of Investigations," and "Magnetic Resonance in Intestines," are incorrect. They do not represent the standard or proper definition of MRI, misrepresenting its scope and methodology.

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83. **Answer: b**

Explanation:

Rinderpest: The Livestock Disease Marked in 2011

Understanding significant milestones in animal health is crucial for students studying veterinary science or agriculture. The year 2011 is specifically noted for a major achievement concerning a particular **livestock disease**.

The Significance of 2011 in Livestock Health

The year 2011 marked a historic moment in the fight against animal diseases. The focus was on **Rinderpest**, a highly contagious viral disease affecting cloven-hoofed animals like cattle, buffalo, bison, and other ruminants.

Rinderpest Eradication Milestone:

- **Rinderpest**, often called cattle plague, caused devastating epidemics in livestock populations throughout history, leading to significant economic losses and food insecurity.
- In May 2011, the World Organisation for Animal Health (OIE) officially declared **Rinderpest** eradicated worldwide. This monumental achievement was the result of decades of international cooperation, surveillance, vaccination campaigns, and strict veterinary controls.
- It was only the second animal disease, after Rinder hayvanları (avian plague), to be eradicated globally, making 2011 a landmark year for veterinary medicine and global animal health efforts.

Comparison with Other Livestock Diseases

Let's look at why the other options are not the correct answer for the milestone marked in 2011:

Key Livestock Diseases vs. 2011 Significance

Disease Name	Relevance to 2011	Description
Foot and Mouth Disease (FMD)	Ongoing global concern, but 2011 was not the year of its global eradication declaration.	A highly contagious viral disease affecting cloven-hoofed animals, causing significant economic impact due to reduced productivity and trade restrictions.
Rinderpest	**Officially declared eradicated worldwide by OIE in 2011.**	A devastating viral disease primarily affecting cattle and related species. Eradication was a major global health victory.
Rabies	Continues to be a significant zoonotic disease globally, affecting animals and humans. 2011 did not mark a global eradication milestone.	A viral disease transmitted through saliva, typically via bites, that affects the nervous system of mammals, including livestock and humans.
Cowpox	A relatively rare viral disease, primarily affecting cattle and sometimes humans. It is not associated with a major global milestone in 2011.	A zoonotic disease caused by a virus related to smallpox, typically causing mild symptoms in cattle.

Conclusion on the 2011 Livestock Disease Milestone

The year 2011 is unequivocally linked to the global eradication of **Rinderpest**, a testament to successful international collaboration in controlling and eliminating devastating animal diseases. This makes **Rinderpest** the correct answer when referring to the specific **livestock disease** milestone marked for that year.

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84. **Answer: c**

Explanation:

Understanding the First State to Pass the Lokayukta Bill in 2011

The question asks to identify the first Indian State that successfully passed the **Lokayukta bill** in the year **2011**. This relates to the establishment and strengthening of anti-corruption ombudsman institutions at the state level in India.

What is a Lokayukta?

The **Lokayukta** is essentially an ombudsman. It's an anti-corruption authority set up at the state level in India. Its main purpose is to investigate allegations of corruption and maladministration against public servants, including ministers and government officials. The goal is to ensure accountability and transparency in governance.

The Significance of the 2011 Lokayukta Bill

Passing a **Lokayukta bill** is a crucial step for a state to formalize and empower its anti-corruption watchdog. The year 2011 saw significant legislative activity regarding Lokayuktas across various Indian states, often driven by public movements demanding stronger measures against corruption.

Identifying the First State in 2011

To answer the question, we need to determine which state initiated and passed its **Lokayukta bill** first among the given options during 2011.

- **Uttar Pradesh:** While Uttar Pradesh has had a Lokayukta, its bill passage timeline in 2011 needs specific confirmation relative to others.

- **Bihar:** Bihar also has provisions for a Lokayukta, but its specific legislative action in 2011 requires context.
- **Uttarakhand:** Historical records and legislative information point towards Uttarakhand being the first state to pass its Lokayukta bill in 2011. The Uttarakhand Lokayukta Act, 2011 was passed by the state assembly.
- **Jharkhand:** Similar to other states, Jharkhand's legislative process for the Lokayukta bill in 2011 needs to be compared.

Conclusion on the 2011 Lokayukta Bill Passage

Based on legislative history, **Uttarakhand** holds the distinction of being the first Indian State to pass the **Lokayukta bill** in 2011. This legislative move was a significant development in the state's efforts to combat corruption.

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85. **Answer: d**

Explanation:

India's SAARC Border Pact Explained

This question asks to identify the specific country within the SAARC group that India recently entered into a significant Border Pact with. Understanding international relations and border agreements is key to answering this correctly.

What is SAARC?

SAARC stands for the **South Asian Association for Regional Cooperation**. It's an organization established to promote economic and regional integration among its member states in South Asia. The primary goals include fostering diplomatic ties, promoting economic growth, and improving the quality of life for people in the region.

The member countries of SAARC are:

- Afghanistan
- Bangladesh
- Bhutan
- India
- Maldives
- Nepal
- Pakistan
- Sri Lanka

From the options provided, **Nepal** and **Bangladesh** are members of SAARC. Myanmar and China are not full members, although China holds observer status.

Examining Border Relations and Pacts

India shares borders with several of its neighbours, and managing these borders involves various agreements and discussions. Let's look at the relationship with the countries mentioned in the options:

Bangladesh Border Pact Details

India signed the **Land Boundary Agreement (LBA)** with Bangladesh in 2015. This historic pact aimed to resolve complex issues related to land boundaries and enclaves (areas of territory surrounded by another country's territory). The agreement involved the exchange of adverse possessions and facilitated the exchange of over 160 enclaves, significantly simplifying border management and improving the lives of thousands of people living in these areas. This is widely considered a major recent border agreement.

Nepal Border Considerations

India and Nepal share a long, open border. While there are established mechanisms for border management and discussions occur regularly regarding border issues, there hasn't been a singular, landmark 'Border Pact' recently equivalent to the LBA signed with Bangladesh. Issues like Kalapani and Susta remain points of discussion.

Evaluating Other Border Agreements

It's also important to consider India's border relations with the non-SAARC options provided to confirm why they might not be the correct answer:

India-Myanmar Border Dynamics

India shares a border with Myanmar, and discussions focus on border security, illegal crossings, and issues related to insurgent groups operating along the frontier. While cooperation exists, a comprehensive 'Border Pact' like the LBA is not the most defining recent event.

India-China Border Talks

India shares a long and often contentious border with China, known as the Line of Actual Control (LAC). Border talks between India and China primarily focus on managing existing disputes, maintaining peace and tranquility, and preventing escalation, rather than signing a definitive agreement resolving all boundary issues.

Final Identification of India's Border Pact Partner

Comparing the situations, the most significant and recent **Border Pact** signed by India with a **SAARC** country among the choices is with **Bangladesh** through the Land Boundary Agreement of 2015. This agreement directly addressed and settled long-standing border complexities.

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86. **Answer: b**

Explanation:

Diplomatic Presence in Delhi: February/March 2012	This analysis focuses on identifying which foreign dignitaries, specifically Foreign Ministers from Norway, China, Italy, and Egypt, were present in New Delhi during February and March 2012. This involves checking records of diplomatic visits and significant international events hosted in Delhi during that time.	Foreign Minister of Norway Visit Analysis	Norway's Foreign Minister during the period of February/March 2012 was Jonas Gahr Støre. Reviewing major diplomatic activities and official schedules for that time does not yield confirmation of Minister Støre visiting Delhi during these specific months.	Foreign Minister of China Visit Analysis	Yang Jiechi held the position of Foreign Minister of China during February and March 2012. While detailed public records confirming Yang Jiechi's presence in Delhi during this exact timeframe are not prominent, high-level diplomatic exchanges between India and China are frequent. Such interactions, potentially including visits by the Foreign Minister to the capital for bilateral discussions, are common to manage the relationship between the two Asian giants.	Foreign Minister of Italy Visit Analysis	Giulio Terzi di Sant'Agata served as Italy's Foreign Minister in early 2012. Crucially, reports confirm that Minister Terzi attended the 8th Asia-Europe Meeting (ASEM) Foreign Ministers' Meeting. This significant international conference was hosted in New Delhi in March 2012. This confirms the presence of the Italian Foreign Minister in Delhi during the specified period.	Foreign Minister of Egypt Visit Analysis	Egypt's Foreig Minister durir February/Ma 2012 was Nab Elaraby, with Mohamed Kamel Amr taking office later in Augu 2012. There is readily available information confirming th either the Egyptian Foreign Minis of that time visited Delhi during Febru or March 201

87. **Answer: d**

Explanation:

This solution focuses on identifying the country where **Kamla Prasad Bissessar** serves as the Prime Minister, based on the provided question and options.

Kamla Prasad Bissessar: Prime Minister Identification

The question asks to identify the country led by **Kamla Prasad Bissessar** in the capacity of Prime Minister. Understanding the political leadership of various nations is key to answering such questions related to current affairs and international relations.

Trinidad and Tobago Leadership

Kamla Prasad Bissessar is the Prime Minister of **Trinidad and Tobago**. She assumed this significant governmental role, becoming the first female Prime Minister of the nation and the first of Indian origin to hold the position. Her tenure began in May 2010.

Analysis of Options Provided

To determine the correct answer, let's examine the options presented:

- **Guyana**: While Guyana is a South American nation with strong ties to the Caribbean and a significant population of Indian descent, Kamla Prasad Bissessar is not its Prime Minister.
- **Jamaica**: Jamaica is an island country situated in the Caribbean Sea. It has its own distinct political leadership, and Kamla Prasad Bissessar does not hold the office of Prime Minister there.
- **Madagascar**: Madagascar is an island country located in the Indian Ocean, off the coast of East Africa. It is geographically separate from the Caribbean nations, and Kamla Prasad Bissessar has no political affiliation or role in Madagascar.
- **Trinidad and Tobago**: This Caribbean nation is the correct country where Kamla Prasad Bissessar holds the position of Prime Minister, having been elected to lead the country starting in 2010.

Based on factual political information, Kamla Prasad Bissessar's role as Prime Minister is associated with Trinidad and Tobago.

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88. **Answer: b**

Explanation:

Investigating the Luxury Cruise Ship Capsizing

This question focuses on a specific maritime event: the **capsizing** of a **luxury cruise ship** that occurred near the **western coast of Italy** on the date of **13th January 2012**. We need to identify the correct name of this vessel from the options provided.

Understanding the Options

Let's look at each option to see how it relates to the details mentioned in the question:

- **Costa Allegra**: This was a cruise ship belonging to Costa Cruises, but it experienced a fire and loss of power in the Indian Ocean in February 2012. It did not capsize near Italy in January 2012.
- **Costa Concordia**: This name is strongly associated with a major disaster involving a large cruise ship.
- **Costa Fortuna**: This is another cruise ship in the Costa Cruises fleet, but it was not involved in the capsizing incident on 13th January 2012.
- **Enrica Lexie**: This is an Italian merchant vessel, previously known as Enrica Lexie, which was involved in a separate incident concerning maritime security off the coast of India. It is not a luxury cruise ship that capsized near Italy.

Identifying the Ship Involved in the 13th January 2012 Incident

The incident described, the capsizing of a **luxury cruise ship** near the **western coast of Italy** on **13th January 2012**, specifically refers to the MV **Costa Concordia**. The ship tragically ran aground on submerged rocks near the island of Giglio, leading to its partial sinking and capsizing. This event remains a significant and somber event in maritime history.

Key Facts about the Costa Concordia Disaster

To confirm the identification, here are the key details:

- **Ship Name**: Costa Concordia
- **Date**: January 13, 2012
- **Location**: Tyrrhenian Sea, near Isola del Giglio, Tuscany, Italy (western coast of Italy)
- **Event Type**: Grounding and subsequent capsizing
- **Operator**: Costa Cruises

Therefore, the **Costa Concordia** is the correct identification for the **luxury cruise ship** that **capsized** near the **western coast of Italy** on **13th January 2012**.

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89. **Answer: b**

Explanation:

Fifth Summit Conference Location (2011)

This section details the location where the Fifth Summit Conference of the IBSA (India, Brazil, and South Africa) Dialogue Forum was held in the year **2011**.

IBSA Forum Background

The **IBSA** Dialogue Forum represents an important collaboration between three major emerging economies: **India**, **Brazil**, and **South Africa**. Established to foster cooperation and dialogue on shared interests and international issues, the Forum aims to strengthen the collective voice of these nations in global governance discussions. The leaders meet periodically to discuss strategic partnerships and global challenges.

2011 Fifth Summit Conference Details

The Summits are the highest decision-making bodies within the IBSA framework. The **Fifth Summit Conference**, held in **2011**, was a crucial meeting for the member states. Based on historical records and official information regarding IBSA meetings, the **Fifth Summit Conference of IBSA** took place in **Pretoria**.

Comparing IBSA Summit Locations

To understand the context, let's look at the options provided:

- **Pretoria**: This city, serving as the administrative capital of South Africa, hosted the 2011 Fifth IBSA Summit Conference.
- New Delhi: As the capital of India, New Delhi has hosted various international events, but it was not the venue for the specific 2011 IBSA summit.
- Brasilia: Brasilia, the capital of Brazil, is another key member of IBSA and has hosted meetings, but not the Fifth Summit Conference in 2011.
- Victoria: This option does not correspond to the known location of the Fifth IBSA Summit Conference in 2011.

Therefore, the confirmed location for the **Fifth Summit Conference of IBSA** in **2011** was **Pretoria**, highlighting South Africa's role as the host nation for this significant international gathering.

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90. **Answer: c**

Explanation:

13th Finance Commission Chairman Details

The Finance Commission of India is a constitutional body set up under Article 280 of the Indian Constitution. Its main job is to advise the President on financial matters, focusing on the distribution of taxes between the central government and state governments, and suggesting principles for grants-in-aid.

Knowing the key figures who lead such important commissions is often tested in competitive exams. This explanation focuses on identifying the correct **Chairman of the 13th Finance Commission**.

Understanding the 13th Finance Commission

The 13th Finance Commission was constituted in 2007 and its recommendations were applicable for the fiscal period from 2010-11 to 2014-15. The commission's work involved analyzing the nation's fiscal health and proposing a framework for financial resource allocation.

The leadership of this commission was entrusted to **Dr. Vijay Kelkar**, a prominent Indian economist and former Finance Secretary.

Examining the Options Provided

We need to determine which of the given options correctly identifies the **Chairman of the 13th Finance Commission**:

- **Indira Rajaraman**: Indira Rajaraman is a notable economist who served as a member of the 12th Finance Commission. She was not the chairman of the 13th commission.
- **C. Rangarajan**: Dr. C. Rangarajan, a former Governor of the Reserve Bank of India, chaired the 12th Finance Commission (for the period 2005-2010).
- **Vijay Kelkar**: Dr. Vijay Kelkar was the Chairman of the 13th Finance Commission, guiding its deliberations and report for the period 2010-2015.
- **None of the above**: Since Dr. Vijay Kelkar was the chairman, this option is not the correct choice.

Based on this information, **Vijay Kelkar** is the correct answer for the Chairman of the 13th Finance Commission.

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91. **Answer: a**

Explanation:

Seychelles Military Base: China's Announcement in December 2011

This solution addresses the question regarding which country announced plans in December 2011 to establish its first overseas military base, specifically in Seychelles, an island nation in the Indian Ocean.

Background: Overseas Military Presence

Establishing military bases abroad is a significant geopolitical move. It allows a country to project power, protect its interests (like trade routes or citizens), conduct operations, and strengthen strategic partnerships in key regions. The Indian Ocean is a vital area for global trade and strategic positioning, making Seychelles an attractive location for establishing such a presence.

Analysis of the December 2011 Announcement

In December 2011, reports confirmed that**China**announced its intention to set up its first military logistics support base outside its mainland territory. The chosen location was the island of Mahé in Seychelles.

Key Points of the Announcement:

- **Country:** China
- **Year:** 2011 (specifically December)
- **Action:** Announced plans for its first overseas military base.
- **Location:** Seychelles (Indian Ocean island).
- **Purpose:** Primarily intended as a logistics and support base, crucial for supporting anti-piracy missions and ensuring the safety of Chinese vessels in the region.

Evaluating Other Options

- **Japan:** While Japan has a strong maritime presence and alliances, its post-WWII constitution has historically limited its overseas military activities. It did not announce establishing its first base in Seychelles in 2011.
- **Russia:** Russia has a history of overseas military bases but did not make such an announcement concerning Seychelles in December 2011 as its *first* such venture.
- **South Korea:** South Korea, although increasing its international role, was not the country that made this specific announcement regarding its first overseas base in Seychelles in 2011.

Conclusion on China's Strategic Move

The establishment of this base marked a significant step in China's growing military reach and its focus on securing maritime interests in the strategically important Indian Ocean region. It was widely seen as a move to enhance its naval capabilities and logistical support far from its shores, marking a new chapter in its military foreign policy.

Therefore, the country that announced in December 2011 the establishment of its first military base abroad in Seychelles was **China**.

Country	Announcement Year	Location	Significance
China	December 2011	Seychelles (Indian Ocean)	First overseas military base (logistics/support)
Japan	N/A (for this specific announcement)	N/A	Limited overseas base activity in 2011
Russia	N/A (for this specific announcement)	N/A	Existing overseas presence, but not the first base announcement in Seychelles in 2011
South Korea	N/A (for this specific announcement)	N/A	Focused elsewhere in 2011 regarding overseas bases

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92. **Answer: d**

Explanation:

17th SAARC Conference 2011: Identifying the Location

This question asks for the specific location where the 17th summit of the South Asian Association for Regional Cooperation (SAARC) took place in the year 2011. Understanding the venues of major international conferences like the SAARC summit is important for keeping track of diplomatic events and regional cooperation.

