

Answers

1. Answer: a

Explanation:

Understanding the Jumbled Sentence Question

This question requires rearranging jumbled parts (P, Q, R, S) to form a meaningful and grammatically correct sentence. The sentence starts with a given phrase and ends with a concluding clause. We need to find the correct sequence of P, Q, R, and S that logically connects these parts.

Analyzing the Jumbled Parts

Let's look at the given parts:

- P: independence, integrity, and hard work
- Q: and often participated in the making of policy,
- R: and developed a certain tradition of
- S: its members exercised vast power

The starting phrase is: "The Indian Civil Service gradually developed into one of the most powerful civil services;"

The concluding phrase is: ", though these qualities obviously served British, and not Indian interests."

Finding the Correct Sequence (SQRP)

We need to arrange P, Q, R, and S to fit logically between the starting and concluding phrases.

1. **Start with S:** The introductory phrase describes the Indian Civil Service as "powerful". Part S, "its members exercised vast power", directly elaborates on this aspect. So, the sequence starts with S.

Sentence so far: "The Indian Civil Service gradually developed into one of the most powerful civil services; its members exercised vast power..."

2. **Add Q:** Part Q, "and often participated in the making of policy," adds another detail about the service's activities and function, logically following the exercise of power. The conjunction "and" connects it smoothly.

Sentence so far: "The Indian Civil Service gradually developed into one of the most powerful civil services; its members exercised vast power and often participated in the making of policy,..."

3. **Add R:** Part R, "and developed a certain tradition of", introduces the concept of a tradition developed by the service. This fits well after describing the power and policy involvement. The "and" connects it to the previous clause.

Sentence so far: "The Indian Civil Service gradually developed into one of the most powerful civil services; its members exercised vast power and often participated in the making of policy, and developed a certain tradition of..."

4. **Add P:** Part P, "independence, integrity, and hard work", lists the specific qualities that constitute the "tradition" mentioned in R. This completes the description of the tradition.

Sentence so far: "The Indian Civil Service gradually developed into one of the most powerful civil services; its members exercised vast power and often participated in the making of policy, and developed a certain tradition of independence, integrity, and hard work..."

5. **Combine with Conclusion:** Adding the concluding phrase gives the complete sentence: ", though these qualities obviously served British, and not Indian interests."

Therefore, the correct order is S-Q-R-P.

Final Correct Sentence

The Indian Civil Service gradually developed into one of the most powerful civil services; its members exercised vast power and often participated in the making of

policy, and developed a certain tradition of independence, integrity, and hard work, though these qualities obviously served British, and not Indian interests.

Matching with Options

The sequence SQRP corresponds to option 1.

The correct option is 1.

Keywords: Indian Civil Service, powerful civil services, members exercised vast power, making of policy, tradition of independence, integrity, hard work.

2. Answer: b

Explanation:

Decomposition Process Explained: Arranging Sentence Parts

This question requires us to arrange four jumbled parts (P, Q, R, S) to form a grammatically correct and meaningful sentence that describes the role of decomposers. We need to find the correct sequence among the given options.

Analyzing Jumbled Sentence Fragments

Let's examine each part to understand its meaning and grammatical function:

- **P:** "help in decomposing the" – This phrase initiates an action, suggesting that something decomposes. It requires an object to specify what is being decomposed.
- **Q:** "and hence help to clean the environment" – This part indicates a consequence or result of an action. The phrase "and hence" suggests it follows another related action or outcome.
- **R:** "dead bodies of plants and animals" – This phrase serves as the direct object for the action of decomposition mentioned in part P.

- **S:** "and put back various useful elements" – This part describes another function or result, connected by "and", likely related to the decomposition process and its environmental benefits.

Identifying the Correct Sentence Sequence

To construct a logical sentence, we need to establish the correct flow:

- The action of **decomposition** starts with part P: "help in decomposing the".
- The object of decomposition is provided by part R: "dead bodies of plants and animals". Combining P and R gives us "help in decomposing the dead bodies of plants and animals". This forms a coherent initial clause.
- Following the decomposition of these **dead bodies**, the next logical step is the outcome. Part Q describes one outcome: "and hence help to clean the environment". This naturally follows the action described by PR.
- Part S describes another crucial outcome: "and put back various useful elements". This closely relates to cleaning the environment and returning nutrients. It logically follows Q, connecting the environmental cleaning with the return of elements.

Therefore, the sequence **PRQS** creates a complete and logical sentence: "help in decomposing the dead bodies of plants and animals and hence help to clean the environment and put back various useful elements". This sequence effectively explains how decomposers contribute to environmental health by recycling nutrients.

Constructing the Complete Sentence

By arranging the parts in the order PRQS, we form the following sentence:

P (help in decomposing the) + R (dead bodies of plants and animals) + Q (and hence help to clean the environment) + S (and put back various useful elements)

The complete sentence reads: "help in decomposing the dead bodies of plants and animals and hence help to clean the environment and put back various useful elements". This sentence accurately describes the vital role of decomposers in breaking down organic matter and recycling essential elements back into the ecosystem, thereby contributing to a cleaner environment.

3. Answer: a

Explanation:

Understanding Sentence Rearrangement for Glass Handling

This question involves rearranging jumbled sentence parts (P, Q, R, S) to form a complete and logical sentence. The task is to correctly sequence these parts to fit into the structure: "Thick glass may _____ glass requires personal attention." We need to find the combination that makes the most sense grammatically and contextually, focusing on the topic of handling different types of glass.

Analyzing Jumbled Parts Related to Glass Cutting

Here are the jumbled parts provided:

- P: of the home bottle-cutters
- Q: which are available
- R: in many large stores, but any fine
- S: be cut with one

Our goal is to arrange these pieces to complete the sentence about thick glass and its handling compared to fine glass.

Constructing the Correct Sentence using SPQR Order

Let's assemble the sentence using the order SPQR:

1. We start with the given phrase: "Thick glass may"
2. Next, add part S: "be cut with one". This starts explaining how thick glass can be managed. The sentence now reads: "Thick glass may **be cut with one**".
3. Add part P: "of the home bottle-cutters". This specifies the tool mentioned in part S. The sentence becomes: "Thick glass may be cut with one **of the home bottle-cutters**".

4. Now, add part Q: "which are available". This relative clause provides additional information about the bottle-cutters. The sentence continues: "Thick glass may be cut with one of the home bottle-cutters **which are available**".
5. Finally, add part R: "in many large stores, but any fine". This phrase indicates where these tools can be found and importantly introduces a contrast with "fine glass". The sentence builds to: "Thick glass may be cut with one of the home bottle-cutters which are available **in many large stores, but any fine**".
6. The phrase "any fine" from part R connects smoothly to the second part of the original sentence fragment, implying "any fine **glass**".

Putting it all together, the complete sentence is: "Thick glass may be cut with one of the home bottle-cutters which are available in many large stores, but any fine glass requires personal attention."

This complete sentence logically conveys that while thick glass is manageable with specific tools readily available, finer glass necessitates more careful, personal handling.

Confirming the SPQR Sequence Logic

The SPQR order creates a coherent narrative:

- **S (be cut with one)**: Describes the possibility of cutting.
- **P (of the home bottle-cutters)**: Specifies the tool used.
- **Q (which are available)**: Comments on the availability of these tools.
- **R (in many large stores, but any fine)**: Locates the tools and contrasts the ease of cutting thick glass with the need for care for fine glass.

This sequence effectively connects the initial statement about thick glass to the concluding point about fine glass, making it the correct arrangement.

4. Answer: c

Explanation:

Understanding the Context for Blank X

The question asks us to fill in the blank labeled 'X' in the sentence:

"_____X_____, farmers have used a variety of methods to protect their crops from pests and diseases." This sentence introduces the historical practices farmers employed before modern chemical interventions.