About the 17th SAARC Summit

- **Event:** The 17th SAARC Summit marked a significant meeting of the heads of state or government of the SAARC member countries.
- **Year:** The summit was held in 2011.
- **Purpose:** These summits are crucial for discussing regional issues, fostering cooperation, and addressing common challenges faced by the South Asian region, including economic development, trade, and security.

Correct Venue: Addu City

The 17th SAARC Summit in 2011 was hosted in **Addu City**. This city is located in the Maldives.

Addu City, an archipelago city comprising several islands connected by causeways, served as the venue for this important international gathering. Hosting the summit here highlighted the Maldives' role in regional diplomacy.

Analysis of Other Options

Let's examine the other options provided to understand why they are not the correct answer for the 17th SAARC Conference in 2011:

- **Male:** While Male is the capital city of the Maldives, the 17th SAARC Summit specifically took place in Addu City, not the capital itself.
- **Dhaka:** Dhaka is the capital of Bangladesh. Bangladesh has hosted SAARC Summits in the past, but it was not the venue for the 2011 conference.
- **Colombo:** Colombo is the commercial capital of Sri Lanka. Sri Lanka has also hosted SAARC meetings, but the 17th Summit in 2011 was not held in Colombo.

Conclusion on SAARC 2011 Summit Location

Based on the confirmed records, the 17th SAARC Conference, held in 2011, convened in **Addu City**, Maldives. This venue choice was significant for the host nation and the regional discussions that took place.

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93. **Answer: c**

Explanation:

Mahatma Gandhi Award: 2011 Recipient for Peace and Reconciliation

The **Mahatma Gandhi International Award for Peace and Reconciliation** is an honor bestowed upon individuals demonstrating exceptional commitment to promoting peace, non-violence, and mutual understanding across communities and nations. This award specifically celebrates efforts that align with the philosophical principles of Mahatma Gandhi.

Understanding the 2011 Award

The question requires identifying the specific recipient of the **Mahatma Gandhi International Award for Peace and Reconciliation** in the year **2011**. This involves knowing which prominent figure was recognized for their peace-building efforts during that particular year.

Dalai Lama Honored in 2011

His Holiness, the **Dalai Lama**, was the recipient of the **Mahatma Gandhi International Award for Peace and Reconciliation** in **2011**. The Dalai Lama, a globally revered spiritual leader, has dedicated his life to advocating for compassion, inter-faith dialogue, and peaceful resolution of conflicts. His consistent message of non-violence and his efforts in promoting global harmony made him a fitting choice for this prestigious award.

Analysis of Other Nominees

The options provided include other influential global figures:

- **Aung San Suu Kyi**: Renowned for her struggle for democracy in Myanmar.
- **Bill Clinton**: Former U.S. President, known for his post-presidency peace advocacy.
- **Sheikh Hasina Wajed**: Current Prime Minister of Bangladesh, recognized for leadership in development and governance.

While these individuals are significant figures in their own right, the specific recognition for the **Mahatma Gandhi International Award for Peace and Reconciliation** in **2011** was given to the **Dalai Lama**.

Confirmation of Peace Awardee

In summary, the **2011** edition of the **Mahatma Gandhi International Award for Peace and Reconciliation** was awarded to the **Dalai Lama**, acknowledging his extensive work in promoting peace and understanding worldwide.

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94. **Answer: a**

Explanation:

2014 FIFA World Cup Host Nation

The **2014 FIFA World Cup** was a major international football (soccer) event that captured the attention of fans worldwide. Understanding which country hosted this prestigious tournament is key to recalling its history.

Identifying the 2014 FIFA World Cup Host

The FIFA World Cup is held every four years, bringing together national teams from around the globe to compete for the title of world champion. The selection of a host country involves a rigorous process by FIFA, considering factors like infrastructure, security, and fan experience.

- **Event:** 2014 FIFA World Cup
- **Significance:** The premier international association football competition contested by the senior men's national teams of the participating FIFA members.
- **Host Selection:** Countries bid to host, and FIFA makes the final decision.

Brazil as the 2014 Host

The nation that hosted the **2014 FIFA World Cup** was **Brazil**. This marked the second time Brazil hosted the prestigious tournament, with the first being in 1950.

- **Host Country:** Brazil
- **Year:** 2014
- **Previous Hosting:** Brazil hosted the World Cup in 1950.
- **Tournament Details:** The competition took place from June 12 to July 13, 2014, across various stadiums in Brazil.

Brazil was the sole bidder for the 2014 FIFA World Cup and was awarded hosting rights in 2007. The tournament was celebrated for its vibrant atmosphere, passionate fans, and exciting matches, culminating in Germany winning the title after defeating Argentina in the final.

Evaluating the Options

Let's look at the given options:

- **Option 1: Brazil** - This aligns with the fact that Brazil was indeed the host nation.

- **Option 2: Argentina** - Argentina is a prominent football nation but did not host the 2014 World Cup.
- **Option 3: Canada** - Canada has hosted other FIFA events, like the Women's World Cup, but not the 2014 Men's World Cup.
- **Option 4: None of the above** - This is incorrect as Brazil is listed as an option.

Therefore, Brazil is the correct answer for the country that hosted the **2014 FIFA World Cup**.

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95. **Answer: b**

Explanation:

Rajeev Gandhi Khel Ratna Award 2011 Recipient

This explanation focuses on identifying the recipient of the Rajeev Gandhi Khel Ratna Award for the year 2011, based on the provided options.

Understanding the Rajeev Gandhi Khel Ratna Award

The Rajeev Gandhi Khel Ratna Award is India's highest honour bestowed in the field of sports. It is awarded annually by the Ministry of Youth Affairs and Sports to recognise outstanding achievements by athletes in the preceding four-year period. The award aims to celebrate excellence and inspire young athletes.

Analysis of the 2011 Awardee Options

The question asks for the specific athlete who received the Rajeev Gandhi Khel Ratna Award in 2011. Let's look at the athletes listed:

- Zaheer Khan: A highly respected former Indian international cricketer.
- Gagan Narang: A celebrated Indian sport shooter.
- Tejaswini Sawant: An accomplished Indian sport shooter.
- Jwala Gutta: A prominent Indian badminton player.

Gagan Narang's 2011 Recognition

The Rajeev Gandhi Khel Ratna Award for 2011 was presented to **Gagan Narang**. This prestigious award acknowledged his remarkable performance and consistency in the sport of shooting.

Key highlights of Gagan Narang's achievements contributing to this award include:

- His spectacular performance at the 2010 Commonwealth Games, where he won four gold medals in the 10m air rifle event.
- His consistent success in international shooting championships, demonstrating world-class skill and dedication.
- His role in popularizing shooting sports in India through his sustained achievements.

Gagan Narang's excellence in shooting made him a deserving recipient of the award in 2011.

Final Determination for 2011

Therefore, based on sporting achievements recognised in 2011, Gagan Narang is identified as the recipient of the Rajeev Gandhi Khel Ratna Award for that year.

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96. **Answer: a**

Explanation:

Decoding India's 63rd Republic Day Special Guest

India's Republic Day, celebrated every year on January 26th, is a significant national event. A key tradition associated with the Republic Day Parade is the invitation extended to a distinguished foreign dignitary to attend as the **Special Guest**. This highlights India's diplomatic relations and partnerships. The question asks us to identify who held this prestigious position during India's 63rd Republic Day celebration.

Guest of Honour Tradition

The selection of a Special Guest is a carefully considered diplomatic decision. The guest often represents a country with which India shares strong bilateral ties. Attending the Republic Day parade provides a high-profile platform for these leaders.

Analyzing the Options for India's 63rd Republic Day

Let's examine the individuals listed in the options to determine who graced India's 63rd Republic Day (January 26, 2012) as the Special Guest:

- **Yingluck Shinawatra**: She served as the Prime Minister of Thailand from 2011 to 2014. It is a notable fact that **Yingluck Shinawatra** was indeed the **Special Guest** for India's 63rd Republic Day celebrations. Her visit marked a significant moment in India-Thailand relations.
- **Thaksin Shinawatra**: He is the former Prime Minister of Thailand and the brother of Yingluck Shinawatra. While influential, he was not the official **Special Guest** for India's 63rd Republic Day.
- **Angela Merkel**: She held the position of Chancellor of Germany for many years. While a prominent global leader, she was not the **Special Guest** for India's 63rd Republic Day in 2012.
- **Sheikh Hasina Wajed**: She is the current Prime Minister of Bangladesh. Although India maintains strong ties with Bangladesh, Sheikh Hasina Wajed was not the **Special Guest** for the 63rd Republic Day celebration.

Conclusion: The 63rd Republic Day Special Guest

Based on historical records and diplomatic events, the Prime Minister of Thailand at the time, **Yingluck Shinawatra**, was the invited **Special Guest** for India's 63rd Republic Day celebration held on January 26, 2012. Her presence underscored the close relationship between India and Thailand during that period.

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97. **Answer: d**

Explanation:

DSC Prize for South Asian Literature 2012 Recipient

This question requires identifying the author who received the second DSC Prize for South Asian Literature, awarded in January 2012. This prize specifically honours literary works focusing on the South Asian experience.

About the DSC Prize for South Asian Literature

The DSC Prize for South Asian Literature is an annual award recognizing excellence in writing about the South Asian diaspora and its experiences. It aims to promote South Asian writing on a global scale. The prize is awarded to authors writing in English or translation, covering themes related to the region.

Determining the 2012 Winner

The second DSC Prize for South Asian Literature was presented in January 2012. The award recognized the novel *Chinaman: The Legend of Pradeep Mathew*.

The author who won this prestigious award was **Shehan Karunatilaka**.

Evaluating the Provided Options

Let's look at the choices provided:

- **Shehan Karunatilaka**: He won the second DSC Prize for South Asian Literature in 2012 for his novel *Chinaman*.
- Amitav Ghosh: While a highly respected author often writing about South Asian themes, he was not the winner of the DSC Prize in 2012.
- H. M. Naqvi: Known for his novel *Home Boy*, but he did not receive the DSC Prize in 2012.
- Shashi Tharoor: A prominent Indian writer and politician, but not the recipient of this particular award in 2012.

Based on the history of the DSC Prize for South Asian Literature, **Shehan Karunatilaka** is the correct recipient for the year 2012.

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98. **Answer: c**

Explanation:

Mariano Rajoy's Prime Ministership in Spain

The question asks to identify the country where Mariano Rajoy took office as Prime Minister on December 20, 2011. Understanding the political history and leadership changes in different European nations is key to answering this question correctly.

Key Event: Mariano Rajoy Becomes Prime Minister

Mariano Rajoy Brey assumed the high office of Prime Minister on a specific date, December 20, 2011. This event marked a significant political transition.

- **Who:** Mariano Rajoy Brey
- **Position Assumed:** Prime Minister
- **Date:** December 20, 2011
- **Country:** Spain

Background on Mariano Rajoy's Appointment

Mariano Rajoy is a prominent Spanish politician who led the People's Party (Partido Popular). His appointment as Prime Minister followed a general election victory for his party. This electoral success paved the way for him to form the government and assume leadership.

Analysis of Country Options

Let's examine the options provided in relation to Mariano Rajoy's premiership:

- **Kosova:** Kosova is a relatively new nation, and Mariano Rajoy has not held any prime ministerial role there.
- **Portugal:** Portugal is a neighboring country to Spain, but Mariano Rajoy's prime ministerial tenure was associated with Spain, not Portugal.
- **Spain:** This is the correct country. Mariano Rajoy served as the Prime Minister of Spain from December 20, 2011, until June 1, 2018. His premiership began on the date specified in the question.
- **Ukraine:** Ukraine is an Eastern European country, and Mariano Rajoy has no connection to its prime ministerial office.

Therefore, the specific event mentioned in the question directly relates to Spain, where Mariano Rajoy became Prime Minister on December 20, 2011.

---

99. **Answer: c**

Explanation:

First Indian Grand Prix Formula One Race Winner

This question asks us to identify the driver who achieved victory in the very first **Indian Grand Prix Formula One** car race. This inaugural event was a significant moment for motorsport in India.

About the Inaugural Indian Grand Prix

The first edition of the Indian Grand Prix took place on October 30, 2011. The venue was the purpose-built Buddh International Circuit, located in Greater Noida, Uttar Pradesh.

Evaluating the Driver Options

The options provided include several well-known Formula One drivers:

- Adrian Sutil: A German racing driver with experience in Formula One.
- Narayan Karthikeyan: An Indian driver who represented the home country at the event.
- Sebastian Vettel: A highly successful German driver competing during that period. (Listed as "Sebastian Vittel" in the options).
- Jenson Button: A British driver and a former Formula One World Champion. (Listed as "Jesson Baton" in the options).

Identifying the Champion Driver

The driver who won the inaugural **Indian Grand Prix Formula One** race was **Sebastian Vettel**. He was driving for the Red Bull Racing team at the time and delivered a commanding performance to win the race held at the Buddh International Circuit.

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100. **Answer: b**

Explanation:

Indian Batsman Centuries in 2011-12 India-Australia Test Series

This question asks to identify the sole Indian batsman who achieved a century during the 2011-2012 India-Australia Test Series. This particular cricket series holds significance as it tested the mettle of the Indian team in Australian conditions.

Performance Analysis of Key Indian Batsmen

To determine the correct answer, let's examine the performance of the mentioned Indian batsmen in the 2011-12 Test series:

- **Sachin Tendulkar:** While a legendary cricketer, Sachin Tendulkar did not score any centuries in the 2011-12 Test series against Australia. His highest score in the series was 76 runs.
- **Virat Kohli:** Virat Kohli emerged as the standout performer among the Indian batsmen in this series concerning centuries. He scored a magnificent century, remaining **133 not out**, in the fourth and final Test match held in Adelaide.
- **Rohit Sharma:** Rohit Sharma was not part of the Indian squad for the 2011-12 Test series against Australia.
- **Rahul Dravid:** Rahul Dravid had a commendable performance in the series, notably scoring 93 runs in the third Test at Perth. However, he narrowly missed out on a century in that innings and did not score any centuries throughout the series.

Identifying the Centurion Batsman

Based on the performance records of the 2011-12 India-Australia Test Series, only one Indian batsman managed to score a century. The series comprised four Test matches played in Australia from December 2011 to January 2012.

Reviewing the individual match performances confirms that:

- Virat Kohli scored **133*** (133 not out) in the second innings of the 4th Test at Adelaide Oval.
- No other Indian batsman registered a century during the entirety of this specific Test series.

Conclusion on the 2011-12 Test Series Centurion

Therefore, Virat Kohli is identified as the only Indian batsman to have scored a century in the 2011-12 India-Australia Cricket Test Series.

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101. **Answer: a**

Explanation:

Investigating the Journalist Behind the "Lucknow Boy" Autobiography

This section focuses on identifying the renowned journalist who penned the autobiography titled *"Lucknow Boy"*. Understanding the authors behind famous literary works, especially autobiographies that offer personal insights into significant careers, is crucial for a comprehensive grasp of the field.

Author Identification: Vinod Mehta's "Lucknow Boy"

The autobiography *"Lucknow Boy"* was written by **Vinod Mehta**. He was a highly respected and influential figure in Indian journalism.

About Vinod Mehta

- **Vinod Mehta** was a prominent Indian journalist, columnist, and editor.
- He held editorial positions at several leading publications, including *The Sunday Observer*, *The Pioneer*, *Sunday Mail*, and *The Indian Post*.
- He also served as the editor-in-chief of *Outlook* magazine for many years, significantly shaping its content and influence.
- His career spanned several decades, during which he became known for his sharp wit, insightful commentary, and distinctive writing style.

Details of the Autobiography

"Lucknow Boy: My Life in Journalism", published in 2011, serves as Vinod Mehta's personal account of his life and experiences, particularly focusing on his journey through the world of journalism in India. The book offers a candid look at his career, the media landscape, and notable events he covered or was involved in.

Analysis of Options

Let's consider the provided options in the context of the autobiography *"Lucknow Boy"*:

- **Vinod Mehta:** Correctly identified as the author of *"Lucknow Boy"*.
- **Alok Mehta:** While also a journalist, he is not the author of this specific autobiography.
- **Narendra Mohan:** A known figure in Hindi journalism, but not associated with writing *"Lucknow Boy"*.
- **Pritish Nandy:** A prominent journalist and media personality, but *"Lucknow Boy"* is not his autobiography.

Therefore, **Vinod Mehta** is the journalist who authored the autobiography *"Lucknow Boy"*.

---

102. **Answer: d**

Explanation:

59th National Film Awards Best Actress Winner

The 59th National Film Awards ceremony honored the best films and performances from the year 2011. These awards are among the most prestigious and anticipated events in Indian cinema, recognizing artistic and technical excellence.

Vidya Balan: Best Actress Accolade

In the category of Best Actress at the 59th National Film Awards, the prestigious award was presented to **Vidya Balan**. This recognition marked a significant milestone in her career, highlighting her exceptional acting prowess.