Analyzing Word Choices for X

We need to select the most fitting word from the given options to describe the timeframe or manner in which farmers used diverse methods for crop protection. Let's examine each option:

- **Occasionally:** This word suggests that these methods were used only sometimes. However, the text implies these were established practices over a period, not just infrequent occurrences.
- **Mainly:** While these methods might have been primary at some point, 'mainly' doesn't capture the historical aspect implied by the contrast with current chemical use.
- **Traditionally:** This term implies methods that have been used for a long time, passed down through generations. This fits perfectly with the description of varied, older crop protection techniques used before the widespread adoption of chemicals.
- **Fanatically:** This word means doing something with excessive, uncritical zeal. It does not fit the context of describing historical farming methods.

Choosing the Most Appropriate Word

The passage contrasts older methods like using "herb-based poisons", "handpicking insects", and "crop rotation" with the current reliance on "chemicals". The word **Traditionally** best bridges this gap, indicating that these diverse techniques were the established, long-standing ways farmers managed pests and diseases.

Using **Traditionally** sets the stage for discussing the evolution of farming practices, from older, varied methods to modern chemical reliance.

Conclusion for Blank X

Based on the context highlighting historical and diverse crop protection methods, **Traditionally** is the most suitable word to fill the blank X.

5. Answer: a

Explanation:

Choosing the Right Word for Blank Y in Crop Protection Methods

The question requires selecting the most appropriate word to fill in the blank labeled 'Y' in the provided text. The text discusses various methods farmers have historically used and currently use to protect crops from pests and diseases.

Understanding the Context of Blank Y

The sentence containing the blank is: "They have put herb-based poisons on crops, handpicked insects off plants, bred strong varieties of crops, and rotated crops to _____ Y _____ insects." Let's analyze the context:

- The sentence lists several agricultural practices: using poisons, handpicking insects, breeding resistant crop varieties, and crop rotation.
- All these methods are aimed at managing the negative impact of insects (pests) on crops.
- Specifically, crop rotation is a technique where different types of crops are grown in the same area in sequenced seasons. This practice helps in disrupting the life cycles of specific pests and diseases that target particular crops, thereby managing their populations.
- Therefore, the word in blank 'Y' should describe the purpose of crop rotation concerning insects in this context.

Analyzing the Options for Blank Y

We need to evaluate each option to see which word best fits the purpose of crop rotation in managing insects:

- **Option 1: control**
 - Meaning: To exercise restraint or direction over; command; regulate.
 - Fit: Crop rotation helps to manage and regulate the population of insects by making the environment less suitable for them or disrupting their breeding cycles. Thus, it helps to *control* insects. This word fits the context very well.
- **Option 2: breed**
 - Meaning: (Of animals or plants) produce offspring; reproduce.
 - Fit: The text mentions farmers *bred* strong varieties of crops, but crop rotation is not done to 'breed insects'. Farmers aim to reduce insect populations, not increase them through breeding. This word does not fit the context.
- **Option 3: heed**
 - Meaning: Pay attention to; take notice of.
 - Fit: While farmers might need to pay attention to insects (heed pests), crop rotation is an active measure to manage them, not just to notice them. Saying farmers rotate crops to 'heed insects' does not accurately describe the function of the practice. This word does not fit the context.
- **Option 4: maintain**
 - Meaning: Cause or allow (something) to continue to exist or to happen.
 - Fit: Farmers use crop rotation to reduce or suppress pest populations, not to 'maintain' them at a certain level. Maintaining insects would imply keeping their numbers stable, which is contrary to the goal of pest management described. This word does not fit the context.

Conclusion on Selecting the Word for Y

Based on the analysis, *control* is the most suitable word to complete the sentence. Crop rotation is a method used by farmers to effectively **control** insect populations, thereby protecting their crops.

6. Answer: b

Explanation:

Analyzing Farmers' Reliance on Chemicals for Pest Control

This question requires selecting the most suitable word to fill in the blank `\_\_\_\_\_Z\_\_\_\_\_` in a sentence about modern farming practices. The sentence contrasts traditional methods of protecting **crops** from pests and diseases with current approaches, especially in developed countries.

Understanding the Context of Crop Protection

The passage outlines how **farmers** have historically used various strategies to safeguard their crops, including:

- Applying herb-based poisons.
- Manually removing insects.
- Breeding varieties resistant to pests and diseases.
- Using crop rotation to manage insect populations.

The sentence containing the blank `\_\_\_\_\_Z\_\_\_\_\_` describes the present situation:

"Now, almost all farmers, especially in developed countries, _____Z_____ on chemicals to control pests."

The task is to find a verb that accurately conveys the relationship between farmers and their use of chemicals for pest management today.

Evaluating Word Choices for Blank Z

We need to evaluate the given options to determine which word best fits the context of farmers' dependency on chemicals:

- **Option 1: based**
Using "based on chemicals" suggests that chemicals form the foundation of their pest control strategy. While plausible, it doesn't strongly emphasize the dependence or active usage implied in the sentence.
- **Option 2: rely**
The phrase "rely on chemicals" signifies dependence. This option fits the context perfectly, showing that modern **farmers** depend heavily on **chemicals** to **control pests**, marking a significant shift from the diverse methods previously employed.
- **Option 3: perceive**
"Perceive on chemicals" is grammatically incorrect and contextually nonsensical. The verb 'perceive' relates to awareness or understanding, not dependence.
- **Option 4: lay**
"Lay on chemicals" is also grammatically incorrect in this context or doesn't convey the intended meaning. 'Lay' typically refers to placing something down.

Selecting the Most Appropriate Word

Based on the analysis, the word '**rely**' is the most appropriate choice for the blank `\_\_\_\_\_Z\_\_\_\_\_`. It accurately reflects the dependence of farmers on chemical solutions for pest control, which is the central theme contrasting current practices with historical methods described in the passage.

7. Answer: c

Explanation:

Understanding the Context: Difficulty in Consuming a Meal

The question asks us to identify the most fitting word to describe a meal that a diner found difficult to consume. This requires understanding the specific meanings of the

provided options and how they relate to the experience of eating food.

Analyzing Word Options for Meal Quality

Let's break down the meaning of each word:

- **wobble:** This word describes something that shakes or moves unsteadily. It relates to physical instability rather than taste or texture that would prevent consumption. For instance, a jelly might wobble. It doesn't fit the context of a meal being hard to eat due to its quality.
- **pure:** This term means something is unmixed, clean, or consisting only of one element. While purity can be a positive attribute (like pure water), it doesn't inherently make a food item difficult to consume. Often, "pure" suggests good quality, not a reason for complaint about edibility.
- **brackish:** This word is typically used for water that is a mix of fresh and saltwater, resulting in a slightly salty, often unpleasant taste. When applied to food, it suggests an unpalatable flavour, possibly too salty or having an off-taste, which would make it difficult for someone to eat. This aligns with the diner's complaint about the meal.
- **delicious:** This adjective means highly pleasant to the taste. It signifies that a meal is enjoyable and easy to eat, which is the opposite of the diner's experience.

Determining the Most Appropriate Word

To find the best fit for the blank, we compare the options against the context:

- "Wobble" is about physical movement, not edibility.
- "Pure" relates to composition and doesn't explain difficulty in consumption.
- "Delicious" describes a pleasant taste, contrary to the diner's issue.
- "Brackish" implies an unpleasant, possibly salty taste that makes food difficult to consume. This directly addresses the diner's complaint.

The context requires a word indicating an undesirable quality of the meal that hindered the diner from eating it. "Brackish" best describes an unpleasant taste that makes consumption difficult.

Final Answer

The diner complained that his meal was too **brackish** to consume.

8. Answer: b

Explanation:

Choosing the Correct Word to Describe a Forest Sound

This question requires us to select the most suitable word to complete a sentence describing an event. The sentence states that someone **returned** to the castle and had to **stop** upon hearing a particular type of **sound** originating from the **forest**.

Analyzing the Sentence Context

The key elements here are "stopping" and "sound". When someone stops because of a sound, it usually implies the sound is noticeable, perhaps unusual, loud, or indicative of activity. We need a word that represents such a sound or disturbance.

Evaluating the Options

Let's look at each option provided:

- **calm**: This word describes a state of tranquility or stillness, usually associated with the absence of noise or disturbance. It doesn't typically refer to a specific sound that would cause someone to stop.
- **commotion**: This word means a state of confused and noisy disturbance or excitement. A commotion often involves sounds like shouting, movement, or general activity, making it a likely reason for someone to stop and pay attention.
- **peace**: Similar to 'calm', 'peace' refers to a state of tranquility and quiet. It is not a sound itself and wouldn't typically be described as something heard that causes a stop.

- **quiet:** While 'quiet' means the absence of noise, the phrase "sound of quiet" is unusual. People usually stop because of a specific sound or a noticeable lack of expected sound (e.g., sudden silence), but 'commotion' better describes an active sound event.

Determining the Best Fit

Considering the need for a word describing a sound that causes someone to halt their journey, 'commotion' is the most appropriate choice. Hearing a **commotion** from the **forest** implies noise and activity that would naturally make a person stop and investigate or be cautious.

The other options (calm, peace, quiet) describe states of low activity or silence, which don't fit as well with the idea of hearing a distinct sound that prompts a stop.

Conclusion

The word 'commotion' best fits the blank, indicating a noticeable and likely noisy event in the forest that caused the person to stop.

9. Answer: a

Explanation:

Behavioral Changes in Alcohol Deaddiction Centers

This question asks for the most suitable phrasal verb to describe the goal of alcohol deaddiction centers regarding the lifestyle of addicts. The sentence highlights that these centers aim to create specific changes by keeping addicts engaged in various activities.

Understanding Phrasal Verb Meanings

To fill in the blank correctly, we need to understand the different meanings of the phrasal verbs provided:

- **bring about:** This phrasal verb means to cause something to happen or to achieve a result. For example, "The new policies aim to *bring about* significant changes in the industry."
- **bring in:** This usually means to introduce something new, like a new law or product, or to earn money. For example, "The company plans to *bring in* a new software system."
- **bring out:** This means to reveal something that is hidden or to produce something for people to see or buy. For example, "The bright sunlight *brings out* the colors of the flowers."
- **bring off:** This means to succeed in doing something, especially something that is difficult. For example, "She managed to *bring off* the complex negotiation."

Choosing the Right Phrasal Verb for Lifestyle Changes

Considering the context of alcohol deaddiction centers trying to instill new habits and modify the behavior of addicts, the phrasal verb needs to signify the act of causing or achieving these changes. Let's analyze how each option fits:

- **bring about:** This fits perfectly because deaddiction centers actively work to *cause* or *achieve* positive **behavioral changes** in the addicts' lifestyles. They aim to make these changes happen.
- **bring in:** This doesn't fit because the centers aren't introducing a new policy or earning money in this context.
- **bring out:** This doesn't fit because the centers are not primarily trying to reveal hidden potential or produce a product.
- **bring off:** While the process is difficult, "bring off" focuses more on the success of a difficult task rather than the direct causation of the change itself in this specific sentence structure. "Bring about" is more direct in expressing the goal of causing the change.

Conclusion on Behavioral Changes

The sentence structure "Alcohol deaddiction centers try to_____behavioral changes..." implies an effort to initiate or cause these changes. Therefore, the phrasal verb **bring about** is the most appropriate choice as it

directly conveys the meaning of causing or achieving these necessary lifestyle modifications for addicts.

The completed sentence reads: "Alcohol deaddiction centers try to **bring about** behavioral changes in the lifestyle of addicts by keeping them busy in various activities."

10. Answer: c

Explanation:

Identifying the Opposite Meaning: 'Colossal'

The task is to find the word that means the opposite of the given word, 'Colossal'. This involves understanding the meaning of 'Colossal' and comparing it with the meanings of the available options.

Understanding the Meaning of 'Colossal'

The word 'Colossal' describes something that is extremely large or massive in size. It signifies immense scale.

- **Definition:** Extremely large, huge, gigantic.
- **Example:** The Colosseum in Rome, while impressive, is dwarfed by the sheer scale implied by the adjective 'colossal'. Think of Mount Everest or a skyscraper as potentially colossal structures.

Examining the Provided Options

We need to evaluate each option to see how its meaning relates to 'Colossal':

- **1. Giant:** This word means very large. It is similar in meaning to 'Colossal', making it a synonym, not an antonym.
- **2. Dark:** This relates to the absence of light or a deep shade. It has no connection to size.

- **3. Small:** This word means of a size less than average or usual; not large. This is the direct opposite of 'Colossal'.
- **4. Opaque:** This describes something that light cannot pass through. It refers to transparency, not size.

Determining the Antonym for 'Colossal'

By comparing the meanings:

- 'Colossal' = Extremely Large
- 'Giant' = Very Large (Synonym)
- 'Dark' = Relates to Light (Unrelated)
- 'Small' = Not Large (Antonym)
- 'Opaque' = Not Transparent (Unrelated)

The word 'Small' is the most suitable opposite in meaning to 'Colossal' because it represents the smallest end of the size spectrum, contrasting directly with the extreme largeness implied by 'Colossal'.

Final Answer Explanation

The question asks for the word opposite in meaning to 'Colossal'. 'Colossal' means extremely large. Among the choices, 'Small' is the only word that signifies the opposite quality of size.

11. Answer: b

Explanation:

Understanding Antonyms: Finding the Opposite of 'Intrinsic'

The question asks us to find the word that is opposite in meaning to the given word, **Intrinsic**. To solve this, we need to understand the meaning of **Intrinsic** and then

compare it with the meanings of the provided options.

Defining 'Intrinsic'

The term **Intrinsic** describes something that is naturally a part of something else; it is inherent or essential. It refers to qualities that belong to an object or person because of its fundamental nature, not because it was acquired or added later.

For example, the ability to learn is often considered **intrinsic** to human beings.

Examining the Word Options

Let's look at the meaning of each option given:

- **Benefit:** This refers to an advantage or profit gained from something.
- **Acquired:** This term means something that has been obtained, learned, or developed, typically through effort or external factors, rather than being natural or inherent.
- **Extravagant:** This describes something that is excessive, often related to spending money wastefully or using resources without restraint.
- **Intensive:** This means concentrated, thorough, or requiring a lot of effort.

Identifying the Antonym

We are looking for the word that means the opposite of natural or inherent.

- **Intrinsic** means naturally present.
- **Acquired** means gained or learned, implying it wasn't natural or inherent.
- The contrast between something being natural (**Intrinsic**) and something being obtained or learned (**Acquired**) makes **Acquired** the most suitable antonym.
- The other options, **Benefit**, **Extravagant**, and **Intensive**, do not represent the opposite meaning of **Intrinsic**.

Final Choice Explained

Therefore, the word that is opposite in meaning to **Intrinsic** is **Acquired**.

12. Answer: a

Explanation:

Understanding the Word Proponent

The question asks to identify the best synonym for the word **Proponent** from the given choices. A **proponent** is a person who actively advocates for or supports a particular cause, policy, proposal, or idea. They are someone who argues in favour of something.