Performance in 'The Dirty Picture'

Vidya Balan earned the Best Actress award for her powerful and transformative role in the biographical drama film, *The Dirty Picture*. The film explored the life of Southern actress Silk Smitha, and Vidya's portrayal was widely acclaimed for its boldness, nuance, and intensity, earning critical praise and audience appreciation.

Analysis of Award Options

The selection for the Best Actress award involves careful consideration of performances across numerous films. For the 59th National Film Awards:

- **Kareena Kapoor** delivered notable performances during this period.
- **Priyanka Chopra** also showcased strong acting skills in her films.
- **Rani Mukerji** has been a consistent performer in Bollywood.
- **Vidya Balan** was ultimately recognized as the Best Actress winner for her impactful role in *The Dirty Picture*.

Vidya Balan's win underscores the impact of her performance in *The Dirty Picture*, making her the standout choice for the Best Actress award at the 59th National Film Awards.

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103. **Answer: a**

Explanation:

Detailed Solution: Matching Athletes with Their Sports

This question requires matching athletes from List - I with the sports they are famous for, listed in List - II. We need to identify the correct sport associated with each athlete.

Understanding the Athletes and Sports

Let's analyze each athlete mentioned in List - I:

- **(A) Preeja Sreedharan:** Known for her achievements in long-distance running events.
- **(B) Sunil Chhetri:** A renowned name in Indian sports, celebrated for his role in football.
- **(C) Rakesh Kumar:** Associated with a popular contact team sport in India.
- **(D) Virdhaval Khade:** A prominent figure in aquatic sports.

Now let's look at the sports in List - II:

- **1. Football:** A team sport played with a ball between two teams.
- **2. Kabaddi:** A contact team sport originating in ancient India.
- **3. Swimming:** An individual or team sport involving propelling oneself through water.
- **4. Athletics:** A collection of sporting events involving rivalry in running, jumping, throwing, and walking.

Matching Process: List - I with List - II

We will now match each athlete to their respective sport:

- **(A) Preeja Sreedharan** is famous for her participation and victories in **Athletics** (specifically, long-distance running). Therefore, (A) matches with 4.
- **(B) Sunil Chhetri** is widely recognized as one of India's greatest **Football** players. Therefore, (B) matches with 1.
- **(C) Rakesh Kumar** is a well-known player of **Kabaddi**. Therefore, (C) matches with 2.
- **(D) Virdhaval Khade** is a celebrated Indian swimmer, making him associated with **Swimming**. Therefore, (D) matches with 3.

Summary of Matches

The correct pairings are:

- (A) - 4
- (B) - 1
- (C) - 2
- (D) - 3

This combination corresponds to the first option provided.

Final Answer Determination

Comparing our derived matches with the given options:

- Option 1: (A) - (4), (B) - (1), (C) - (2), (D) - (3) - This matches our analysis.
- Option 2: (A) - (1), (B) - (2), (C) - (3), (D) - (4) - Incorrect.
- Option 3: (A) - (4), (B) - (2), (C) - (3), (D) - (1) - Incorrect.
- Option 4: (A) - (3), (B) - (4), (C) - (2), (D) - (1) - Incorrect.

Therefore, the correct option is the one that lists these matches.

List - I (Athlete)	List - II (Sport)
(A) Preeja Sreedharan	4. Athletics
(B) Sunil Chhetri	1. Football
(C) Rakesh Kumar	2. Kabaddi
(D) Virdhaval Khade	3. Swimming

The correct sequence of matches is (A) - 4, (B) - 1, (C) - 2, (D) - 3.

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104. **Answer: c**

Explanation:

12th Five Year Plan Development Target

This question relates to the specific economic development goal set forth in the initial 'vision paper' for India's 12th Five Year Plan (2012-2017). It also specifies that this target was considered or accepted by the National Development Council (NDC).

Understanding the Vision for the 12th Plan

India's Five Year Plans have historically guided the nation's socio-economic development strategies. The 12th Five Year Plan (2012-2017) was designed with the overarching goal of achieving "Faster, Sustainable and More Inclusive Growth".

Before the finalization of the detailed plan document, an 'approach paper' or 'vision paper' is usually prepared. This document outlines the key objectives, priorities, and anticipated targets, setting the direction for the subsequent detailed planning.

The Vision Paper's Growth Target

The 'vision paper' for the 12th Five Year Plan articulated an ambitious target for the country's economic expansion.

Key points regarding the target:

- The initial vision document aimed for an average economic growth rate of **9%** per annum during the 12th Plan period.
- This aspiration was articulated in the early stages of planning.

While the final 12th Five Year Plan document, which was eventually approved by the National Development Council, set a target of **8%** average annual growth, the question specifically asks for the target mentioned in the 'vision paper'. The 'vision paper' reflected the higher aspiration discussed during the initial formulation phase.

Therefore, the development target expected in the 'vision paper' was approximately 9%.

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105. **Answer: c**

Explanation:

Matching Harappan Sites with Their Locations

The question asks us to correctly match the **Harappan Sites** listed in List-I with their corresponding **Locations** provided in List-II. We need to find the option that represents the accurate pairings.

Determining the Correct Locations of Harappan Sites

Let's identify the location for each Harappan site mentioned in List-I:

- **(A) Manda:** This site is located in the northernmost part of the Indus Valley Civilization's reach. It is situated in **Jammu – Kashmir**.
- **(B) Daimabad:** This significant site belongs to the Late Harappan period and is found in the state of **Maharashtra**, specifically in the Godavari-Pravara valley.
- **(C) Kalibangan:** Kalibangan is an important archaeological site that flourished during the Harappan era. It is located in **Rajasthan**, on the banks of the Ghaggar River.
- **(D) Rakhigarhi:** Considered one of the largest Harappan cities, Rakhigarhi is located in the Hisar district of **Haryana**.

Tabulating the Correct Matches

Based on the information above, the correct pairings between the **Harappan Sites** and their **Locations** are:

Harappan Site (List – I)	Location (List – II)
(A) Manda	3. Jammu – Kashmir
(B) Daimabad	4. Maharashtra
(C) Kalibangan	1. Rajasthan
(D) Rakhigarhi	2. Haryana

Evaluating the Options

Now, let's compare these correct matches with the given options to find the one that reflects our findings:

- Option 1 suggests: (A)-(1), (B)-(2), (C)-(3), (D)-(4). This is incorrect.
- Option 2 suggests: (A)-(2), (B)-(3), (C)-(4), (D)-(1). This is incorrect.
- **Option 3 suggests: (A)-(3), (B)-(4), (C)-(1), (D)-(2).** This matches our determined correct pairings: Manda with Jammu – Kashmir, Daimabad with Maharashtra, Kalibangan with Rajasthan, and Rakhigarhi with Haryana.
- Option 4 suggests: (A)-(4), (B)-(1), (C)-(2), (D)-(3). This is incorrect.

Therefore, the option that correctly matches the **Harappan Sites** with their **Locations** is Option 3.

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106. **Answer: b**

Explanation:

Matching Vedic Rivers with Modern Names

This question requires matching the rivers mentioned in the Vedic period (List-I) with their corresponding modern names (List-II). Understanding these ancient river names is crucial for geographical and historical context related to the Vedic civilization.

Vedic Rivers Identification

The Vedic texts often refer to various rivers that played significant roles in the lives of the people during that era. Here is a breakdown of the matching based on historical and geographical evidence:

List - I (Vedic River)	List - II (Modern Name)
(A) Kubha	(2) Kabul
(B) Parushni	(3) Ravi
(C) Sadanira	(1) Gandak
(D) Sutudri	(4) Satluj

Detailed Explanation of Matches

Let's look at each match in detail:

- **(A) Kubha:** The Vedic river Kubha is identified with the modern **Kabul River**. This river flows through Afghanistan and Khyber Pakhtunkhwa province of Pakistan.
- **(B) Parushni:** The Parushni River is historically significant, notably mentioned in the context of the Battle of the Ten Kings. It corresponds to the modern **Ravi River**, which flows through Punjab and Himachal Pradesh in India and Punjab province in

Pakistan.

- **(C) Sadanira:** This river is mentioned as forming a boundary in ancient texts. It is identified with the modern **Gandak River** (also known as Narayani in Nepal), a tributary of the Ganges River.
- **(D) Sutudri:** The Sutudri River is a major river mentioned in Vedic literature. It is known today as the **Satluj River** (or Sutlej River), one of the five major rivers of the Punjab region.

Selecting the Correct Option

Based on the accurate matching:

- (A) Kubha matches with (2) Kabul.
- (B) Parushni matches with (3) Ravi.
- (C) Sadanira matches with (1) Gandak.
- (D) Sutudri matches with (4) Satluj.

This corresponds to the option where (A) is paired with (2), (B) with (3), (C) with (1), and (D) with (4).

Therefore, the correct option is 2: (A) - (2), (B) - (3), (C) - (1), (D) - (4).

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107. **Answer: a**

Explanation:

Locating Sacred Buddhist Sites on the Niranjana River

This section explores significant Buddhist pilgrimage destinations and their geographical context, specifically focusing on their relationship with the historical **River Niranjana**.

The Importance of the River Niranjana in Buddhism

The **River Niranjana** holds profound importance in Buddhist history. It is famously associated with the period when Prince Siddhartha Gautama meditated intensely under the Bodhi Tree and attained enlightenment, becoming the Buddha. The river is now known as the Phalgu River. Understanding the location of key Buddhist sites relative to this river helps clarify historical accounts and pilgrimage significance.

Analysis of Key Buddhist Sacred Places

Let's examine the locations of the places mentioned in the options:

- **Bodh Gaya**: This is arguably the most sacred site in Buddhism, marking the location where Siddhartha Gautama achieved enlightenment. It is situated in the state of Bihar, India, on the banks of the **River Niranjana** (now Phalgu River). The Mahabodhi Temple Complex here is a UNESCO World Heritage site.
- **Kushinagar**: This site is significant as the location of the Buddha's Mahaparinirvana (final moments and death). It is located in the Kushinagar district of Uttar Pradesh, India. Kushinagar is situated near the Hiranyavati River, not the Niranjana River.
- **Lumbini**: This sacred place is renowned as the birthplace of Siddhartha Gautama. Lumbini is located in the Rupandehi District of Province No. 5 in Nepal. It is not situated on the River Niranjana.
- **Rishipattana**: Commonly known as Sarnath, this is the deer park near Varanasi in Uttar Pradesh, India, where the Buddha delivered his first sermon after attaining enlightenment, setting in motion the Wheel of Dharma. Sarnath is located near the Ganges River and its tributaries, not the Niranjana River.

Bodh Gaya: The Sacred Site on the Niranjana

Based on historical and geographical evidence, **Bodh Gaya** is the sacred Buddhist place that was situated on the banks of the **River Niranjana**. It was near this river that Siddhartha Gautama meditated and achieved enlightenment under the Bodhi Tree,

making it a central pilgrimage site for Buddhists worldwide.

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108. **Answer: d**

Explanation:

Padma Vibhushan Awardee 2012: K.G. Subrahmanyan

The question asks to identify the recipient of the prestigious **Padma Vibhushan** award in the year **2012** from the given options. The **Padma Vibhushan** is the second-highest civilian award in India, awarded for exceptional and distinguished service.

Analysis of Candidates for Padma Vibhushan 2012

Let's examine each option provided:

- **K.G. Subrahmanyan:** He was a highly respected Indian artist, sculptor, and writer. **K.G. Subrahmanyan** was indeed conferred the **Padma Vibhushan** award in 2012 for his significant contributions to the field of art and culture. His work significantly influenced modern Indian art.
- **Anil Kapoor:** Anil Kapoor is a prominent Indian actor and producer. While he has received national recognition, his Padma award was the **Padma Shri**, awarded in 2008, not the **Padma Vibhushan** in 2012.
- **Homi K. Bhabha:** Dr. Homi J. Bhabha was a renowned nuclear physicist, often called the "father of India's nuclear program." He was honored with the **Padma Bhushan** in 1954. He passed away in 1966, making it impossible for him to receive an award in 2012.
- **Jose Pereira:** While there might be individuals named Jose Pereira, public records do not indicate that any prominent figure with this name received the **Padma Vibhushan** award in 2012.

Confirmation of K.G. Subrahmanyan's Award

Based on the official records of Padma Awards conferred by the Government of India, **K.G. Subrahmanyan** is the correct awardee of the **Padma Vibhushan** in the year **2012**. His dedication and pioneering work in the arts earned him this high civilian honor.

Therefore, the individual among the choices who received the **Padma Vibhushan** in 2012 is **K.G. Subrahmanyan**.

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109. **Answer: b**

Explanation:

2012 UP Vidhan Sabha Election: Women's Representation

This explanation addresses the specific question regarding the number of women elected during the Uttar Pradesh Legislative Assembly (Vidhan Sabha) elections held in the year 2012. The Vidhan Sabha serves as the lower house of the state legislature in Uttar Pradesh, India.

Key Details of the 2012 UP Assembly Elections

The 2012 Uttar Pradesh Assembly elections were a significant electoral event that determined the composition of the state's legislative body. These elections involve voters choosing representatives for various constituencies across the state.

Number of Women Elected in 2012 UP Vidhan Sabha

Following the completion of the 2012 elections and the announcement of results, the total number of women who successfully secured seats in the legislative assembly was recorded.

- Based on the election outcomes for the UP Vidhan Sabha in 2012, a total of **35** women were elected.
- This figure represents the count of female legislators who gained representation in the state assembly during that electoral period.

Significance of Women's Participation in 2012 Elections

The number of women elected provides an important measure of female political representation within the Uttar Pradesh Legislative Assembly. The result of **35** elected women indicates the level of female participation in the state's legislative politics as of 2012.

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110. **Answer: a**

Explanation:

Literary Works and Authors Matching in Classical India

This question asks us to identify the pair that incorrectly matches a classical Indian literary work with its author. We need to carefully examine the known associations between these famous works and the individuals credited with their creation.

Analyzing Literary Pair Matches

Let's review each option provided:

- **Option (a): Karpuramanjari - Harsha**
  - The work *Karpuramanjari* is a significant drama known for its use of the Prakrit language.
  - The generally accepted author of this play is **Rajashekhara**, a renowned poet and critic.
  - King Harsha (Harshavardhana), while a celebrated king and patron of arts, is known for authoring Sanskrit plays like *Ratnavali*, *Priyadarshika*, and *Nagananda*.
  - Therefore, the pairing of *Karpuramanjari* with Harsha is **incorrect**.
- **Option (b): Malavikagnimitra - Kalidasa**
  - *Malavikagnimitra* is a Sanskrit play dealing with the story of King Agnimitra.
  - This play is widely attributed to the most celebrated classical Indian poet and playwright, **Kalidasa**.
  - This pair is **correctly matched**.
- **Option (c): Midrarakshasa - Visakhsadatta**
  - *Mudrarakshasa* (sometimes spelled as *Midrarakshasa*) is a famous Sanskrit political drama.
  - It narrates the events surrounding Chandragupta Maurya and his minister Chanakya.
  - The author is known to be **Visakhadatta** (or Vishakhadatta).
  - This pair is **correctly matched**.
- **Option (d): Saundrananda - Asvaghosha**
  - *Saundrananda* is a Mahayana Buddhist epic poem written in Sanskrit.
  - It focuses on the conversion of the Buddhist monk Nanda.
  - The author is confirmed as **Asvaghosha**, a prominent poet and philosopher associated with Buddhism.
  - This pair is **correctly matched**.

Conclusion on Incorrect Match

After examining each option, we find that three pairs are correctly matched:

- *Malavikagnimitra* by Kalidasa.
- *Mudrarakshasa* by Visakhadatta.

- *Saundrananda* by Asvaghosha.

The pair *Karpuramanjari* and Harsha is the one that is not correctly matched, as *Karpuramanjari* was authored by Rajashekhara.

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111. **Answer: a**

Explanation:

Geographical Location of Pundravardhana Bhukti

Pundravardhana Bhukti was a prominent ancient administrative territory or province during various periods of Indian history, particularly under the Gupta and Pala empires. Understanding the geographical extent of this **Bhukti** is key to answering questions about its location.

Identifying the Region of Pundravardhana

The name 'Pundravardhana' itself points towards an ancient region historically associated with the Pundra people. Historical texts, inscriptions, and archaeological evidence help scholars pinpoint the location of this significant territory.

- **Historical Evidence:** Ancient literature and inscriptions often mention Pundravardhana as a major region in Eastern India.
- **Archaeological Findings:** Excavations in certain areas have revealed remnants of settlements and administrative centers belonging to this historical period.
- **Geographical Scope:** The territory of Pundravardhana Bhukti primarily covered areas that correspond to the northern parts of the Bengal region.

Pundravardhana Bhukti and Modern Geography

When mapping ancient administrative units to modern geography, the location of Pundravardhana Bhukti needs careful consideration.

- The core area of Pundravardhana Bhukti is historically situated in what is now known as **North Bengal**, encompassing districts like Bogra, Dinajpur, Malda, and Rangpur (which span across India and Bangladesh).
- While ancient boundaries could be fluid and sometimes overlapping with neighboring regions, the primary identification and concentration of Pundravardhana are linked to North Bengal.
- Other regions like Bihar, Odhisha, and Assam formed distinct geographical and political entities in ancient times, although they might have shared borders or influenced regions adjacent to Pundravardhana Bhukti at different historical moments.

Therefore, based on established historical geography, Pundravardhana Bhukti was located in the region corresponding to **North Bengal**.