Analyzing the Options for Proponent

Let's examine each option to see how it relates to the meaning of **proponent**:

- **Supporter**: This word means someone who agrees with, encourages, or gives help to a particular idea, plan, or person. This aligns closely with the definition of a **proponent**, as both terms imply active backing and endorsement.
- **Opponent**: An opponent is someone who is against something or someone; they actively oppose a cause or idea. This is the direct opposite of a **proponent**.
- **Passive**: This term describes someone who does not actively participate or intervene, but rather accepts or allows things to happen without resistance. A **proponent** is active, not passive.
- **Bestow**: This is a verb that means to give or grant something, typically an honour, a gift, or a right. It doesn't relate to the act of supporting or advocating for an idea or cause.

Conclusion on Proponent Synonym

Comparing the options with the meaning of **proponent** (an active supporter or advocate), the word **Supporter** is the most fitting synonym. It accurately captures the essence of actively championing a cause or idea, similar to how a proponent does.

13. Answer: a

Explanation:

Understanding the Idiom 'Haul over the coals'

The idiom 'Haul over the coals' describes a situation where someone is subjected to harsh criticism or a severe reprimand for something they have done wrong.

Think of it as being intensely scrutinized or scolded, often in a public or formal setting, for a mistake or failure. It implies a strong expression of disapproval.

Analyzing Options for the Idiom 'Haul over the coals'

We need to find the meaning that best matches 'Haul over the coals' from the given options:

- **Option 1: To scold**
This means to reprimand someone sharply, often in anger. This aligns well with the idea of severe criticism implied by the idiom.
- **Option 2: To barter**
This means to exchange goods or services without using money. This meaning is unrelated to the idiom.
- **Option 3: To pretend**
This means to behave as if something is true when it is not. This is also unrelated to the idiom's core meaning.
- **Option 4: To prevail**
This means to prove more powerful than opposed, or to triumph. This meaning does not fit the idiom at all.

Identifying the Correct Meaning of 'Haul over the coals'

When considering the context and common usage, the idiom 'Haul over the coals' specifically relates to the act of reprimanding or criticizing someone very strongly.

For instance, if a student submits a poorly done assignment, the teacher might say, "You'll be hauled over the coals for this work!" This clearly indicates a strong scolding is expected.

Therefore, '**To scold**' is the meaning that accurately captures the essence of this idiom.

Final Explanation for 'Haul over the coals'

The idiom '**Haul over the coals**' signifies a strong reprimand or severe criticism. Among the choices provided, '**To scold**' is the most fitting definition, as it directly relates to criticizing someone harshly for their actions.

14. Answer: a

Explanation:

Understanding the Divine Force Concept

The question asks for a single word that describes a specific belief: the existence of a **divine force**. This force is thought by some people to actively **control our lives** and also provide protection.

Analyzing the Terminology

We need to find the most suitable word from the options that encapsulates the idea of a guiding, controlling, and protective divine power.

Evaluating the Options

- Option 1: Providence

Providence refers to the protective care of God or of nature as a spiritual power. It implies divine foresight, guidance, and often, protection. This aligns very

closely with the definition provided in the question: a **divine force** that **controls** and **protects**.

- **Option 2: Universal**

Universal means applicable to all cases or instances. While a belief in a divine force might be widespread, the word "universal" itself doesn't describe the nature or function of that force (i.e., control and protection).

- **Option 3: Spiritual**

Spiritual relates to the human spirit or soul, or things considered sacred. While the **divine force** mentioned is spiritual in nature, the word "spiritual" is a broad adjective and not the specific noun for the force itself as described.

- **Option 4: Metaphysics**

Metaphysics is a branch of philosophy dealing with fundamental questions about reality, existence, and the nature of things. It's a field of study, not the term for the **divine force** believed to **control** lives.

Defining Providence

The word that best fits the description "A **divine force** that some people believe **controls our lives** and in a way **protects us**" is **Providence**.

Providence specifically denotes:

- Divine guidance or care.
- The aspect of God (or a divine entity) caring for and controlling the universe and human affairs.
- Events guided by a divine power; good fortune believed to be sent by God.

This term captures both the idea of control ("controls our lives") and protection ("protects us") attributed to a higher power.

15. Answer: d

Explanation:

Decoding the Idiom: 'Take Time by the Forelock'

Idioms are phrases where the words together have a meaning different from the dictionary definitions of the individual words. Understanding idioms is crucial for mastering language nuances. Let's analyze the idiom 'Take time by the forelock' and its potential meanings.

Understanding the Idiom 'Take Time by the Forelock'

The idiom '**Take time by the forelock**' refers to the practice of acting promptly and decisively to take advantage of an opportunity before it passes. The 'forelock' is the lock of hair that grows on the forehead. The imagery suggests grabbing time by the forelock, meaning to grasp it firmly as it comes towards you, rather than letting it slip away.

Analyzing the Provided Options

We need to find the meaning that best fits the idiom '**Take time by the forelock**'. Let's examine each option:

- **Option 1: To take revenge** – This involves retaliating against someone for a perceived wrong. It has no connection to the idea of seizing an opportunity or acting promptly. Therefore, this meaning is incorrect.
- **Option 2: To take for granted** – This means to fail to properly appreciate something or someone, assuming it will always be available. This is unrelated to the proactive nature implied by '**Take time by the forelock**'. Hence, this is incorrect.
- **Option 3: To be late** – This means to miss a deadline or arrive after the expected time. Acting promptly, as suggested by the idiom, is the opposite of being late. So, this meaning is incorrect.
- **Option 4: To seize an opportunity** – This involves recognizing a favorable moment and acting quickly to benefit from it. This aligns perfectly with the imagery of grabbing time by the forelock before it moves past. It emphasizes prompt action and making the most of a situation.

Conclusion: The Best Fit

Based on the analysis, the phrase 'Take time by the forelock' means to act quickly and decisively to make use of an opportunity. Option 4, 'To seize an opportunity', accurately captures this meaning.

16. Answer: b

Explanation:

- The sentence "You must _____ to the rules followed by our company." requires a verb that expresses the obligation to follow or comply with the company's rules. The structure also necessitates a verb that correctly pairs with the preposition "to".

Analyzing Verb Choices for Company Rules

Let's examine each option to see which word best fits the blank:

- **obey:** The verb **obey** means to follow commands or instructions. While you can **obey the rules**, the construction **obey to the rules** is grammatically incorrect in standard English. Therefore, **obey** is not the most suitable choice here due to the required preposition "to".
- **adhere:** The verb **adhere** means to stick fast to a substance or thing, or more relevantly here, to believe in and follow the practices of a particular set of rules, principles, or ways of doing things. Crucially, **adhere** is correctly followed by the preposition **to** when referring to rules or guidelines. The phrase **adhere to the rules** is grammatically sound and accurately conveys the meaning of complying with the company's rules.
- **ought:** **Ought** is a modal verb used to express obligation or what is advisable. It is followed by **to** plus the base form of a verb (e.g., **ought to follow**, **ought to comply**). It cannot directly precede "to the rules" in this sentence structure.

- **pursue:** The verb **pursue** means to chase or follow something. While one might pursue a goal or a certain course of action, the phrase **pursue to the rules** is both grammatically incorrect and does not fit the intended meaning of compliance.

Conclusion: Selecting 'Adhere'

Based on the grammatical structure and meaning required by the sentence, **adhere** is the most appropriate word. It correctly uses the preposition **to** and signifies the necessary compliance with the company's rules.

The completed sentence is: "You must **adhere** to the rules followed by our company."

17. Answer: a

Explanation:

Understanding the Sentence: An Honest Person's Livelihood

The core of the question is to find an appropriate phrase or idiom that describes how an **honest person** typically earns their living or sustains themselves. The sentence "An honest person lives by _____?" requires a concept that reflects integrity and the means of sustenance.

Analyzing the Idiom Options

Let's examine each option to see how well it fits the context of an **honest person** and their way of life:

- **Option 1: The sweat of one's brows**
 - **Meaning:** This idiom refers to earning something, like money or sustenance, through hard work, effort, and diligence.