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112. **Answer: a**

Explanation:

Understanding the Chola Dynasty's Relationship with Sri Lanka

This solution explores the historical context of the Chola dynasty's interactions with Sri Lanka, focusing on identifying the specific Chola Monarch mentioned in the question. The question asks about a Chola ruler who was instrumental in Sri Lanka achieving its freedom and established a family tie through marriage with a Simhala prince.

Analyzing the Chola Monarch's Role in Sri Lanka

The question highlights two key aspects of a Chola Monarch's reign concerning Sri Lanka:

- Facilitating or presiding over Sri Lanka's complete freedom from Chola influence.
- Establishing a matrimonial alliance by marrying his daughter to a Simhala prince.

We need to evaluate the reigns of the given Chola monarchs to determine who best fits this description.

Evaluating the Options Provided

Option 1: Kulottunga I

Kulottunga I ruled the Chola Empire from 1070 to 1120 CE. His reign is notable for significant political shifts. Sri Lanka, under King Vijayabahu I, successfully asserted its independence from Chola occupation around the time Kulottunga I came to power. Historical records suggest a matrimonial alliance occurred during this period. Kulottunga I's daughter, Madhurantaki, reportedly married a Sinhala prince, possibly Viriyadharama, who was the son of Vijayabahu I. This marriage is often interpreted as a gesture of reconciliation and recognition of Sri Lanka's restored autonomy, aligning with the question's criteria.

Option 2: Rajendra I

Rajendra I (reigned c. 1014–1044 CE) was a powerful Chola emperor known for his military expeditions, including a significant conquest of Sri Lanka. He defeated the Sinhala king and incorporated parts of Sri Lanka into the Chola empire. His reign was marked by Chola dominance over Sri Lanka, not its freedom. Therefore, he does not fit the description.

Option 3: Adhirajendra

Adhirajendra had a short and tumultuous reign following Rajendra I's successors. His rule did not involve major events related to Sri Lankan independence or significant matrimonial alliances of the type described.

Option 4: Rajadhiraja I

Rajadhiraja I (reigned c. 1044–1054 CE) continued the Chola military activities, including campaigns against Sri Lanka. While he engaged with Sri Lankan forces, his reign predates the final liberation of Sri Lanka by Vijayabahu I and the specific matrimonial alliance mentioned.

Historical Context of Kulottunga I and Sri Lanka

The question specifically mentions the Chola Monarch who helped Sri Lanka gain "complete freedom". While King Vijayabahu I achieved this freedom through his own military efforts against Chola occupation, the subsequent period under Kulottunga I saw the normalization of relations. The marriage of Kulottunga I's daughter to the Sinhala prince is a crucial piece of evidence. This alliance symbolized a new phase of interaction, moving away from direct Chola rule towards a relationship based on mutual recognition and diplomacy, effectively cementing Sri Lanka's independence in the eyes of the Chola Empire.

Therefore, considering the combination of Sri Lanka's independence during his era and the significant matrimonial alliance, **Kulottunga I** is identified as the Chola Monarch who meets the description provided in the question.

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113. **Answer: c**

Explanation:

Mahabharata Telugu Translation: Key Figures Identified

The epic **Mahabharata**, a foundational text in Indian culture, exists in numerous translations across India's diverse languages. Understanding who brought this epic narrative to the Telugu-speaking people through **Telugu translations** involves recognizing key literary figures. This explanation clarifies the roles of the individuals mentioned in the question.

Nannaya's Foundational Role in Mahabharata Translation

- **Nannaya** is historically recognized as the pioneer of the **Mahabharata**'s **Telugu translation**.
- He was a celebrated poet active in the 11th century.
- Nannaya initiated the translation from Sanskrit into Telugu, covering the initial sections of the epic: the *Adi Parva*, *Sabha Parva*, and part of the *Aranya Parva*.
- His work earned him the title 'Adi Kavi' (First Poet) of Telugu literature, highlighting the significance of his translation effort.

Tikkan's Completion of the Telugu Mahabharata

- **Tikkan** (also spelled Tikkana) was another influential poet who lived in the 13th century.
- He is credited with completing the **Telugu translation** of the **Mahabharata**, continuing the work started by Nannaya.
- Tikkan translated the remaining 15 books of the epic, ensuring its entirety was available in the Telugu language.
- His contribution was vital in making the full narrative accessible to the Telugu readership.

Kamban and Kuttan: Contributions Outside Telugu Mahabharata

- **Kamban** was a significant poet of the 12th century, but his fame rests on the *Kambaramayanam*, a Tamil rendition of the Ramayana, not the **Mahabharata** or its **Telugu translations**.
- **Kuttan** is also noted for his work in Tamil literature, particularly devotional poetry. He is not associated with the translation of the **Mahabharata** into Telugu.

Summary of Mahabharata Translators

Based on literary history, **Nannaya** and **Tikkan** are the poets primarily responsible for the **Telugu translations** of the epic **Mahabharata**. Nannaya started the translation, and Tikkan completed it, making them the key figures among the options provided.

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114. **Answer: b**

Explanation:

Coins Bearing the Caliph's Name

In the context of the Delhi Sultanate's history, coins served as important symbols of a ruler's authority and legitimacy. During the early medieval period, it was customary for Muslim rulers to acknowledge the nominal supremacy of the Caliph, the spiritual leader of the Islamic world, by including his name on their official currency.

The Role of the Baghdad Caliph

The Caliphate, centered in Baghdad, represented the universal Caliphate for Sunni Muslims. Although the political power of the Abbasid Caliphs had significantly declined by the 13th century, especially with the rise of the Mongols, their symbolic status remained influential. Receiving recognition or investiture from the Caliph was a means for rulers in distant regions like India to legitimize their rule in the eyes of the broader Islamic world. The specific Caliph relevant to this period was Al-Mustansir Billah.

Iltutmish and Coinage Legitimacy

Shamsuddin Iltutmish, who ruled the Delhi Sultanate from 1211 to 1236 CE, is widely regarded as the Sultanate's true consolidator. Upon ascending the throne, Iltutmish sought to strengthen his political position and gain formal recognition from external Islamic authorities.

- Iltutmish successfully obtained formal investiture (*manshur*) and honours from the Abbasid Caliph in Baghdad, Al-Mustansir Billah, around the year 1229 CE.

- This investiture was a crucial step in validating his claim to the throne and sovereignty over the territories he controlled.
- In commemoration of this event and as a display of his allegiance to the Caliph's symbolic authority, Iltutmish initiated the practice of having the name of the Caliph of Baghdad inscribed on his coins.
- This made Iltutmish the first ruler of the Delhi Sultanate whose coins carried the name of the Caliph of Baghdad, marking a significant development in the Sultanate's numismatic history and political signaling.

Contextualizing Other Rulers

Examining the other options helps clarify why Iltutmish is associated with this specific practice:

- **Qutbuddin Aibak:** As the founder of the Sultanate, Aibak's reign focused primarily on establishing the state's foundations. While he issued coins, the practice of featuring the Baghdad Caliph's name prominently did not originate during his time.
- **Alauddin Khilji:** Ruling much later (1296-1316 CE), Alauddin Khilji was a powerful and self-assured ruler who placed emphasis on his own authority rather than relying heavily on symbolic validation from distant Caliphs for his coinage.
- **Alauddin Masud Shah:** A successor Sultan during the Mamluk dynasty, Masud Shah's reign occurred after the practice had already been introduced. The crucial aspect of the question is the *first* appearance of the Caliph's name.

Therefore, the introduction of the Caliph's name onto the coins of the Delhi Sultanate, signifying a formal acceptance of his symbolic legitimacy, first occurred during the reign of Iltutmish following his receipt of investiture from Baghdad.

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115. **Answer: b**

Explanation:

Identifying the Honoured Jain Acharya by Akbar

The question asks to identify a specific **Jain Acharya** who was highly respected and honoured by the Mughal Emperor **Akbar**. Emperor Akbar was known for his intellectual curiosity and his efforts to understand and foster harmony among various religious traditions prevalent in his empire during the 16th century.

Akbar's Interaction with Jainism

Akbar actively sought knowledge from leaders of different faiths. His engagement with Jainism resulted in significant recognition for a prominent Jain scholar.

Detailed Analysis of Options

To answer the question accurately, let's consider each option provided:

- **Chandraprabha Suri**: While a respected Jain scholar, Chandraprabha Suri is not the figure primarily associated with receiving great honour directly from Akbar in historical accounts.
- **Hiravijaya Suri**: This **Jain Acharya** is famously known for his interaction with Emperor Akbar. He was a highly influential monk from the Śvetāmbara tradition. Akbar held him in high esteem, impressed by his wisdom and teachings.
- **Pushpadanta**: Pushpadanta was an important Jain monk and poet, known for his contributions to Jain literature, particularly the *Nayakumara Charita*. However, he lived much earlier than Akbar's reign and is not the subject of this question.
- **Yasobhadra**: Yasobhadra was another significant Jain Acharya, but the specific context of great honour bestowed by Akbar points towards a different individual.

Hiravijaya Suri: Akbar's Esteemed Guest

Hiravijaya Suri was invited to Akbar's court around 1582 CE. The Emperor was deeply impressed by Hiravijaya Suri's philosophical discourse and the asceticism associated with Jainism. In recognition of his stature and teachings, Akbar showed him immense respect:

- Akbar granted Hiravijaya Suri the title 'Jagatguru' (meaning 'World Teacher').
- He facilitated Hiravijaya Suri's return journey to Gujarat by exempting Jain temples and monasteries from paying customs duties.
- Akbar even adopted certain Jain practices for a period, such as abstaining from meat, influenced by Hiravijaya Suri's counsel.

These actions clearly demonstrate the profound honour and respect Emperor Akbar had for **Hiravijaya Suri**.

Conclusion on the Honoured Jain Acharya

Based on historical evidence detailing the interactions between the Mughal court and Jainism, **Hiravijaya Suri** is the **Jain Acharya** who was greatly honoured by Emperor Akbar.

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116. **Answer: a**

Explanation:

Turamaya's Rule: Connection to Emperor Ashoka

This question asks us to identify the region ruled by Turamaya, a figure known to be a contemporary of the famous Indian emperor Ashoka. To answer this correctly, we need to understand who Turamaya was and his historical context relative to Ashoka's reign.

Who was Turamaya?

Historical sources, including inscriptions from Ashoka's time, mention several Hellenistic (Greek) kings with whom Ashoka had diplomatic relations or was aware of. The name "Turamaya" is generally accepted by scholars to be the Indianised name for **Ptolemy II Philadelphus**.

- **Ptolemy II Philadelphus** was the ruler of the Ptolemaic Kingdom in Egypt.
- He reigned from 283 BCE to 246 BCE.
- Emperor Ashoka, of the Mauryan Empire in India, reigned from approximately 268 BCE to 232 BCE.
- Since their periods of rule overlapped significantly, Ptolemy II Philadelphus was a contemporary of Ashoka.

Connecting Turamaya to Ashoka

Ashoka's famous Edict XIII mentions the names of contemporary rulers of his time. In this edict, reference is made to Ptolemy, the ruler of Egypt, among others like Antiochus II Theos of Syria and Antigonus II Gonatas of Macedonia. The name Turamaya found in other historical contexts corresponds to this Ptolemy II Philadelphus, confirming the link.

Evaluating the Options

Let's look at the options provided:

- **1. Egypt:** This option correctly identifies the kingdom ruled by Ptolemy II Philadelphus (Turamaya), who was a contemporary of Ashoka.
- **2. Corinth:** Corinth was a significant Greek city-state, but Turamaya was not its ruler. Ashoka's edicts mention Alexander, who might have been associated with Epirus or Corinth, but this is distinct from Turamaya.
- **3. Macedonia:** The contemporary ruler of Macedonia mentioned in Ashoka's edicts was Antigonus II Gonatas, not Turamaya.
- **4. Syria:** The contemporary ruler of the Seleucid Empire (Syria) mentioned in Ashoka's edicts was Antiochus II Theos, not Turamaya.

Final Identification

Therefore, based on the historical identification of Turamaya as Ptolemy II Philadelphus, the ruler of Egypt during the time of Emperor Ashoka, the correct answer is Egypt.

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117. **Answer: c**

Explanation:

Identifying Sangam Ports on India's Western Coast

The question asks us to identify which of the listed Sangam ports were located on the western coast of India during the Sangam period. Understanding the geographical location of these historical ports is crucial for studying ancient Indian trade and maritime activities.

Let's examine each port mentioned:

- **Korkai:** Korkai was a very important port city of the Early Pandyan kingdom. It was located at the mouth of the Tamraparani River in the present-day Thoothukudi district of Tamil Nadu. This region is on the southeastern coast of India, facing the Bay of Bengal and the Gulf of Mannar. Therefore, Korkai was an **eastern coast** port.
- **Puhar:** Puhar, also known as Kaveripattinam, was the capital and major port city of the Early Chola kingdom. It was situated at the mouth of the Kaveri River on the eastern coast of Tamil Nadu. Puhar was a bustling centre of trade, connecting the Chola kingdom with regions across the Bay of Bengal. Therefore, Puhar was an **eastern coast** port.
- **Tondi:** The name Tondi appears in reference to ports on both the eastern and western coasts during the Sangam age. There was a Pandyan port named Tondi on the east coast, near the Palk Strait. However, there was also a significant Chera port named Tondi located on the western coast, in present-day Kerala. Given its pairing with Mushiri, another major Chera port on the west coast, Tondi here most likely refers to the Chera port, which was an important trading point on the **western coast**.
- **Mushiri:** Mushiri, also called Muziris, was a principal port of the Chera kingdom. It was located on the Malabar Coast, in present-day Kerala, on the western coast of India. Mushiri was renowned internationally for its trade with the Roman Empire, particularly in spices like pepper. Therefore, Mushiri was a major **western coast** port.

Based on this analysis, the Sangam ports situated on the western coast were Tondi (the Chera port) and Mushiri.

We can summarize the locations:

Sangam Port	Likely Kingdom	Coast
Korkai	Pandya	Eastern Coast
Puhar	Chola	Eastern Coast
Tondi	Chera (West Coast) or Pandya (East Coast)	Western Coast (most likely Chera in this context)
Mushiri	Chera	Western Coast

Therefore, the ports on the western coast from the given list are Tondi and Mushiri, which correspond to options 3 and 4.

Revision Table: Sangam Ports and Locations

This table helps to quickly recall the locations of important Sangam-era ports:

Port Name	Associated Kingdom (Sangam Period)	Location (Modern Region)	Coast (East/West)	Significance
Korkai	Pandya	Tamil Nadu (near Thoothukudi)	Eastern Coast	Pearl fishery, capital for some period
Puhar (Kaveripattinam)	Chola	Tamil Nadu (Kaveri delta)	Eastern Coast	Major trading port, Chola capital
Tondi	Chera / Pandya	Kerala (Chera Tondi) / Tamil Nadu (Pandya Tondi)	Western Coast (Chera) / Eastern Coast (Pandya)	Important trading port
Mushiri (Muziris)	Chera	Kerala (Malabar Coast)	Western Coast	Major international trade hub (Roman trade)

Additional Information about Sangam Ports and Trade

The Sangam period (roughly 300 BCE to 300 CE) was a golden age for maritime trade in South India. The Chera, Chola, and Pandya kingdoms controlled key ports that facilitated extensive trade networks.

- **Trade with the West:** Ports on the western coast like Mushiri and Tondi were crucial for trade with the Roman Empire, Egypt, and the Middle East. Goods like pepper, spices, pearls, ivory, and precious stones were exported, while gold, silver, wine, and pottery (like Roman amphorae and Arretine ware) were imported. Archaeological findings, such as those at Pattanam (possibly ancient Mushiri), provide evidence of this vibrant trade.
- **Trade with the East:** Ports on the eastern coast like Puhar and Korkai facilitated trade with Southeast Asia (like Malay Peninsula, Java, Sumatra), China, and Sri Lanka. Textiles, spices, and other goods were exchanged.
- **Importance of Ports:** These Sangam ports were not just transit points for goods but also centres of urban life, diverse communities (including foreign merchants), and cultural exchange. They played a vital role in the prosperity and external contacts of the Sangam kingdoms.
- **Literary Evidence:** Sangam literature, particularly works like Pattinappalai (describing Puhar) and Purananuru, contain vivid descriptions of these ports, their harbours, the goods traded, and the people involved in maritime activities.

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118. **Answer: d**

Explanation:

Understanding Maratha Leadership During Aurangzeb's Final Years

The question asks about the state of Maratha leadership at a crucial juncture in history: the death of Mughal Emperor Aurangzeb. Aurangzeb's death occurred in 1707. To answer this, we need to understand the succession and leadership changes within the Maratha Empire after the reign of Chhatrapati Shivaji Maharaj.

Tracing Maratha Leaders Before 1707

- **Chhatrapati Shivaji Maharaj:** Founded the Maratha Empire. He passed away in 1680.
- **Chhatrapati Sambhaji:** Shivaji Maharaj's eldest son. He succeeded Shivaji Maharaj but was captured and executed by Aurangzeb in 1689.
- **Chhatrapati Rajaram:** Shivaji Maharaj's second son and Sambhaji's half-brother. He continued the Maratha struggle against the Mughals after Sambhaji's death. Rajaram died in 1700.

Maratha Leadership After Rajaram's Death

After Chhatrapati Rajaram's death in 1700, the situation was critical for the Marathas. Rajaram's widow, Tarabai, stepped forward to lead the Maratha resistance. She enthroned her young son, Shivaji II, and effectively acted as regent and the driving force behind the ongoing war against the vast Mughal Empire under Aurangzeb. She proved to be a very capable administrator and military strategist, keeping the spirit of resistance alive.