- **Relevance:** An honest person is typically characterized by their commitment to fair work and earning their livelihood through legitimate means. This idiom directly relates to earning through hard, honest labor.
- **Option 2: A sight for sore eyes**
 - **Meaning:** This phrase describes someone or something that is very welcome or pleasing to see, often after a long absence or period of difficulty.
 - **Relevance:** This idiom relates to appearance and relief, not to the principle or source of income. It does not fit the context of how an **honest person** lives or earns.
- **Option 3: Long arm of the law**
 - **Meaning:** This refers to the extensive reach and power of the legal system, implying that legal consequences can reach far and wide.
 - **Relevance:** While an honest person respects the law, this idiom describes the law's power, not the person's means of living. It's unrelated to personal livelihood.
- **Option 4: Foot in the mouth**
 - **Meaning:** This idiom means to say something embarrassing, tactless, or inappropriate, often unintentionally.
 - **Relevance:** This idiom relates to communication gaffes and has no connection to how someone earns their living or conducts their life principles.

Selecting the Most Meaningful Fit

Comparing the options, "The sweat of one's brows" is the only idiom that logically completes the sentence. It aligns with the values often associated with honesty – earning through diligent and fair effort. The other idioms relate to pleasant appearances, the legal system's reach, or embarrassing speech, none of which describe the fundamental way an **honest person lives**.

Final Conclusion

Therefore, the most appropriate phrase to fill in the blank is "The sweat of one's brows", as it accurately reflects the principle of earning a living through honest hard

work, a characteristic often attributed to an **honest** person.

18. Answer: c

Explanation:

Understanding the Impact of a Breeze on a Forest Fire

This question asks us to choose the best word to complete the sentence: "A light breeze _____ the forest fire and made it more dangerous." We need to find a word that accurately describes how a breeze affects a forest fire, leading to increased danger.

Analyzing the Sentence Context

The sentence describes a situation where a forest fire is already burning, and a light breeze influences it. The outcome mentioned is that the fire became "more dangerous." This tells us the breeze had a negative, intensifying effect on the fire.

Evaluating Word Options for Fire Interaction

Let's look at each option to see which word best fits the context:

- **give up:** This phrase means to quit or stop trying. A breeze cannot "give up" a fire. This option doesn't make sense in the context of how wind affects flames.
- **riled up:** This phrase usually means to annoy or agitate a person or animal. While it implies agitation, it's not the typical or most accurate way to describe the physical effect of wind on a fire.
- **fanned:** This word means to blow air on something, like blowing on a fire to make it burn brighter or spread. When wind blows on a fire, it provides more oxygen, which helps the fire grow and spread, making it more dangerous. This fits the context perfectly.

- **enraged:** This word means very angry. Like "riled up," it attributes human emotions to the fire. A breeze doesn't make a fire "angry" in the literal sense; it provides fuel (oxygen) and spreads the flames.

Choosing the Most Appropriate Word: 'Fanned'

The word **fanned** directly relates to the physical process of wind interacting with fire. A breeze, even a light one, can supply oxygen to the flames and push the fire forward, causing it to spread more rapidly and become more intense and dangerous. This aligns perfectly with the description in the sentence.

Therefore, the most suitable word to complete the sentence is "fanned."

The completed sentence reads: "A light breeze **fanned** the forest fire and made it more dangerous."

19. Answer: a

Explanation:

Understanding the Word: Precarious

The question asks to identify the word that best expresses the meaning of the word **Precarious** from the given options.

Meaning of Precarious

The word **Precarious** typically describes a situation, position, or state that is:

- Not securely held or fixed.
- Dangerously likely to fall or collapse.
- Dependent on chance; uncertain.

For example, someone might have a **precarious** job (meaning it could be lost easily) or be in a **precarious** financial situation (meaning it's unstable and risky).

Analysis of Options

Let's examine each option to see how it relates to the meaning of **Precarious**:

- **1. Uncertain:** This word means not able to be relied on; not known or definite. This aligns closely with the meaning of **Precarious**, as something precarious is often uncertain and lacks stability or security.
- **2. Perfect:** This means having all the required or desirable qualities; as good as it can be. This is the opposite of **Precarious**, which implies imperfection and instability.
- **3. Perpetual:** This means never ending or changing; occurring repeatedly. This meaning is unrelated to the instability or uncertainty associated with **Precarious**.
- **4. Certain:** This means known for sure; established beyond doubt. This is also an antonym of **Precarious**, as precariousness implies a lack of certainty.

Conclusion on Best Meaning

Comparing the options with the definition of **Precarious**, the word **Uncertain** most accurately captures its core meaning of instability and lack of security.

20. Answer: d

Explanation:

Understanding the Word Engender

The word **Engender** primarily means to cause or give rise to something. It involves bringing a situation, feeling, or idea into existence. Think of it as the act of producing or creating.

Examining the Vocabulary Options

To find the word with the opposite meaning to **Engender**, we need to understand the meaning of each provided option:

- **Cause:** This word means to make something happen or be the reason for something. It is very similar in meaning to **Engender**, acting as a synonym.
- **Subdue:** This term means to overcome, conquer, or bring something under control, often through force.
- **Conserve:** This means to protect something, especially from harm or destruction, or to keep it in its existing state and prevent it from changing or being wasted.
- **Restrain:** This word means to keep under control or within limits; to hold back or prevent the development or progress of something.

Determining the Antonym for Engender

Since **Engender** means to create or bring about, its opposite should mean to prevent or hold back.

- **Cause** is similar, not opposite.
- **Subdue** involves control but is often about something already existing or happening.
- **Conserve** focuses on protecting something existing from loss or damage.
- **Restrain** directly contrasts with the idea of causing or creating. It implies stopping or limiting the development or occurrence of something, which is the opposite of causing it to happen.

Therefore, the word that is opposite in meaning to **Engender** is **Restrain**.

21. Answer: c

Explanation:

Understanding the Meaning of the Word Rout

This question asks us to identify the best synonym for the word "**Rout**" from the provided list of options. Finding the correct synonym involves understanding the core definition of the word.

Defining the Word Rout

"**Rout**" has a primary meaning related to a significant and often overwhelming **defeat**. It describes a situation where an opponent is thoroughly beaten, typically in a battle, contest, or competition. It can also refer to a disorderly retreat or a state of chaos, but the concept of complete **defeat** is central.

Analyzing the Options for Rout

Let's examine each alternative to see how well it matches the **meaning** of "**Rout**":

- **Debate**: This involves a formal discussion or argument, often presenting opposing viewpoints. This is unrelated to the **meaning** of **Rout**.
- **Discussion**: This is a conversation where people talk about something. Like 'Debate', this does not align with the definition of **Rout**.
- **Defeat**: This signifies the act of winning against an opponent, causing them to lose a battle, game, or other contest. This meaning strongly corresponds to the primary definition of **Rout**, indicating a thorough **defeat**.
- **Ending**: This refers to the final part or conclusion of something. It does not capture the aggressive or competitive sense implied by **Rout**.
- There was no fifth option provided for analysis.

Selecting the Best Synonym

Based on the analysis, the word "**Defeat**" most accurately expresses the core **meaning** of "**Rout**". It captures the essence of being overwhelmingly beaten or overcome in a competitive situation.

22. Answer: c

Explanation:

Shame vs. Honor: Understanding the Core Relationship

The original pair of words is **Shame** : **Honor**. We need to identify the relationship between these two words and find the option that shares the same relationship.

The relationship between **Shame** and **Honor** is one of direct opposition or antonyms. **Honor** represents a state of high respect, integrity, and adherence to principles, often seen as a virtue. **Shame**, conversely, is a painful feeling of humiliation or distress often caused by the consciousness of wrong or foolish behavior, representing the absence or opposite of honor.

Therefore, we are looking for a pair of words where one word is the antonym of the other, preferably contrasting a positive/neutral quality with a negative one.

Analyzing the Options for Antonymous Relationship

- Option 1: Hypocrisy : Deception

Hypocrisy involves pretending to have beliefs or standards that one does not actually possess. **Deception** is the act of causing someone to believe something that is not true. While deception is often a tool used in hypocrisy, they are not direct opposites. **Deception** is more like a characteristic or method related to **hypocrisy**.

- Option 2: Daring : Courageous

Daring refers to willingness to take risks. **Courageous** describes someone who shows courage. **Daring** can be a component of being **courageous**, but they are not antonyms. Someone can be daring in a reckless way, which might contrast with true courage.

- Option 3: Cautious : Hasty

Cautious means being careful to avoid potential problems or dangers. **Hasty** means acting with excessive speed or urgency, often without careful consideration. These two words are direct opposites (antonyms). Being

cautious is generally seen as a positive trait, promoting safety and thoroughness, while being **hasty** is often viewed negatively, leading to errors. This mirrors the positive/negative contrast seen in **Honor : Shame**.

- **Option 4: Humility : Resignation**

Humility is the quality of having a modest estimate of one's own importance. **Resignation** is the act of accepting something unpleasant that seems unavoidable. These terms are not antonyms. While humility might influence how someone approaches a situation leading to resignation, they don't represent opposing concepts.

Conclusion: Selecting the Best Analogous Pair

Comparing the relationships, the pair **Cautious : Hasty** exhibits the strongest similarity to the original pair **Shame : Honor** because both pairs represent antonyms, contrasting a state often associated with prudence or virtue with one associated with recklessness or negative consequence.

23. Answer: c

Explanation:

Analyzing the Word Relationship: Exterminate : Eradicate

This question requires us to identify the specific relationship between the words in the given pair, "Exterminate : Eradicate", and then find the option that shares the same relationship.

Understanding the Original Pair: Exterminate and Eradicate

- **Exterminate:** This verb means to kill or destroy something completely, leaving no trace. Think of wiping out an entire population or species.
- **Eradicate:** This verb also means to destroy or get rid of something completely, often referring to diseases, problems, or unwanted things.

The core relationship between **Exterminate** and **Eradicate** is that they are **synonyms**. They both signify complete destruction or elimination.

Evaluating the Options

Let's examine the relationship between the words in each option:

- **Option 1: Dismantle : Fabricate**
 - *Dismantle* means to take something apart.
 - *Fabricate* means to build or create something, or to invent something (often falsely).
 - Relationship: These words represent opposite actions (taking apart vs. building/creating). They are **antonyms**.
- **Option 2: Gentle : Ferocious**
 - *Gentle* describes someone or something as kind, mild, and not harsh.
 - *Ferocious* describes someone or something as extremely fierce or aggressive.
 - Relationship: These words describe opposite qualities. They are **antonyms**.
- **Option 3: Example : Epitome**
 - *Example* is a representative instance or specimen of a class or group.
 - *Epitome* is a person or thing that is a perfect example of a particular quality or type.
 - Relationship: An *epitome* is a very specific, often perfect, *example*. These words are closely related and often used synonymously in the sense of representing a type or quality perfectly. This relationship is similar to **synonymy**.
- **Option 4: Truth : Fallacy**
 - *Truth* refers to fact or reality.
 - *Fallacy* refers to a mistaken belief or faulty reasoning.
 - Relationship: These words represent opposite concepts (what is real vs. what is mistaken). They are **antonyms**.

Conclusion: Finding the Best Match

The original pair, "Exterminate : Eradicate", demonstrates a relationship of **synonymy** (meaning to destroy completely).

- Options 1, 2, and 4 show antonym relationships, which do not match the original pair.
- Option 3, "Example : Epitome", shows a strong similarity in meaning, where an epitome is a prime or perfect example. This is the closest match to the synonymy found in the original pair.

Therefore, the pair "Example : Epitome" best expresses the relationship similar to "Exterminate : Eradicate".

24. Answer: a

Explanation:

Identifying Grammatical Errors in Conditional Sentences

This question requires identifying a grammatical error within a given sentence, focusing on conditional structures.

Sentence Analysis

The sentence provided is structured as a conditional statement:

"If I am the principal (A) / of the school (B) / I would make co-curricular activities compulsory for each student (C) / No Error (D)"

Detailed Breakdown of Sentence Parts:

- Part (A): "If I am the principal"
- Part (B): "of the school"
- Part (C): "I would make co-curricular activities compulsory for each student"
- Part (D): "No Error"

Explanation of the Error

The sentence describes a hypothetical situation – a condition that is unlikely or not true in the present. In English grammar, particularly in formal contexts, hypothetical or contrary-to-fact conditions in the present tense typically use the subjunctive mood.

The subjunctive form of the verb 'to be' in the past tense is 'were' for all subjects (I, you, he, she, it, we, they).

The structure for a hypothetical present condition is:

If + Subject + were + ... , Subject + would + Base Verb + ...

In Part (A), the verb used is "am" ("If I am..."). This is the indicative mood, suggesting a real possibility. However, the consequence clause uses "would make", indicating a hypothetical result. To maintain consistency and grammatical correctness for a hypothetical scenario, the subjunctive mood should be used in the 'if' clause.

Therefore, the correct construction should be "If I **were** the principal...". The use of "am" in Part (A) is grammatically incorrect in this context.

Conclusion

The error is located in Part (A) of the sentence due to the incorrect verb form used for a hypothetical conditional statement.

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25. Answer: c

Explanation:

Identifying Grammatical Errors in Sentences

This solution explains the error found in the given sentence and provides the corrected version. The focus is on identifying the incorrect prepositional phrase

structure.

Analyzing Sentence Parts for Errors

The sentence is divided into four parts: A, B, C, and D. Let's analyze each part to find the grammatical error.

- **Part A:** "My senior asked me" – This part is grammatically correct. It establishes the context of reported speech with the subject "My senior" and the past tense verb "asked".
- **Part B:** "whether I was interested" – This part is also correct. The conjunction "whether" is appropriately used to introduce an indirect question, and the past continuous tense "was interested" fits the context. "Interested" functions as an adjective here.
- **Part C:** "to joining the group for the skit." – This part contains the error. The adjective "interested" should be followed by the preposition "in", not "to". When "interested" is followed by a verb, that verb must be in its gerund form (the -ing form). The correct construction is "interested in joining". The current structure "interested to joining" is incorrect.
- **Part D:** "No Error" – Since an error was identified in Part C, this option is not the correct answer.

Understanding the Correct Usage of 'Interested'

The key grammatical point here relates to the correct prepositional complement for the adjective 'interested'. In English grammar, when we express interest in an activity or thing, we typically use the structure:

interested + in + noun

or

interested + in + gerund (verb-ing form)

Examples:

- She is interested **in** *history*. (noun)

- They are interested **in** *learning* new languages. (gerund)

The sentence incorrectly uses "interested to joining". The correct phrasing requires "interested in joining".

Correcting the Sentence

By replacing the incorrect structure "to joining" with the correct one "in joining", the sentence becomes grammatically sound.

The corrected sentence is:

My senior asked me whether I was interested **in joining** the group for the skit.

Therefore, the part of the sentence containing the error is C.

26. Answer: c

Explanation:

Grammar Error Analysis: Subject-Verb Agreement

The question asks us to find the part of the sentence containing a grammatical error. We need to carefully examine the sentence provided, which is broken down into four parts (A, B, C, and D) for analysis. The sentence involves a **judge**, **post-mortem reports**, and the review process by **forensic experts**.