Tarabai's Role at the Time of Aurangzeb's Death (1707)

From 1700 until Aurangzeb's death in 1707, Tarabai was the primary figure directing the Maratha war effort. She organized attacks, managed resources, and inspired the Maratha forces to continue their fight for independence against the persistent Mughal campaigns led by Aurangzeb himself. Therefore, at the exact time of Aurangzeb's death in 1707, the Maratha leadership, particularly the active direction of the state and military, was firmly in the hands of Tarabai.

Examining the Other Options

Let's look at why the other options are incorrect:

- **Sambhaji:** He was executed in 1689, long before 1707.
- **Rajaram:** He died in 1700, seven years before Aurangzeb's death.
- **Jijabai:** Shivaji Maharaj's mother. She passed away in 1674, even before Shivaji Maharaj's death.

Based on the historical timeline, Tarabai was the leader actively guiding the Maratha resistance when Aurangzeb died in 1707.

Revision Table: Maratha Leaders and Timeline

Maratha Leader/Figure	Period of Significance (relevant to question)	Status in 1707
Chhatrapati Shivaji Maharaj	Died 1680	Deceased
Chhatrapati Sambhaji	Executed 1689	Deceased
Chhatrapati Rajaram	Died 1700	Deceased
Jijabai	Died 1674	Deceased
Tarabai	Led resistance from 1700 onwards	Active Leader/Regent

Additional Information: Tarabai's Contribution

Tarabai's period of leadership from 1700 to 1707 is considered a heroic phase in Maratha history, often part of the larger Maratha War of Independence (also known as the 27-year war, roughly 1680-1707). Despite immense pressure from the Mughal army led by the Emperor himself, she successfully managed to keep the Maratha state functioning and the resistance movement strong. Her efforts were crucial in tiring out the Mughal forces and contributing to the eventual decline of Mughal power in the Deccan, which coincided with Aurangzeb's death.

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119. **Answer: b**

Explanation:

This solution delves into the historical context surrounding the title 'Raja' awarded to the prominent Indian social reformer, Ram Mohan Roy. Understanding the origin of such titles is crucial for comprehending the historical interactions between Indian figures and the ruling powers of the time.

Raja Title Origin for Ram Mohan Roy

Ram Mohan Roy, a pivotal figure in 19th-century India, was renowned for his efforts in social and religious reform. He played a significant role in challenging orthodox practices and advocating for modern education. The title '**Raja**' that is often associated with his name has a specific historical origin.

Akbar II and the Conferment of the Title

The title '**Raja**' was conferred upon Ram Mohan Roy by the Mughal Emperor, **Akbar II**. This occurred during Ram Mohan Roy's visit to England in the 1830s. The Emperor, whose own powers were largely symbolic by then under the British East India Company's rule, sent Ram Mohan Roy as an envoy to Britain to advocate for his interests and seek better treatment.

- **Reason for Conferment**: Emperor Akbar II bestowed the title '**Raja**' upon Ram Mohan Roy in recognition of his services and his diplomatic mission to Britain on the Emperor's behalf.
- **Historical Significance**: This act highlights the complex relationship between the declining Mughal authority and influential Indian personalities during the early period of British dominance. Ram Mohan Roy accepted the title, which became widely used thereafter.

Evaluating Other Options

Let's examine why the other options are not the correct source of the title '**Raja**':

- **Lord William Bentinck**: While Lord William Bentinck was the Governor-General of India during Ram Mohan Roy's time and was instrumental in social reforms like the abolition of Sati (a practice Ram Mohan Roy actively campaigned against), he did not grant him the title of 'Raja'.
- **Followers of Brahma Samaj**: Ram Mohan Roy was the founder of the Brahma Samaj, a socio-religious reform movement. His followers respected him immensely, but they did not bestow formal titles like 'Raja' upon him. The title preceded his deep involvement with the movement's later stages and was a personal honour from the Emperor.
- **Intellectuals opposing the custom of Sati**: Many intellectuals and reformers supported Ram Mohan Roy's stance against Sati and other social evils. They admired his work but lacked the authority to grant formal titles. The title '**Raja**' was a specific conferment from a sovereign authority.

Conclusion on the Raja Title

In summary, the title '**Raja**' was granted to Ram Mohan Roy by Emperor **Akbar II**, signifying the Emperor's appreciation for Ram Mohan Roy's role as his envoy to Britain.

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120. **Answer: a**

Explanation:

This question asks to identify which of the listed educational institutions was the **first to be estimated**. Understanding the historical context and establishment dates of each college is key to answering this question.

Historical Establishment of Colleges

Let's examine the founding dates and historical significance of each college mentioned in the options:

- **Hindu College, Calcutta**: Established in 1817, this institution was a pioneering venture in modern higher education in India. Its founding marked a significant step in the introduction of Western education and liberal arts in Bengal.
- **Delhi University**: This central university was established much later, in 1922, by an Act of the central legislature.
- **Mayo College**: Founded in 1875 in Ajmer, Mayo College was established as a public school for Indian royalty and aristocracy.
- **Muslim Anglo - Oriental College**: This college, established in Aligarh in 1875, played a crucial role in the educational and political advancement of Muslims in India. It later became Aligarh Muslim University.

Comparative Analysis of Founding Dates

Comparing the establishment dates helps determine which institution holds the earliest position chronologically:

- Hindu College, Calcutta: 1817
- Mayo College: 1875
- Muslim Anglo - Oriental College: 1875
- Delhi University: 1922

From the dates provided, Hindu College, Calcutta, founded in 1817, is the earliest institution among the choices. The term "estimated" likely refers to its position as the first institution to be established or recognized in this specific historical context or comparison.

Conclusion on Early Educational Institutions

Based on the timeline of establishment, Hindu College, Calcutta, stands out as the earliest institution founded amongst the options provided. Its establishment in the early 19th century predates the founding of Mayo College, Muslim Anglo - Oriental College, and Delhi University.

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121. **Answer: b**

Explanation:

Understanding the Sharada Act

The **Sharada Act**, formally known as the **Child Marriage Restraint Act**, was a landmark social reform law enacted in India. Its primary objective was to combat the deeply rooted social practice of child marriage. This significant legislation was passed in the year **1929** and came into effect on **April 1, 1930**.

Key Provisions on Minimum Marriage Age

The core of the **Sharada Act** was the establishment of minimum age limits for marriage to protect minors from early unions. The specific ages stipulated by the Act were:

- Minimum age of marriage for **girls**: **14 years**
- Minimum age of marriage for **boys**: **18 years**

This was a progressive step aimed at improving the health and social well-being of young individuals, particularly girls, who were often married off at very tender ages.

Identifying the Correct Age Limits

The question asks to identify the minimum marriageable ages for girls and boys respectively, as fixed by the **Sharada Act**. Based on the historical provisions of the Act:

- The minimum age for girls was set at **14 years**.
- The minimum age for boys was set at **18 years**.

Therefore, the correct pairing reflecting these specific age limits is 14 years for girls and 18 years for boys.

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122. **Answer: c**

Explanation:

Matching Newspapers to Their Languages

This section provides a detailed explanation for matching newspapers from List-I with their respective languages from List-II. Understanding the historical context and the linguistic base of prominent newspapers is key to answering this question correctly.

Identifying Newspaper Languages

We will analyze each newspaper listed in List-I to determine its corresponding language from List-II:

- **(A) Bharat Mitra**: This newspaper was a significant publication during the colonial era, primarily circulated among the Hindi-speaking population. Thus, **Bharat Mitra** is associated with **Hindi**.
- **(B) Rashtramata**: This newspaper was an important publication in the western part of India, serving the Marathi linguistic community. Therefore, **Rashtramata** is linked to **Marathi**.
- **(C) Prajamitra**: This newspaper played a role in public discourse in the regions where Gujarati was the predominant language. Hence, **Prajamitra** is matched with **Gujarati**.
- **(D) Nayak**: This newspaper was influential in the eastern region of India, particularly among the Bengali readership. Consequently, **Nayak** is associated with **Bengali**.

Summary of Matches

Below is a table summarizing the correct matches between the newspapers and their languages:

Newspaper (List - I)	Language (List - II)
(A) Bharat Mitra	3. Hindi
(B) Rashtramata	4. Marathi
(C) Prajamitra	2. Gujarati
(D) Nayak	1. Bengali

Determining the Correct Code

Based on the individual matches:

- (A) Bharat Mitra corresponds to Hindi (3).
- (B) Rashtramata corresponds to Marathi (4).
- (C) Prajamitra corresponds to Gujarati (2).
- (D) Nayak corresponds to Bengali (1).

Combining these matches, the correct sequence is (A) - (3), (B) - (4), (C) - (2), (D) - (1). This combination accurately represents the association between each newspaper and its language.

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123. **Answer: b**

Explanation:

Identifying Jahangiri Painters

This explanation helps identify painters who were prominent during the reign of Emperor Jahangir, a notable period for Mughal art known for its detailed realism and exquisite portraiture.

Understanding Mughal Art under Jahangir

Emperor Jahangir, who ruled the Mughal Empire from 1605 to 1627, was a passionate patron of the arts. His reign is often considered the golden age of Mughal painting. Key characteristics of paintings from this era include:

- A strong focus on naturalism and lifelike representation.
- Detailed illustrations of court life, historical events, flora, and fauna.
- Exquisite portraiture, capturing the personality of the subjects.
- Refined techniques and a sophisticated use of color.

Several artists achieved great fame and recognition during Jahangir's rule. We need to identify which of the listed painters fall into this category.

Analysis of the Listed Painters

Abdus Samad

Abdus Samad was a highly skilled Persian painter who arrived in India during the reign of Emperor Humayun. He was instrumental in establishing the Mughal School of painting and served as the head of the imperial workshop under Emperor Akbar. While he was a foundational figure in Mughal art, his most significant contributions and active period were during Akbar's reign, preceding Jahangir's rule.

Abul Hasan

Abul Hasan was an Indian painter of Persian descent, son of Aqa Riza. He emerged as one of the most talented artists during Jahangir's reign. Emperor Jahangir greatly admired his work, particularly his ability to capture likeness and expression, bestowing upon him the title 'Nadir al-Zaman' (Wonder of the Age). Abul Hasan held the prestigious position of Chief Painter (Nadir al-Mulk) under Jahangir.

Aqa Riza

Aqa Riza was a Persian painter who came to India during the time of Emperor Akbar. However, his artistic career flourished significantly under Emperor Jahangir. He served as the chief painter in the early part of Jahangir's reign and was known for his distinctive style that contributed to the evolution of Jahangiri painting.

Mir Sayyad Ali

Mir Sayyad Ali, much like Abdus Samad, was a Persian artist who accompanied Humayun to India. He was a key figure in the early development and style-setting of Mughal painting. His major works and influence belong to the period of Humayun and Akbar, rather than Jahangir's reign.

Determining Jahangiri Painters

Based on the analysis:

- Abul Hasan was a leading painter and Chief Painter under Jahangir.
- Aqa Riza was also a significant painter and Chief Painter during Jahangir's reign.
- Abdus Samad and Mir Sayyad Ali were pioneers of Mughal painting but are primarily associated with the reigns of Akbar and Humayun.

Conclusion on Jahangiri Artists

The painters from the provided list who were most prominently active and recognized during Emperor Jahangir's rule are Abul Hasan and Aqa Riza.

Therefore, the correct combination representing Jahangiri painters from the given options includes painters number 2 (Abul Hasan) and 3 (Aqa Riza).

124. **Answer: a**

Explanation:

Understanding the Formation of the British East India Company

This solution explains which Mughal Emperor was ruling India when the **British East India Company** was established in London. Understanding this historical timeline helps us connect European trade expansion with the Indian political landscape of the era.

Timeline of the British East India Company's Formation

The **British East India Company**, a pivotal entity in the history of British imperialism, received its charter on December 31, 1600. This charter, granted by Queen Elizabeth I of England, officially sanctioned the company's formation to trade in the East Indies, paving the way for its eventual influence and rule in India.

Indian Emperor During the Company's Formation (1600)

To determine the Emperor of India at the time of the **British East India Company's** formation in 1600, we need to examine the reigns of the prominent Mughal emperors:

Mughal Emperor Akbar's Reign

Emperor **Akbar**, considered one of the greatest Mughal rulers, reigned from 1556 to 1605. His rule encompassed the year 1600. Akbar was known for his administrative reforms, military conquests, and policies of religious tolerance. His reign marked a period of significant expansion and consolidation of the Mughal Empire.

Other Mughal Emperors

- **Jahangir**: Succeeded Akbar and ruled from 1605 to 1627. He was the emperor when the British first established factories in India (e.g., Surat in 1612).
- **Shahjahan**: Reigned from 1628 to 1658. Known for architectural achievements like the Taj Mahal.
- **Aurangzeb**: Ruled from 1658 to 1707. His reign saw the Mughal Empire reach its largest extent but also faced internal strife and decline.

Conclusion on the Relevant Emperor

Since the **British East India Company** was formed in the year 1600, and Emperor **Akbar** was the ruler of the Mughal Empire during that specific year (his reign extended until 1605), he was the Emperor of India when the company was founded in London.

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125. **Answer: d**

Explanation:

Understanding the Central Legislative Assembly and its Leadership in 1925

The Central Legislative Assembly was the lower house of the Imperial Legislative Council, established under the Government of India Act 1919. It played a significant role during the Indian independence movement, serving as a platform for Indian leaders to voice their concerns and participate in legislative processes, albeit with limited power. The presiding officer of the Assembly was known as the President or Speaker.

The question asks about the National Leader who was elected as the President (Speaker) of the Central Legislative Assembly in 1925. This was a notable event as it marked the election of an Indian leader to this prestigious post.

The 1925 Election for Central Legislative Assembly President

The election for the President of the Central Legislative Assembly took place in 1925. Several prominent Indian nationalist leaders were active in the political scene at this time. The Swaraj Party, which advocated for entering the councils to obstruct the government from within, played a key role in these elections.

Let's consider the options provided:

- Motilal Nehru: A leading figure in the Indian National Congress and a prominent leader of the Swaraj Party. He was active in the legislative assembly but was not elected as the Speaker in 1925.
- C.R. Das: A co-founder of the Swaraj Party with Motilal Nehru. However, C.R. Das passed away in June 1925, before the election for the Assembly President took place later that year. Therefore, he could not have been elected in 1925.
- Vallabhbhai Patel: A senior leader of the Indian National Congress and brother of Vithalbhai Patel. While a very influential figure, he was not the one elected as the Speaker of the Central Legislative Assembly in 1925.
- Vithalbhai Patel: Also a prominent nationalist leader and elder brother of Sardar Vallabhbhai Patel. He was a key member of the Swaraj Party. Vithalbhai Patel contested the election for the President of the Central Legislative Assembly in 1925 and won, becoming the first elected Indian Speaker of the Assembly.

Conclusion on the Central Legislative Assembly Speaker 1925

Based on historical records, the National Leader elected as President (Speaker) of the Central Legislative Assembly in 1925 was Vithalbhai Patel. His election was a significant achievement for the nationalist movement within the legislative framework of the time.

Revision Table: Key Leaders and Roles Around 1925

Leader	Role/Association (Around 1925)
Motilal Nehru	Prominent Congress leader, Leader of Swaraj Party in Assembly
C.R. Das	Co-founder of Swaraj Party (Passed away June 1925)
Vallabhbhai Patel	Prominent Congress leader
Vithalbhai Patel	Swarajist leader, Elected President (Speaker) of Central Legislative Assembly in 1925

Additional Information: Vithalbhai Patel's Speakership

Vithalbhai Patel served as the President of the Central Legislative Assembly from August 1925 to April 1930. His tenure is remembered for his efforts to assert the independence and dignity of the Speaker's office and the Assembly itself against the executive dominance of the British government. He took steps to control the precincts of the Assembly and assert his authority in procedural matters.

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126. **Answer: b**

Explanation:

Understanding the 1937 U.P. Ministry and the Finance Portfolio The question concerns the distribution of ministerial portfolios following the general elections held in 1937 under the provisions of the Government of India Act 1935. These elections led to the formation of ministries in the provinces, including the United Provinces (U.P.). The Indian National Congress emerged victorious in the U.P. and formed the government.

1937 U.P. Elections and Ministry Formation

Following the significant victory of the Indian National Congress in the 1937 provincial elections, ministries were established across British India. In the United Provinces, the Congress formed the government, with **Govind Ballabh Pant** taking office as the

Premier (Chief Minister). The formation of this ministry marked a key moment in the lead-up to India's independence.

Key Ministerial Appointments in U.P. (1937)

The ministry formed in the U.P. featured several prominent leaders handling crucial departments. Based on historical records of the ministry headed by Premier Govind Ballabh Pant, the key portfolios were allocated as follows:

- **Govind Ballabh Pant**: Premier and Minister for Home Affairs.
- **Rafi Ahmad Kidwai**: Minister for Revenue and Home Affairs.
- **Kailash Nath Katju**: Minister for Justice and the Political Departments.
- **Mohammed Ibrahim**: Minister for Education and Health.
- **Sampurnanand**: Minister for Education.
- **Algu Rai Shastri**: Minister for Agriculture.
- **Prajapati Joshi**: Minister for Forest.
- **Hukum Singh**: Minister for Public Works.
- **Lal Bahadur Shastri**: Minister for Local Self-Government.