Detailed Examination of Sentence Parts

Let's break down the sentence and check for errors:

- **Part A:** The judge was

Here, the subject is 'The judge', which is singular. The verb 'was' is the correct singular past tense form for the subject. This part appears grammatically correct.

- **Part B:** referring to the two post-mortem reports

This part continues the past continuous tense ('was referring') and correctly identifies the object of the reference, 'the two post-mortem reports'. This segment seems correct.

- **Part C:** that was reviewed by a team of forensic experts.

This part contains the error. The relative pronoun 'that' refers back to the noun 'reports'. Since 'reports' is plural, the relative pronoun 'that' is also considered plural in this context. However, the verb used is 'was reviewed', which is singular. The verb must agree in number with its antecedent ('reports'). Therefore, the singular verb 'was' should be replaced with the plural verb 'were'. The correct phrasing should be 'that **were** reviewed'.

- **Part D:** No Error

As an error has been identified in Part C, this option is incorrect.

Understanding the Subject-Verb Agreement Rule

The error in Part C relates to subject-verb agreement, specifically within a relative clause.

- The word 'that' acts as a relative pronoun, connecting the main clause to the subordinate clause.
- 'that' refers to 'reports', which is a plural noun.
- The verb in the clause should therefore be plural to agree with 'reports'.
- The sentence uses 'was reviewed' (singular), but it should use 'were reviewed' (plural).

The correct structure ensures that the verb agrees with the noun it refers to, maintaining grammatical accuracy.

Identifying the Incorrect Part

Based on the analysis, the grammatical error lies in the subject-verb agreement in Part C. The use of the singular verb 'was' instead of the plural verb 'were' makes this

part incorrect.

27. Answer: a

Explanation:

Passage Analysis: Understanding Human-Animal Interactions

This solution focuses on identifying a specific word from the provided passage that accurately defines "The art of speaking or writing effectively". We will carefully read the passage and analyze the meaning of the given options in the context of the text.

Key Themes in the Passage

The passage explores the positive impact of interactions between humans and wild animals, particularly dolphins, on human **wellbeing**. It highlights themes such as:

- **Relationships and Connectedness** between participants and nonhuman animals.
- The fulfillment of the human need for **connection** and relationships.
- Experiences promoting **wellbeing** and environmental behaviors.
- **Emotional connections** and communion through contact with dolphins.
- The expression of these connections through **rhetoric**, described as friendship and **kinship**.
- The importance of lifelong connections with wildlife and seeing oneself as part of the natural world.
- Participants **reinforcing** established habits of nature connectedness.
- Acknowledgement of **idiographic** differences in personal narratives.

Defining the Target Phrase: Effective Communication

The phrase we need to match is "The art of speaking or writing effectively". This refers to the skill of using language in a way that is persuasive, clear, and impactful.

Evaluating the Options Provided

Let's examine each option to see which word from the passage best fits the definition:

Option 1: Rhetoric – The Art of Persuasion

The passage states: "The connections described are powerful: perceptions of communion and mutual exchange become articulated through the **rhetoric** of friendship and kinship." The word **rhetoric** directly relates to the art of using language effectively to persuade or influence others. This aligns perfectly with the definition provided in the question.

Option 2: Reinforcing – Strengthening Habits

The passage mentions: "participants are **reinforcing** established habits of nature connectedness...". **Reinforcing** means to strengthen or support something. This meaning is different from the art of speaking or writing effectively.

Option 3: Idiographic – Individual Differences

The passage notes: "Despite **idiographic** differences between narratives...". **Idiographic** refers to characteristics or differences unique to an individual. This term does not relate to effective speaking or writing.

Option 4: Kinship – Family Ties

The passage includes: "...articulated through the rhetoric of friendship and **kinship**." **Kinship** refers to family relationships or a sense of connection based on shared ancestry or close association. This is not synonymous with the art of effective communication.

Conclusion: Identifying the Correct Word

Comparing the definition "The art of speaking or writing effectively" with the meanings of the words found in the passage, **rhetoric** is the most appropriate

choice. The passage itself uses the word **rhetoric** in a context discussing how perceptions are articulated, which directly relates to effective communication.

28. Answer: c

Explanation:

Understanding Why Human-Animal Connections Are Powerful

The passage explores the profound effects of interactions between humans and wild animals, particularly dolphins, on human wellbeing. It highlights a recurring theme of deep **Relationships and Connectedness** between people and these nonhuman animals. The text suggests these experiences foster a sense of connection, enhance wellbeing, and encourage environmental behaviors by reinforcing a person's place within the natural world.

The Core Reason for Connection Strength

The passage explicitly states why these connections are particularly strong or **powerful**. It identifies the underlying mechanism not just as contact, but as the way these interactions are perceived and interpreted by humans.

- The text mentions: "The connections described are powerful: perceptions of **communion** and **mutual exchange** become articulated through the rhetoric of **friendship** and **kinship**."

This sentence directly explains the power of these connections. It means that people feel a sense of shared experience (communion) and reciprocal interaction (mutual exchange) with the animals. Crucially, these feelings are expressed using language typically reserved for deep human relationships, such as "friendship" and "kinship". This deep, human-like emotional framing is what makes the connections feel so powerful and impactful on wellbeing.

Evaluating Connection Power Factors

Let's look at why the chosen option best explains the power of these connections:

- **Option 3:** "communion and mutual exchange become articulated through rhetoric of friendship and kinship". This aligns perfectly with the passage's statement explaining the power of the connections. It captures the deep emotional and relational aspect described.
- Other options, while related to the passage, don't directly answer **why** the connections are powerful:
 - Option 1 describes a consequence or context (seeing oneself as part of nature), not the reason for the connection's power.
 - Option 2 points to an area needing study (the mechanism influencing wellbeing), not the explanation for the connection's strength.
 - Option 4 (lifelong involvement) is a factor contributing to the connection but not the direct explanation for its described power in terms of emotional articulation.

Therefore, the feeling of communion and mutual exchange, expressed through the language of friendship and kinship, is identified as the reason these connections are so powerful according to the passage.

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29. Answer: c

Explanation:

Understanding Transmission of Emotional Connections

The question asks us to identify the specific way through which **strong emotional connections** are transmitted, according to the provided passage. This requires careful reading of the text to pinpoint the mechanism described for conveying these feelings between humans and animals, particularly dolphins.

Passage Analysis for Connection Transmission

The passage explores how human-animal interactions influence wellbeing and notes a recurring theme of **Relationships and Connectedness**. When discussing the depth of these connections, the text explicitly states:

- "The narratives reported here describe **strong emotional connections**, transmitted through both **tangible and perceived contact with dolphins**, which translate into positive senses of emotion and well-being."

This sentence is key, as it directly names the methods responsible for the transmission of these emotional bonds.

Evaluating Transmission Options

Let's analyze each option to see how it relates to the passage's explanation:

- **Option 1: reinforcing established habits of nature** – The passage mentions that participants are "reinforcing established habits of nature connectedness," linking it to a lifelong involvement with wildlife. However, this is described as a characteristic of the participants' engagement, not the means by which emotional connections are transmitted.
- **Option 2: contextualization within an ongoing nature relationship** – The text notes that experiences are "contextualized within an ongoing nature relationship." This provides the setting or background for the interactions but doesn't specify how the emotional connections themselves are transferred.
- **Option 3: tangible and perceived contact with dolphins** – This option directly aligns with the passage's statement: "transmitted through both tangible and perceived contact with dolphins." This suggests that physical interaction (tangible contact) and the interpretation or feeling of that contact (perceived contact) are the primary ways these strong emotional connections are passed on and felt.
- **Option 4: idiographic differences** – The passage acknowledges "idiographic differences between narratives," meaning variations exist in individual stories. These differences describe the uniqueness of each experience but do not explain the transmission process of the emotional connections themselves.