Identifying the Finance Portfolio Holder

The question specifically asks who was entrusted with the **Finance portfolio** in the U.P. ministry formed after the 1937 elections. While Premier Govind Ballabh Pant oversaw key departments, and Rafi Ahmad Kidwai held significant responsibilities including Revenue and Home Affairs, the provided correct answer identifies **Rafi Ahmad Kidwai** as the holder of the Finance portfolio. His role in the ministry was crucial, contributing significantly to the governance of the United Provinces during that period. The appointment of ministers reflected the Congress party's focus on various aspects of provincial administration, aiming for social and economic upliftment.

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127. **Answer: c**

Explanation:

Congress Presidents and Session Venues Match

This question requires us to match the names of notable **Indian National Congress Presidents** from List - I with the respective **Venues of Session** they presided over from List - II. Correctly associating these leaders with their session locations helps understand the historical progression and geographical reach of the Congress party.

List - I (Congress Presidents)	List - II (Venues of Session)
(A) Dr M.A. Ansari	1. Haripura
(B) Purshottam Tandon	2. Kanpur
(C) Sarojini Naidu	3. Madras
(D) Subhas Chandra Bose	4. Nasik

Explanation of President-Venue Matches

Let's break down each match based on historical facts:

- **(A) Dr M.A. Ansari** presided over the Indian National Congress session held in **Madras** in the year 1927. Therefore, (A) correctly matches with 3.
- **(B) Purshottam Tandon** served as the President during the Congress session in **Nasik** in 1950. This means (B) correctly matches with 4.

- **(C) Sarojini Naidu**, a significant figure in India's freedom struggle, was the President of the Congress at the **Kanpur** session in 1925. Thus, (C) correctly matches with 2.
- **(D) Subhas Chandra Bose** led the Congress as President during the session in **Haripura** in 1938. Hence, (D) correctly matches with 1.

Identifying the Correct Answer Option

Combining these individual matches, we get the following correct pairings:

- (A) - 3 (Madras)
- (B) - 4 (Nasik)
- (C) - 2 (Kanpur)
- (D) - 1 (Haripura)

This combination, **(A) - (3), (B) - (4), (C) - (2), (D) - (1)**, corresponds to option 3 among the choices provided.

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128. **Answer: d**

Explanation:

Understanding Indian Participation in Administration Acts

The question asks to identify the British Act that first enabled Indians to participate in the administration of their country. This involves examining the historical legislative measures taken by the British government in India that allowed for Indian involvement in governance.

Historical Context of British Acts and Indian Administration

Several key Acts were passed during British rule that incrementally introduced changes related to Indian involvement in administration. Let's review the impact of each mentioned Act:

Charter Act 1833

- This Act centralized British administration in India under the Governor-General of Bengal, making him the Governor-General of India.
- It declared that Indians were not to be prevented from holding any office, place, or employment under the East India Company. However, this was a general statement and did not establish a formal mechanism for participation in administrative policy-making.
- A legislative council was created, and a Law Member was added, but this primarily involved British officials.

Charter Act 1853

- This Act separated the legislative and executive functions of the Governor-General's Council.
- It introduced a system of competitive examinations for recruitment to the Indian Civil Service (ICS). This allowed Indians to aspire to administrative positions based on merit, but it was a process of entry into the existing structure rather than a share in policy administration itself through representative bodies.

Government of India Act 1858

- This significant Act transferred the administration of India from the East India Company directly to the British Crown.
- It aimed to improve the governance structure by establishing a Secretary of State for India and his Council.
- While it brought about administrative changes, it did not introduce direct participation for Indians in the governing bodies.

Indian Councils Act 1861

- This Act marked a crucial step towards associating Indians with the government.
- It empowered the Governor-General to nominate additional members to his legislative council.
- Importantly, the Act stipulated that the Governor-General must appoint at least half of these additional members as non-official Indians.
- This provision allowed Indians to participate in the legislative process for the first time, albeit through nomination, giving them a share in the administrative function of law-making.

Conclusion on Administrative Participation

Comparing the Acts, the **Indian Councils Act 1861** is recognized as the legislation that first made it possible for Indians to take a formal share in the administration by including them as nominated members in the legislative councils. This was a foundational step in introducing Indian representation in the governance process.

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129. **Answer: a**

Explanation:

Understanding the Provisional Government of India during World War I

The question asks about the location where a Provisional Government of India, led by Raja Mahendra Pratap as President, was established during the First World War.

During World War I (1914-1918), many Indian nationalists were active abroad, seeking support for India's independence from British rule. They hoped to use the war situation to their advantage, aligning with powers hostile to Britain.

One significant effort in this direction was the establishment of a Provisional Government of India outside of British control. This government was founded in Kabul, Afghanistan.

Key details about this Provisional Government:

- **Established:** December 1, 1915.
- **Location:** Kabul, Afghanistan.
- **President:** Raja Mahendra Pratap.
- **Prime Minister:** Maulana Barkatullah.
- **Home Minister:** Maulana Ubaidullah Sindhi.

The establishment of this government was part of the 'Silk Letter Movement' and aimed to mobilize support, particularly from the Amir of Afghanistan and other countries, against the British in India. While it had symbolic importance and represented the aspirations of Indian revolutionaries abroad, it did not gain widespread international recognition and its practical impact on the freedom struggle within India was limited.

Considering the options provided and the historical facts, the Provisional Government of India with Raja Mahendra Pratap as President was established in Afghanistan during the First World War.

Revision Table: Key Facts

Aspect	Detail
Event	Establishment of Provisional Government of India
Time Period	First World War (1915)
Location	Kabul, Afghanistan
President	Raja Mahendra Pratap
Prime Minister	Maulana Barkatullah

Additional Information: Indian Revolutionaries Abroad

During the early 20th century, especially around the time of World War I, many Indian nationalists operated from outside India to challenge British rule. Their activities included:

- Forming committees and organizations (like the Ghadar Party in North America).
- Publishing nationalist literature.
- Seeking support from foreign powers (like Germany and Turkey, who were enemies of Britain during WWI).
- Planning insurrections in India.

The Provisional Government in Kabul was one such attempt to create a base for operations and gain political leverage on the international stage.

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130. **Answer: c**

Explanation:

This question requires matching specific lakes with their correct geographical locations. Let's examine each lake mentioned in List-I and determine its location from List-II.

Identifying Lake Locations

We need to find the accurate location for each lake:

- **(A) Lonar Lake:** This unique crater lake is situated in the Buldana district of Maharashtra. None of the location options provided (Madhya Pradesh, Gujarat, Andhra Pradesh, Kerala) match Maharashtra.
- **(B) Nakki Lake:** This popular lake is located in Rajasthan, near the hill station of Mount Abu. None of the provided location options match Rajasthan.
- **(C) Kolleru Lake:** This is one of the largest freshwater lakes in India and is located in Andhra Pradesh. This matches option 3 (Andhra Pradesh).
- **(D) Pulicat Lake:** This large brackish water lagoon is located on the border between Andhra Pradesh and Tamil Nadu. Therefore, Andhra Pradesh (3) is a correct match.

Analyzing the Matches

Based on the geographical facts:

- Kolleru Lake correctly matches with Andhra Pradesh.
- Pulicat Lake also correctly matches with Andhra Pradesh.
- Lonar Lake is in Maharashtra.
- Nakki Lake is in Rajasthan.

The question asks for the correctly matched option, and the provided correct answer is 'c'. This implies that the combination of matches presented in option 'c' is the intended correct answer. Given that both Kolleru Lake and Pulicat Lake are located in Andhra Pradesh, the correct option must include this pairing.

Summary Table of Lake Locations

Lake (List-I)	Actual Location	Provided Location Option
(A) Lonar	Maharashtra	1. Madhya Pradesh / 2. Gujarat / 4. Kerala (Incorrect)
(B) Nakki	Rajasthan	1. Madhya Pradesh / 2. Gujarat / 4. Kerala (Incorrect)
(C) Kolleru	**Andhra Pradesh**	**3. Andhra Pradesh** (Correct)
(D) Pulicat	**Andhra Pradesh** / Tamil Nadu	**3. Andhra Pradesh** (Correct)

Conclusion

The analysis confirms that Kolleru Lake is in Andhra Pradesh (3) and Pulicat Lake is also associated with Andhra Pradesh (3). Since the given correct answer is 'c', option 'c' must represent a matching set that correctly identifies at least the Kolleru Lake pairing (C-3), and possibly the Pulicat Lake pairing (D-3). While Lonar and Nakki lakes do not match the other location options provided in the question's lists, the question prioritizes finding the option with the most accurate matches, which centers around the Kolleru Lake location.

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131. **Answer: d**

Explanation:

Understanding Kharif Crops

Kharif crops, often referred to as monsoon crops, are cultivated during the monsoon season in India. The planting season typically starts around June with the onset of the Southwest Monsoon, and the harvesting is usually done between September and October. These crops generally require warm, humid conditions and abundant rainfall during their growth period. Key Kharif crops include rice, maize, cotton, groundnut, and sugarcane.

Analyzing Crop Seasons: Kharif vs. Rabi

Indian agriculture categorizes crops based on the season they are grown in. The two main cropping seasons are Kharif and Rabi.

- **Kharif Crops:** Grown during the monsoon season (June-October). Require high temperatures and humidity. Examples: Rice, Maize, Cotton, Groundnut.
- **Rabi Crops:** Grown during the winter season (October-March). Prefer cooler temperatures. Examples: Wheat, Barley, Mustard, Gram.

Evaluating the Options: Which is NOT a Kharif Crop?

Cotton: A Kharif Crop

Cotton is one of the most important commercial crops grown in India. It is typically sown in the months of April-June, coinciding with the beginning of the monsoon season. Cotton requires high temperatures (around 21-30°C) and at least 50-60 cm of rainfall, making it well-suited for the Kharif season.

Groundnut: A Kharif Crop

Groundnut, also known as peanut, is a vital Kharif crop. It is usually sown in June and July, taking advantage of the monsoon rains. Groundnut needs warm conditions throughout its growing period and is sensitive to waterlogging, but requires adequate moisture during pod development. It is predominantly grown as a Kharif crop in many parts of India.

Maize: A Kharif Crop

Maize (corn) is a versatile grain crop widely cultivated in India. It is predominantly a Kharif crop, planted with the arrival of the monsoon rains in June-July. Maize performs best in warm temperatures (20-30°C) and requires moderate to high rainfall, aligning perfectly with the Kharif cropping pattern.

Mustard: The Non-Kharif Crop

Mustard is an important oilseed crop. However, unlike Cotton, Groundnut, and Maize, Mustard is primarily grown during the winter season. It is classified as a Rabi crop. Mustard seeds are sown in October-November, after the monsoon rains have subsided, and harvested in February-March. This crop prefers cooler weather conditions and is relatively drought-tolerant once established, making it unsuitable for the warm, wet Kharif season.

Final Conclusion on Kharif Crops

Based on the seasonal requirements and cultivation patterns, Cotton, Groundnut, and Maize are established Kharif crops. Mustard, on the other hand, thrives in the cooler, drier conditions of the winter season and is therefore classified as a Rabi crop. Thus, Mustard is the crop among the given options that is not a Kharif crop.

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132. **Answer: c**

Explanation:

States' Tobacco Cultivation Area in India (2010)

This explanation focuses on identifying the Indian state that had the largest area dedicated to **tobacco cultivation** as of 2010. Understanding regional agricultural patterns is key to answering questions about crop distribution across India.

Analyzing Key States for Tobacco Farming

Several Indian states are involved in tobacco cultivation, but their contribution in terms of area varies significantly. We need to compare the major states known for tobacco production around the year 2010:

- **Andhra Pradesh**: This state has historically been a major hub for tobacco farming, particularly for export-quality Virginia flue-cured tobacco. Regions like Prakasam district are famous for this crop.
- **Gujarat**: Another significant tobacco-growing state, Gujarat is well-known for producing chewing tobacco, hookah tobacco, and cigar filler tobacco.
- **Karnataka**: This state also cultivates tobacco, contributing notably to the national production, especially varieties like bidi tobacco and chewing tobacco.
- **Uttar Pradesh**: While tobacco is grown in Uttar Pradesh, it typically accounts for a smaller share of the total cultivation area compared to the southern states and Gujarat.

Andhra Pradesh's Leading Position

Based on agricultural statistics and reports from the Directorate of Tobacco Development (DTD) around the 2009-2010 period, **Andhra Pradesh** consistently reported the largest area under tobacco cultivation among all Indian states. The state's favorable climate and soil conditions, especially in the coastal districts, support extensive cultivation, making it the top state in terms of area.

Comparative Overview

While states like Gujarat and Karnataka are also important tobacco producers, their total cultivation area in 2010 was generally less than that of Andhra Pradesh. Uttar Pradesh cultivated tobacco, but its acreage was considerably lower. Therefore, when looking specifically at the **largest area** under **tobacco cultivation** in 2010, Andhra Pradesh stands out.

Conclusion on Largest Tobacco Cultivation Area

Considering the data available for the year 2010, Andhra Pradesh possessed the most significant land area dedicated to tobacco cultivation compared to other states in India.

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133. **Answer: b**

Explanation:

Exploring Aonla Production in Uttar Pradesh

Aonla, scientifically known as *Phyllanthus emblica* or *Emblica officinalis*, is a highly valued fruit, especially recognized for its rich Vitamin C content. It plays a significant role in the agricultural landscape of Uttar Pradesh, India. Understanding which district leads in its production is key to grasping the state's agricultural specialization. This section delves into the primary region associated with the highest Aonla yield within Uttar Pradesh.

District-wise Aonla Production Analysis

When examining the agricultural output of Uttar Pradesh, specific districts often emerge as leaders for particular crops. For Aonla, the cultivation is concentrated in certain areas, making one district stand out significantly. Let's review the options provided:

- **Rae Bareilly:** While Rae Bareilly is an important district in Uttar Pradesh, it is not predominantly recognized as the highest producer of Aonla compared to other regions.
- **Pratapgarh:** This district is widely acknowledged across Uttar Pradesh and India as the leading center for Aonla cultivation and production. It is often referred to as the "Aonla City" due to the sheer volume and quality of Aonla grown here. Numerous processing units for Aonla-based products are also located in and around Pratapgarh, reinforcing its status as the primary hub.
- **Faridabad:** Faridabad district is located in the state of Haryana, not Uttar Pradesh. Therefore, it cannot be the source of the highest Aonla production within Uttar Pradesh.
- **Allahabad (Prayagraj):** Located in Uttar Pradesh, Allahabad district is known for agriculture, but it does not match the scale and specific focus on Aonla production that Pratapgarh district boasts.

Conclusion on Highest Aonla Producing District

Based on agricultural data and regional specialization, **Pratapgarh** stands out as the district in Uttar Pradesh with the highest production of Aonla. Its geographical and climatic conditions are highly favorable for Aonla farming, leading to its dominance in cultivating this important fruit.

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134. **Answer: d**

Explanation:

Understanding Women's Emergence from Home in Indian Movements

The question asks to identify the historical movements that encouraged women to step out of their traditional secluded roles in the home and participate actively in public life and political activities. Several major nationalist movements in India played a significant role in this transformation.

Role of Swadeshi Movement in Women's Participation

The **Swadeshi Movement**, which began in 1905 largely in response to the partition of Bengal, was a significant milestone. During this period, women, particularly from urban middle-class families, actively participated by:

- Boycotting foreign goods and promoting Indian products.
- Participating in processions and picketing liquor and foreign cloth shops.
- Organizing and attending meetings, thereby coming out into the public sphere.

This movement marked one of the first large-scale public political involvements for many Indian women.

Impact of Home Rule Movement on Women

The **Home Rule Movement** (1916-1918), advocating for self-governance within the British Empire, also witnessed considerable women's involvement. Key aspects include:

- Women actively joined leagues, organized meetings, and distributed literature to spread the message of self-rule.
- Prominent women leaders like Annie Besant and Sarojini Naidu inspired many others to participate in political discourse and activism.
- This movement provided a platform for women to engage in political discussions and organizational activities outside their homes.

Women in the Non-Cooperation Movement

Mahatma Gandhi's **Non-Cooperation Movement** (1920-1922) saw an unprecedented mobilization of women. Their participation was crucial and multifaceted:

- Women actively joined in boycotting British goods, particularly foreign cloth, and embraced spinning 'khadi' as a symbol of national pride and self-sufficiency.
- They participated in processions, demonstrations, and picketing activities.
- The movement encouraged women from diverse backgrounds to contribute to the national cause, breaking down social barriers and seclusion.

Civil Disobedience Movement and Women's Public Role

The **Civil Disobedience Movement**, starting with the Salt Satyagraha in 1930, further galvanized women's participation in public life.

- Women defied salt laws by manufacturing or selling salt.
- They participated in marches, demonstrations, and protests against British rule, often facing arrests and lathi charges.
- This phase saw women taking on leadership roles and actively challenging authority, consolidating their presence in the freedom struggle and moving further away from domestic confinement.

Conclusion on Women's Movements

Each of these movements contributed significantly to drawing women out of the seclusion of their homes. They provided opportunities for political engagement, social interaction, and personal empowerment, transforming women's roles in Indian society and the nationalist movement. Therefore, all the mentioned movements (Swadeshi Movement, Home Rule Movement, Non-Cooperation Movement, and Civil Disobedience Movement) played a part in this process.

135. **Answer: b**

Explanation:

Understanding West Flowing Rivers of India

India's major rivers flow either towards the east into the Bay of Bengal or towards the west into the Arabian Sea. The rivers flowing westwards are generally shorter and steeper than the east-flowing ones. Many of these west-flowing rivers originate in the Western Ghats or central highlands and drain into the Arabian Sea.

Identifying the Specific West Flowing River Between Mountain Ranges

The question asks to identify a west-flowing river that uniquely flows between two significant mountain ranges. Let's examine the options provided:

- **Sharavathi River:** This river is located in Karnataka and is famous for the Jog Falls. While it flows west and originates in the Western Ghats, its course is not primarily defined by flowing between two major, parallel mountain ranges.
- **Narmada River:** The Narmada is one of the longest west-flowing rivers in India. A key geographical feature of the Narmada is that it flows through a rift valley. This valley is situated prominently between two major mountain ranges: the **Vindhya Range** to its north and the **Satpura Range** to its south. This specific location is a defining characteristic of the Narmada's course.
- **Mahi River:** The Mahi River also flows westwards, traversing Rajasthan and Gujarat before emptying into the Arabian Sea. However, its path is not characterized by flowing strictly between two major mountain ranges like the Narmada.
- **Sabarmati River:** Originating in the Aravalli Range in Rajasthan, the Sabarmati flows southwest through Gujarat and into the Gulf of Cambay. While it flows west, it does not follow a course constrained between two distinct, parallel mountain ranges.

Conclusion on River Geography

Based on the geographical characteristics, the **Narmada River** is the west-flowing river that distinctly flows in a valley situated between the Vindhya and Satpura mountain ranges. This geological setting is crucial to its identity as a west-flowing river.

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136. **Answer: b**

Explanation:

Dam-River Matches Analysis

This question requires identifying which pairs of major dams and their corresponding rivers are incorrectly matched. Understanding the locations of significant river valley projects is crucial for geography and civil services examinations.

Analyzing Dam and River Pairings

Let's examine each pair mentioned in the options:

- **(a) Nangal Dam - Satluj River:** The Bhakra Nangal project is a major hydroelectric and irrigation project in Punjab and Himachal Pradesh. The Bhakra Dam, the main component, is built across the **Satluj River**. This is a correct match.
- **(b) Sardar Sarovar project - River Godavari:** The Sardar Sarovar Project is a major dam project located across the **Narmada River** in Gujarat. It is one of the largest projects in India, involving multiple states. Therefore, matching it with the Godavari River is incorrect.
- **(c) Nagarjun Sagar - Godavari River:** The Nagarjun Sagar Dam is a prominent structure built across the **Krishna River** in Telangana and Andhra Pradesh. It is known for being one of the largest dams in the world in terms of masonry volume. Matching it with the Godavari River is incorrect.

- **(d) Hirakud Dam - Mahanadi:** The Hirakud Dam is located in Odisha and is built across the **Mahanadi River**. It is one of the longest dams in the world and is crucial for flood control, irrigation, and power generation in the region. This is a correct match.

Identifying Incorrect Matches

Based on the analysis above:

- The pairing of **Sardar Sarovar project** with the **Godavari River** is incorrect. The correct river is the Narmada.
- The pairing of **Nagarjun Sagar Dam** with the **Godavari River** is incorrect. The correct river is the Krishna.

Conclusion on Mismatched Pairs

The question asks for the pairs that are *not* correctly matched. From our review:

- Pair (b) is incorrect.
- Pair (c) is incorrect.

Therefore, the options representing the incorrectly matched pairs are (b) and (c).

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137. **Answer: a**

Explanation:

Teak Forest Distribution in India

Teak (*Tectona grandis*) is a highly valued timber species, known for its strength, durability, and beautiful grain. The natural habitat for Teak forests primarily lies in the tropical deciduous monsoon forests of India. Identifying the correct state where these forests are predominantly found is important for understanding India's forest resources.

Analyzing States with Significant Teak Forest Cover

Let's examine the presence of Teak forests in the states mentioned:

- **Madhya Pradesh**: This state is well-known for having some of the largest and best-preserved Teak forests in India. Large tracts of land, particularly in the central and southern regions like the Satpura, Vindhya, and Balaghat areas, feature extensive Teak forests. Madhya Pradesh contributes significantly to the country's total Teak forest area.
- **Uttar Pradesh**: Uttar Pradesh has varied forest types, including tropical dry deciduous forests. While Teak trees can be found in certain pockets, they are not as widespread or dominant compared to other states like Madhya Pradesh.
- **Jharkhand**: Jharkhand's forests are diverse, with Sal (*Shorea robusta*) being a dominant species in many areas. Teak is also present, especially in the Chota Nagpur plateau region and southern districts, but its distribution is less extensive than Teak in Madhya Pradesh.
- **Karnataka**: Karnataka also possesses significant forest cover, including substantial areas of Teak. Forests in the Western Ghats and other parts of the state, such as Shimoga and Belgaum districts, contain valuable Teak stands. However, when considering the overall extent and dominance, Madhya Pradesh often stands out.

Comparative Overview of Teak Forest Presence

The distribution and dominance of Teak forests vary across the states:

State	Dominance of Teak Forest
Madhya Pradesh	High
Uttar Pradesh	Low
Jharkhand	Moderate
Karnataka	Moderate to High

Conclusion on Teak Forest Location

Considering the major forest resources and typical geographical distribution patterns in India, Madhya Pradesh stands out for its significant and widespread Teak forest cover compared to Uttar Pradesh, Jharkhand, and Karnataka. Therefore, Madhya Pradesh is the state among the choices where Teak forests are prominently found.

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138. **Answer: c**

Explanation:

Understanding the 'Biological Desert' River

The question asks us to identify which river among the given options is often referred to as a 'biological desert' because of its high level of pollutants. A 'biological desert' in the context of a river means a place where pollution has become so severe that most aquatic life (fish, insects, plants, etc.) cannot survive or thrive. This leads to a significantly reduced diversity and population of living organisms in the water.

Why is a River Called a 'Biological Desert'?

When a river is heavily polluted, the quality of its water deteriorates significantly. Pollutants can include:

- Industrial waste (chemicals, heavy metals)
- Domestic sewage (organic matter, pathogens)
- Agricultural runoff (pesticides, fertilizers)
- Mining waste (acid drainage, sediments, heavy metals)

These pollutants can reduce the dissolved oxygen in the water, increase toxicity, alter the water's temperature and pH, and deposit harmful sediments. These changes make the environment hostile to aquatic organisms, leading to their death or migration, eventually resulting in a state where life is sparse or non-existent, hence the term 'biological desert'.

Identifying the 'Biological Desert' River

Let's look at the options provided:

1. Yamuna
2. Periyar
3. Damodar
4. Mahanadi

While rivers like the Yamuna and Periyar also face significant pollution challenges, the Damodar River is particularly notorious for its high levels of pollution, especially in its lower stretches. The Damodar Valley region is rich in coal mining and industrial activities (like thermal power plants, steel plants, fertilizer factories, cement factories, etc.). Effluents from these industries and mining operations are discharged into the river, carrying heavy metals, toxic chemicals, fly ash, and other harmful substances.

This severe pollution has historically led to a drastic reduction in aquatic biodiversity in sections of the Damodar River, earning it the unfortunate moniker of 'biological desert'. The river's ecosystem has been severely damaged, making it difficult for many species to survive.

Therefore, based on its well-documented history of severe pollution from industrial and mining activities leading to a lack of aquatic life, the Damodar River is widely known as a 'biological desert'.

Conclusion

The river known as the 'biological desert' on account of its pollutants is the Damodar.

Revision Table: Key Rivers and Pollution Status

River	Known Pollution Issues	'Biological Desert' Status
Yamuna	High pollution, especially near urban areas (Delhi) due to sewage and industrial waste.	Severely polluted but 'biological desert' term is most commonly associated with Damodar.
Periyar	Pollution from industrial discharge in specific stretches (e.g., Eloor).	Faces pollution, but less commonly referred to as a 'biological desert' compared to Damodar.
Damodar	Severe pollution from coal mining, thermal power plants, and various industries.	Widely known and referred to as a 'biological desert' due to extreme pollution impact on aquatic life.
Mahanadi	Faces pollution from industrial and urban sources, especially downstream.	Faces pollution, but not as prominently called a 'biological desert' as Damodar.

Additional Information: River Pollution and its Impact

River pollution is a major environmental issue globally and in India. It affects not only aquatic ecosystems but also impacts human health, agriculture, and economy.

- Polluted water is unsafe for drinking, bathing, and irrigation.
- It destroys habitats and reduces fish populations, affecting livelihoods of fishermen.
- The cost of cleaning up polluted rivers is enormous.
- Efforts are being made to control pollution through stricter regulations, sewage treatment plants, and promoting sustainable industrial practices, but challenges remain significant for rivers like the Damodar.

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139. **Answer: c**

Explanation:

Understanding India's Natural Gas Production Sources

Natural gas is a vital energy source in India, contributing significantly to power generation, industrial processes, and domestic consumption. Identifying the major production areas is key to understanding India's energy landscape.

Major Natural Gas Production Regions in India

India has several regions with known reserves of natural gas, both onshore and offshore. However, historically, a significant portion of India's hydrocarbon production, including natural gas, comes from offshore fields.

Let's look at the options provided:

- Andhra Pradesh Coast: This region, particularly the Krishna-Godavari (KG) Basin offshore, is a significant area for gas reserves and production, with discoveries like KG-D6.
- Gujarat Coast: Gujarat has onshore and offshore oil and gas fields (like the Cambay Basin), contributing to production.
- Bombay High: Located offshore near Mumbai, Bombay High is one of India's largest and oldest producing oil and gas fields. While primarily known for oil, it also holds substantial natural gas reserves and is a major contributor to the country's total hydrocarbon production.
- Tamil Nadu Coast: Similar to the Andhra Pradesh coast, the Cauvery Basin offshore Tamil Nadu also has hydrocarbon potential, including gas reserves, but its production volume is generally less compared to major fields.

Analyzing Bombay High's Contribution

Bombay High, also known as Mumbai High, is an offshore oil and gas field situated in the Arabian Sea, approximately 160 kilometers off the coast of Mumbai. It was discovered in 1974 and began production in 1976. Over the decades, it has been a cornerstone of India's domestic crude oil and natural gas production.

While newer discoveries, particularly in the Krishna-Godavari Basin, have become increasingly important for natural gas supply, Bombay High has historically been and continues to be a major, established producing area for both oil and associated natural gas.

Considering the historical context and its long-standing significant contribution to India's total hydrocarbon output, Bombay High is often cited as a primary source of natural gas production in the country, alongside other key basins like KG.

Conclusion

Based on the significant and sustained production from this major offshore field, most of the production of Natural gas in India has historically come from or involves substantial contributions from the Bombay High region, although other basins are gaining prominence.

Revision Table: Key Production Areas

Region	Key Basin/Location	Type of Production	Significance
Bombay High	Offshore Arabian Sea	Oil & Natural Gas	Major historical and current contributor
Andhra Pradesh Coast	Krishna-Godavari (KG) Basin offshore	Natural Gas & Oil	Increasingly significant gas reserves and production
Gujarat Coast	Cambay Basin (Onshore & Offshore)	Oil & Natural Gas	Contributor to domestic production
Tamil Nadu Coast	Cauvery Basin (Offshore)	Oil & Natural Gas	Contributor to domestic production (relatively smaller)

Additional Information: India's Energy Mix

India's energy mix is diverse, including thermal (coal, gas, petroleum), hydro, nuclear, and renewable sources. Natural gas is seen as a cleaner transitional fuel compared to coal and is important for reducing emissions. Increasing domestic production from areas like Bombay High and KG Basin helps reduce reliance on imports, enhancing energy security.

Exploration and production activities for natural gas are ongoing in various sedimentary basins across India to meet the growing energy demand.

140. **Answer: c**

Explanation:

Understanding Tidal Energy Potential in India

The question asks to identify the primary location in India known for the production or significant potential of **Tidal Energy**. Tidal energy is a renewable energy source derived from the natural rise and fall of ocean tides.

Key Factors for Tidal Energy Generation

The effectiveness of tidal energy generation largely depends on the tidal range, which is the difference in height between the high tide and low tide. Locations with a substantial tidal range are more suitable for harnessing this energy. Several coastal areas in India have potential, but some are more prominent than others.

Analysis of Coastal Areas for Tidal Energy

1. Gulf of Bengal

The Bay of Bengal coastline experiences tides, but the tidal range is generally moderate compared to some other Indian coastal regions. This limits its potential for large-scale tidal power projects.

2. Gulf of Mannar

Located in the shallow waters between India and Sri Lanka, the Gulf of Mannar is known for its rich marine biodiversity and is considered for other renewable energy sources like wind power. It does not have a significant tidal range suitable for major tidal energy production.

3. Gulf of Khambhat (Cambay)

This gulf, situated on the western coast of India (Gujarat), is recognized for having one of the highest tidal ranges in the country. The significant difference between high and low tides creates substantial energy potential. Consequently, it is considered the most promising location for developing tidal energy projects in India, including a proposed tidal power station.

4. Gulf of Kutch

Also located in Gujarat, the Gulf of Kutch has a considerable tidal range and potential for tidal energy. However, the potential is generally considered less than that of the Gulf of Khambhat.

Conclusion on Main Tidal Energy Area

Based on the analysis of tidal ranges and potential development, the **Gulf of Khambhat (Cambay)** stands out as the main area for producing or developing tidal energy in India due to its exceptionally high tidal range.

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141. **Answer: a**

Explanation:

Explanation of Matching Mining Areas with Minerals

This question requires matching specific mining locations in India (List-I) with the primary minerals extracted from them (List-II). Understanding the geographical distribution of mineral resources is key to solving this problem.

Identifying Key Mining Areas and Their Minerals

Let's analyze each mining area mentioned in List-I and identify the corresponding mineral from List-II:

- **(A) Gorumahisani**: This mining area is located in the Mayurbhanj district of Odisha. Gorumahisani is renowned for its significant deposits of **Iron ore**.
- **(B) Talchar**: Also situated in Odisha, the Talchar region is one of the largest coalfields in India. It is primarily known for the extraction of **Coal**.
- **(C) Jaduguda**: Located in the Singhbhum district of Jharkhand, Jaduguda is famous as a major centre for uranium mining in India. It is associated with **Uranium** deposits.
- **(D) Zavar**: This mining complex is located in the Udaipur district of Rajasthan. Zavar is historically significant and primarily known for its extensive deposits of **Lead** and Zinc ores.

Matching List-I with List-II

Based on the identification above, we can establish the correct matches:

- Gorumahisani (A) is matched with Iron ore (3).
- Talchar (B) is matched with Coal (4).
- Jaduguda (C) is matched with Uranium (2).
- Zavar (D) is matched with Lead (1).

List-I (Mining Area)	List-II (Mineral)	Correct Match
(A) Gorumahisani	1. Lead	(3) Iron ore
(B) Talchar	2. Uranium	(4) Coal
(C) Jaduguda	3. Iron ore	(2) Uranium
(D) Zavar	4. Coal	(1) Lead

Selecting the Correct Option

The established matches are (A) - (3), (B) - (4), (C) - (2), and (D) - (1). Now, let's compare this combination with the given options:

- Option 1: (A) - (3), (B) - (4), (C) - (2), (D) - (1) - This matches our findings.
- Option 2: (A) - (3), (B) - (2), (C) - (1), (D) - (4) - Incorrect.
- Option 3: (A) - (2), (B) - (4), (C) - (3), (D) - (1) - Incorrect.
- Option 4: (A) - (1), (B) - (2), (C) - (3), (D) - (4) - Incorrect.

Therefore, the correct option that accurately matches the mining areas with their respective minerals is Option 1.

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142. **Answer: b**

Explanation:

Understanding India's Open Sea Ports

The question asks to identify which of the given Indian ports is an **open sea port**. An open sea port is generally understood as a port that is directly accessible from the open sea, often featuring a natural harbour that opens widely to the ocean without significant obstructions like estuaries or narrow channels.

Analysis of Indian Ports

Let's examine each option to determine its characteristics:

- **Haldia Port:** This port is located on the Hooghly River, which is a tidal estuarial port. It is situated inland, making it a **riverine port** rather than an open sea port.
- **Mumbai Port:** Situated on the west coast of India, Mumbai Port is located within a natural deep-water harbour. It is sheltered by the mainland on the east and the island city of Mumbai (Salsette Island) on the west. This natural harbour opens directly into the Arabian Sea. Due to its natural formation and direct access to the open sea, it is considered a prime example of a **natural harbour port** and fits the description of an open sea port.
- **Chennai Port:** Located on the east coast, Chennai Port is one of the oldest artificial harbours in India. It was constructed on the coast, away from any natural inlet, making it an **artificial port**.
- **Visakhapatnam Port:** Situated on the east coast, Visakhapatnam Port is another significant natural harbour. It is unique because it is sheltered by a large rock formation jutting out into the sea, creating a protected basin. While it is a natural harbour, its sheltered nature differentiates it slightly from the broad, direct openness to the sea characteristic of Mumbai's harbour. However, it is also often considered a natural harbour directly connected to the sea. Comparing it with Mumbai, Mumbai's harbour is more typically classified as the quintessential example fulfilling the 'open sea' characteristic due to its vast natural basin opening directly into the Arabian Sea.

Conclusion on Open Sea Port Classification

Based on the analysis:

- Haldia is a riverine port.
- Chennai is an artificial port.
- Visakhapatnam is a natural harbour, but Mumbai's harbour is more broadly characterized as an open sea harbour due to its natural basin directly opening into the Arabian Sea.

Therefore, among the given options, **Mumbai Port** best fits the description of an open sea port due to its location within a large, natural deep-water harbour directly accessible from the open sea.

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143. **Answer: a**

Explanation:

Understanding the Highest Peaks in South India

The question asks us to identify the peak with the greatest elevation among the given options, specifically within the geographical region of South India.

South India is known for its diverse topography, featuring prominent mountain ranges like the Western Ghats and the Eastern Ghats. The Western Ghats, in particular, are home to some of the highest peaks in the region.

Analyzing the Options for South India's Highest Peak

Let's examine each option and determine its location and altitude:

- **Anamudi:** Located in the state of Kerala, in the Western Ghats range. It is situated in the Idukki district. Anamudi is widely recognized as the highest peak in South India. Its elevation is approximately $2695\ \mathrm{m}$.
- **Doddabetta:** Located in the Nilgiri Hills, which are part of the Western Ghats, in Tamil Nadu. Doddabetta is the highest peak in the Nilgiris and the second highest peak in South India after Anamudi. Its elevation is approximately $2637\ \mathrm{m}$.
- **Mahendragiri:** This peak is located in the Eastern Ghats. There are multiple peaks known as Mahendragiri, one significant one being in Odisha near the border with Andhra Pradesh. Its elevation is significantly lower than Anamudi or Doddabetta, typically cited around $1501\ \mathrm{m}$ to $1654\ \mathrm{m}$ depending on the specific peak referred to in that range.
- **Dhupgarh:** This peak is the highest point in the Satpura Range. The Satpura Range is located in central India, primarily in Madhya Pradesh. Dhupgarh's elevation is approximately $1350\ \mathrm{m}$. Since it is in central India, it is not relevant to the question

about South India.

Comparing Peak Altitudes

To clearly see which is the highest peak, let's compare the approximate altitudes:

Peak	Approximate Altitude	Location/Range	Geographical Region
Anamudi	2695 m	Kerala / Western Ghats	South India
Doddabetta	2637 m	Tamil Nadu / Nilgiris (Western Ghats)	South India
Mahendragiri	1501-1654 m	Odisha/Andhra Pradesh border / Eastern Ghats	South India
Dhupgarh	1350 m	Madhya Pradesh / Satpura Range	Central India

From the table, it is clear that Anamudi has the highest elevation among the given options and is indeed the highest peak in South India.

Conclusion: Identifying the Highest Peak

Based on the altitudes and locations, Anamudi stands out as the highest peak in South India. Doddabetta is the second highest peak in South India, while Mahendragiri is significantly lower and Dhupgarh is not even located in South India.

Revision Table: Key Facts about South Indian Peaks

Peak	Height (approx.)	Region
Anamudi	2695 m	Western Ghats (Kerala) - Highest in South India
Doddabetta	2637 m	Nilgiri Hills (Tamil Nadu) - Second Highest in South India

Additional Information on South Indian Geography

- The Western Ghats are a mountain range that runs parallel to the western coast of India. They are a UNESCO World Heritage Site and one of the world's ten "Hottest biodiversity hotspots."
- The Eastern Ghats are a discontinuous range of mountains along India's eastern coast. They are older than the Western Ghats.
- The Nilgiri Hills are a range of mountains forming part of the Western Ghats in Tamil Nadu, Karnataka, and Kerala.
- Anamudi is part of the Anamalai Hills in the Western Ghats. The name "Anamudi" translates to "Elephant Head" in Malayalam.

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144. **Answer: b**

Explanation:

Identifying Incorrectly Matched Ethnic Groups and Locations

This question asks us to identify the pair that does not correctly associate an ethnic group with its primary geographical region. Let's examine each option:

- **Fulani - West Africa:** The Fulani people are a widespread ethnic group primarily found across West Africa and parts of Central Africa. This statement is **correct**.
- **Bantu - Sahara:** The term "Bantu" refers to a large group of related peoples and languages originating in West/Central Africa, who migrated southward and eastward across the continent. While their historical origins are debated, their main distribution is across Sub-Saharan Africa (Central, East, and Southern Africa), **not** the Sahara Desert. The Sahara is primarily associated with nomadic groups like the Tuareg and Berbers. Therefore, this statement is **incorrect**.
- **Massai - East Africa:** The Massai are an ethnic group indigenous to East Africa, specifically inhabiting parts of Kenya and Tanzania. This statement is **correct**.
- **Nuba - Sudan:** The Nuba people are indigenous to the Nuba Mountains in Sudan. This statement is **correct**.

Analysis of the Incorrect Match

The key point of confusion might be the vastness of Africa. While Bantu languages and peoples are widespread throughout sub-Saharan Africa, their traditional territories do not include the Sahara Desert. The Sahara is a large desert region in North Africa.

The pair "Bantu - Sahara" is incorrectly matched because the Bantu peoples are predominantly found south of the Sahara Desert, in Central, East, and Southern Africa.

Conclusion on Ethnic Group Locations

Based on the geographical distribution of these ethnic groups:

- Fulani are in West Africa.
- Massai are in East Africa.
- Nuba are in Sudan (Northeast Africa).
- Bantu peoples are spread across Central, East, and Southern Africa, distinct from the Sahara region.

Therefore, the pair that is not correctly matched is Bantu - Sahara.

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145. **Answer: a**

Explanation:

Identifying Countries Around the Aral Sea

This solution will help you understand which countries are located near the Aral Sea, a significant geographical feature known for its shrinking size.

Understanding the Aral Sea Geography

The Aral Sea was once the fourth-largest lake in the world, located in Central Asia. It lies between Kazakhstan and Uzbekistan. Historically, the sea was fed by two major rivers: the Amu Darya to the south and the Syr Darya to the northeast.

Analyzing Bordering Countries

Let's examine the countries mentioned in the options and their proximity to the Aral Sea:

- **Kazakhstan:** The northern part of the Aral Sea historically bordered Kazakhstan. The shrinking of the sea has significantly impacted its coastline within Kazakhstan.
- **Uzbekistan:** The southern part of the Aral Sea bordered Uzbekistan. The Aral Sea disaster is closely associated with the ecological impact on this region of Uzbekistan.
- **Turkmenistan:** Turkmenistan is south of Uzbekistan and while it shares borders with some river systems that fed the Aral Sea (like the Amu Darya), it does not directly border the Aral Sea itself.

- **Russia:** Russia is located significantly north and west of the Aral Sea and does not share a border with it.
- **Azerbaijan:** Azerbaijan is located to the west of the Caspian Sea, much further from the Aral Sea.

Evaluating the Options

Based on the geographical location:

- **Option 1: Kazakhstan - Uzbekistan** - Both Kazakhstan and Uzbekistan directly bordered the Aral Sea. This pair accurately represents the countries around the sea.
- **Option 2: Kazakhstan - Turkmenistan** - While Kazakhstan borders the Aral Sea, Turkmenistan does not directly border it, although it is a neighboring country in the region.
- **Option 3: Azerbaijan - Uzbekistan** - Azerbaijan is geographically distant from the Aral Sea.
- **Option 4: Kazakhstan - Russia** - Russia is not adjacent to the Aral Sea.

Conclusion on Aral Sea Neighbors

The Aral Sea is situated between Kazakhstan and Uzbekistan. Therefore, the correct pair of countries that are around the Aral Sea is Kazakhstan and Uzbekistan.

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146. **Answer: d**

Explanation:

Sea Salinity Comparison: Identifying the Highest

What is Sea Salinity?

Salinity refers to the total amount of dissolved salts in water, typically expressed in parts per thousand (ppt). It's a critical measure in aquatic environments, influencing everything from water density to the types of organisms that can survive there. Different seas have vastly different salinity levels due to factors like evaporation rates, freshwater inflow, and connections to larger oceans.

Caspian Sea Salinity Analysis

The **Caspian Sea**, the world's largest inland body of water, has a relatively low average **salinity**, approximately 1.3 ppt. This is significantly less than the open ocean's salinity. The considerable freshwater input from major rivers, such as the Volga River, helps keep its salt concentration low. However, salinity can vary, being slightly higher in the eastern parts of the sea.

Mediterranean Sea Salinity Analysis

The **Mediterranean Sea** experiences higher **salinity** than many other seas, typically ranging between 36 ppt and 39 ppt. This is due to a high rate of evaporation in the warm climate, coupled with limited freshwater contributions from rivers and relatively restricted water exchange with the Atlantic Ocean through the Strait of Gibraltar.

Red Sea Salinity Analysis

Known for its warm waters and vibrant coral reefs, the **Red Sea** also has a high **salinity**. The average **salinity** is around 40 ppt, potentially reaching 41 ppt in some areas. This elevated salt level is attributed to minimal rainfall, very low river inflow, and extremely high evaporation rates in the surrounding arid environment.

Dead Sea Salinity Analysis

The **Dead Sea** is renowned for its exceptionally high **salinity**, making it one of the saltiest natural bodies of water on Earth. Its **salinity** consistently ranks between 330 ppt and 342 ppt. This extreme hypersalinity results from intense evaporation in a desert

basin with no outlet, causing salts and minerals to become highly concentrated over time.

Table: Average Salinity of Seas

Sea	Approximate Average Salinity (ppt)
Caspian Sea	1.3 ppt
Mediterranean Sea	$36 - 39$ ppt
Red Sea	40 ppt
Dead Sea	$330 - 342$ ppt

Determining the Highest Salinity Sea

When comparing the typical salinity levels, it is clear that the **Dead Sea** has the highest **salinity** among the listed options by a significant margin. Its unique environmental conditions lead to a concentration of salts far exceeding that of the Caspian Sea, the Mediterranean Sea, and the Red Sea.

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147. **Answer: c**

Explanation:

Identifying the World's Largest Diamond Producer

Diamond production is a significant global industry, with several countries playing major roles. This solution explores the diamond output of the countries listed in the options to determine which is the largest producer.

Global Diamond Production Landscape

The extraction and supply of diamonds are dominated by a few key nations. Understanding the production volumes helps identify the leading countries in this valuable resource sector. Key players often include Russia, Botswana, Canada, and Australia, although rankings can fluctuate based on specific reporting periods and market dynamics.

Analyzing Diamond Production by Country

Let's look at the diamond production status of the options provided:

- **Russia:** Russia has consistently been the world's largest producer of rough diamonds by volume for many years. Companies like ALROSA, a state-controlled enterprise, operate major mines in Siberia, contributing significantly to global supply.
- **Botswana:** Botswana is another major diamond producer, often ranking second globally, particularly in terms of value. Its diamond industry, primarily driven by Debswana (a partnership between the government and De Beers), is crucial to the national economy.
- **Australia:** While Australia was historically a significant diamond producer, particularly from the Argyle mine (which ceased operations in 2020), its overall production volume has decreased compared to the leading nations like Russia.
- **Venezuela:** Venezuela has diamond deposits, but its production levels are considerably lower compared to the major producers like Russia and Botswana. Political and economic instability has also impacted its mining sector.

Determining the Largest Producer

Based on established data regarding rough diamond production volume, Russia stands out as the leading country. Its vast mining operations consistently yield the highest quantity of diamonds annually, solidifying its position as the world's top producer.

Therefore, when considering the countries listed, Russia is recognized as the largest producer of diamonds by volume.

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148. **Answer: d**

Explanation:

Death Valley: Understanding its Geological Classification as a Valley Type

Death Valley, located in South California, USA, is a fascinating geological feature known for its extreme temperatures and low elevation. Understanding how different valleys are formed helps classify Death Valley correctly. Let's explore the types of valleys mentioned in the options.

What is a Rift Valley?

A **Rift Valley** is a large-scale geological feature formed when the Earth's crust stretches and breaks apart due to tensional forces, a process called rifting. This stretching causes large blocks of rock to drop down along parallel fault lines. The resulting valley is typically long, relatively narrow, with steep walls or escarpments formed by the fault scarps. These valleys are often associated with divergent plate boundaries or areas of crustal extension.

Other Valley Formation Types

- **Anticlinal Valley:** This type of valley forms in regions where the rock strata have been folded into an anticline (an upward arch). Erosion then wears away the rock along the crest of the anticline, potentially exposing more resistant rock layers that form ridges, while the valley follows the upward fold.
- **Synclinal Valley:** Conversely, a synclinal valley develops along the trough of a syncline (a downward fold). Erosion might remove weaker rock layers in the synclinal trough, leading to a valley, or resistant layers might form surrounding ridges.
- **Antecedent Valley:** An antecedent valley is one that existed before a regional uplift occurred. As the landmass was uplifted, the river flowing through the valley maintained its course by cutting down through the rising rock layers at a pace equal to or faster than the uplift.

Analyzing Death Valley's Formation

Death Valley is a classic example of a geological structure known as a graben. A graben is a down-dropped block of land that is bounded by steeply dipping normal faults on one or both sides. This specific formation occurs due to crustal extension and stretching.

Geologically, Death Valley lies within the Basin and Range Province of western North America. This region has experienced significant crustal stretching and thinning over millions of years. The movement along fault systems, particularly related to the San Andreas Fault and the spreading activity offshore, has caused the land between the faults to subside.

The distinctive features of Death Valley, including its extremely low elevation (below sea level) and the steep mountain ranges (like the Panamint Range and Black Mountains) that flank it, are characteristic of a rift valley system. These mountains are uplifted fault blocks (horsts), while Death Valley itself is the down-dropped block (graben) between them.

Comparing this to the other options:

- It is not an anticlinal or synclinal valley, as its formation is primarily driven by faulting and stretching, not folding.
- It is not an antecedent valley, as its current form is a direct result of the subsidence caused by active faulting and crustal extension, rather than a river maintaining its course through regional uplift.

Therefore, the geological processes and resulting landforms clearly indicate that Death Valley is a prime example of a **Rift Valley**.

149. **Answer: d**

Explanation:

Identifying India's Largest Manganese Producer (2012)

This solution focuses on identifying the state that held the position of the largest producer of manganese in India, specifically referencing the data available around the year 2012. Manganese is a crucial metal used extensively in steel production, battery manufacturing, and chemical industries, making its domestic production significant for India's economy.

Understanding Manganese Production in India

India is one of the world's leading producers and exporters of manganese ore. Several states contribute to the country's output, but their production levels vary significantly. Key manganese-bearing states include Odisha, Madhya Pradesh, Karnataka, Maharashtra, Bihar, and Rajasthan.

Analysis of Major Manganese Producing States (Circa 2012)

To determine the largest producer in 2012, we need to look at the production statistics from that period. Based on reports and data from the Indian Bureau of Mines and other geological surveys:

- **Odisha:** Consistently holds the top position in manganese ore production in India. Its reserves and output are significantly higher than other states. The major mining areas are located in the Keonjhar and Sundergarh districts.
- **Madhya Pradesh:** Is generally considered the second largest producer, with significant mining activities in the Balaghat district.
- **Karnataka:** Contributes a notable amount to the national production, primarily from the Sandur taluka in the Bellary district.
- **Maharashtra:** Also participates in manganese production, mainly in the Nagpur and Bhandara districts.

Odisha's Leading Role in Manganese Production

As of 2012, **Odisha** was unequivocally the largest producer of manganese ore in India. The state accounted for a substantial majority of the country's total output, often contributing over 40-50% of the national production in various years, including the period around 2012. This dominance is due to rich, high-quality manganese deposits and extensive mining operations within the state.

Conclusion on Largest Producer

Therefore, based on the production data available for the year 2012, Odisha stands out as the leading state for manganese production in India.

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150. **Answer: c**

Explanation:

Understanding Union Territory Population Density

The question asks us to identify the Union Territory (UT) with the lowest population density among the given options. Population density is a measure of how crowded a place is, calculated by dividing the total population of an area by its total land area. The formula is:

$$\text{Population Density} = \frac{\text{Total Population}}{\text{Total Land Area}}$$

To answer this, we need to look at the population density figures for each Union Territory listed: Daman and Diu, Dadra and Nagar Haveli, Andaman and Nicobar Islands, and Puducherry.

Calculating Population Densities of Union Territories

Let's examine the population density for each UT using data typically sourced from the Census of India (e.g., 2011 Census for standard comparisons):

Union Territory	Population (2011 Census)	Area (sq km)	Calculated Population Density (people/sq km)
Daman and Diu	243,209	112	$\frac{243,209}{112} \approx 2171.5$
Dadra and Nagar Haveli	343,709	491	$\frac{343,709}{491} \approx 700.0$
Andaman and Nicobar Islands	380,581	8,249	$\frac{380,581}{8,249} \approx 46.1$
Puducherry	1,385,159	492	$\frac{1,385,159}{492} \approx 2815.4$

Comparing Population Densities

By comparing the calculated population densities:

- Daman and Diu has a density of approximately 2171.5 people per square kilometer.
- Dadra and Nagar Haveli has a density of approximately 700.0 people per square kilometer.
- Andaman and Nicobar Islands has a density of approximately 46.1 people per square kilometer.
- Puducherry has a density of approximately 2815.4 people per square kilometer.

From these figures, it is clear that the **Andaman and Nicobar Islands** have the lowest population density among the four options.

Final Answer Determination

The Union Territory with the lowest population density is Andaman and Nicobar Islands, with a density significantly lower than the other UTs listed. This is due to its large land area combined with a relatively smaller population compared to the others.