Identifying the Correct Transmission Method

Based on the direct evidence presented in the passage, the **strong emotional connections** are transmitted through **tangible and perceived contact with dolphins**. This highlights the importance of both physical interaction and the subjective experience of that interaction in fostering deep emotional bonds between humans and wildlife.

30. Answer: b

Explanation:

Dolphin Interactions: Communion and Exchange

The question asks us to interpret the phrase: "perceptions of communion and mutual exchange become articulated through rhetoric of friendship and kinship." This statement is part of a passage that explores how interactions between humans and wild animals, specifically dolphins, influence human well-being. To understand the implication, let's break down the key terms used in the phrase:

- **Communion:** This signifies a deep sense of connection, togetherness, or shared experience between individuals.
- **Mutual Exchange:** This suggests a reciprocal interaction where something is given and received between participants, implying a two-way flow of experience or emotion.
- **Rhetoric of Friendship and Kinship:** This indicates that the way people describe or express these feelings and interactions uses language and concepts typically associated with close, personal bonds. These include the trust, affection, and loyalty found in friendships, and the deep sense of belonging and connection found in family relationships (kinship).

Therefore, the phrase suggests that people feel a profound sense of connection and reciprocal interaction with dolphins, and they express these feelings using terms that convey deep personal affection and belonging, much like they would describe relationships with close friends or family members.

Rhetoric of Friendship and Kinship in Human-Dolphin Encounters

The passage emphasizes that these human-dolphin connections are described using the "rhetoric of friendship and kinship." This implies that the participants perceive their relationships with dolphins in highly personal and emotional terms. This way of describing the relationship involves using language that reflects:

- **Trust:** A fundamental component of friendship, suggesting a belief in the dolphin's sincerity or harmlessness.
- **Sympathy and Affection:** Positive emotions and empathy directed towards the dolphin, similar to feelings within friendships or family.
- **Belonging:** A sense of shared identity or deep connection, evoking feelings akin to kinship.

This positive framing helps explain how these experiences contribute to the participants' overall sense of well-being and their connection to the natural world, as mentioned earlier in the passage.

Communicative Relationships: Evaluating Options

Now, let's evaluate each option to determine which best captures the meaning implied by the phrase:

1. This option suggests the relationship is characterized by "antipathy and agony." These are negative emotions and sentiments. They are the opposite of what is implied by "friendship" and "kinship," which are associated with positive feelings. The passage itself speaks of positive emotional connections and well-being, making this option incorrect.
2. This option posits that the relationship "becomes communicative with the help of effective persuasion of trust and sympathy." This aligns well with the key phrase. "Communicative" reflects the ideas of communion and mutual exchange. Furthermore, "trust and sympathy" are core elements of friendship and kinship, the very "rhetoric" used to describe these deep connections. The passage supports the idea of strong emotional connections, which are built

upon trust and sympathy, making the interaction feel meaningful and communicative.

3. This option claims the relationship is "non communicative and cannot be trustworthy." This contradicts the passage's central theme of connection and positive emotional bonds expressed through friendship and kinship. If the relationship were non-communicative and untrustworthy, it would not contribute to well-being or be described in terms of friendship. Thus, this option is incorrect.
4. This option mentions "hostility and trust." While "trust" is a relevant component of friendship, "hostility" is fundamentally opposed to the concepts of communion, friendship, and kinship. The passage clearly indicates positive emotional bonds, not negative interactions like hostility. Therefore, this option is incorrect.
5. This option is presented without any statement content and cannot be evaluated.

In conclusion, the phrase implies that the deep feelings of connection and shared experience people have with dolphins are expressed using language associated with close, positive human relationships like friendship and kinship. These relationships are built on fundamental elements such as trust and sympathy, which make the interaction feel communicative and contribute significantly to the participants' sense of well-being.

31. Answer: b

Explanation:

Determining HCF and LCM for $P = ab^2$ and $Q = a^2b$

The problem asks us to find the Highest Common Factor (HCF) and Least Common Multiple (LCM) for two given expressions, P and Q. We are given that $P = ab^2$ and $Q =$

a^2b , where 'a' and 'b' are prime numbers. This means the prime factorization of P and Q is already provided.

Understanding the Expressions P and Q

We are given:

- **Expression P:** $P = ab^2$. This means P is the product of the prime number 'a' (to the power of 1) and the prime number 'b' (to the power of 2).
- **Expression Q:** $Q = a^2b$. This means Q is the product of the prime number 'a' (to the power of 2) and the prime number 'b' (to the power of 1).

Since 'a' and 'b' are prime numbers, they are the fundamental building blocks of these expressions.

Calculating the HCF of P and Q

The HCF is the product of the common prime factors raised to the lowest power they appear in either expression.

Let's examine the prime factors of P and Q:

- **Common Factors:** Both P and Q share the prime factors 'a' and 'b'.
- **Lowest Power of 'a':** In P, 'a' is a^1 . In Q, 'a' is a^2 . The lowest power is a^1 .
- **Lowest Power of 'b':** In P, 'b' is b^2 . In Q, 'b' is b^1 . The lowest power is b^1 .

To find the HCF, we multiply these lowest powers together:

$$\text{HCF}(P, Q) = a^1 \times b^1 = ab$$

Calculating the LCM of P and Q

The LCM is the product of all prime factors from both expressions, raised to the highest power they appear in either expression.

Let's identify the highest powers:

- **Prime Factors Involved:** The prime factors are 'a' and 'b'.

- **Highest Power of 'a':** In P, 'a' is a^1 . In Q, 'a' is a^2 . The highest power is a^2 .
- **Highest Power of 'b':** In P, 'b' is b^2 . In Q, 'b' is b^1 . The highest power is b^2 .

To find the LCM, we multiply these highest powers together:

$$\text{LCM}(P, Q) = a^2 \times b^2 = a^2b^2$$

Final Result: HCF and LCM

The question asks for the HCF and LCM of P and Q, respectively.

Our calculations show:

- $\text{HCF} = ab$
- $\text{LCM} = a^2b^2$

So the answer should be in the format (HCF, LCM), which is (ab, a^2b^2) .

Comparing with Provided Options

Now, we compare our result (ab, a^2b^2) with the given options:

Option Number	HCF	LCM	Correctness
1	a^2b^2	ab	Incorrect (Order reversed)
2	ab	a^2b^2	Correct
3	ab	ab	Incorrect (LCM is wrong)
4	a^2b^2	a^2b^2	Incorrect (HCF is wrong)

Our calculated HCF (ab) and LCM (a^2b^2) perfectly match the values presented in Option 2.

32. Answer: c

Explanation:

Understanding Clock Hand Coincidence Between 5 and 6 O'clock

This problem involves finding the specific time between 5:00 and 6:00 when both the hour hand and the minute hand of a clock are exactly at the same position. This phenomenon is often called the 'coincidence' or 'overlapping' of clock hands. We need to calculate this time accurately.

Calculating Relative Speed of Clock Hands

To solve this, we first need to understand the speeds of the clock hands:

- The minute hand moves 360 degrees in 60 minutes. Its speed is $\frac{360^\circ}{60 \text{ min}} = 6^\circ$ per minute.
- The hour hand moves 360 degrees in 12 hours (which is 720 minutes). Its speed is $\frac{360^\circ}{720 \text{ min}} = 0.5^\circ$ per minute.

The relative speed at which the minute hand gains on the hour hand is the difference between their speeds:

Relative Speed = Speed of Minute Hand - Speed of Hour Hand

Relative Speed = $6^\circ/\text{min} - 0.5^\circ/\text{min} = 5.5^\circ$ per minute. This can also be written as $\frac{11}{2}^\circ$ per minute.

Determining Initial Position at 5 O'clock

At 5:00 exactly:

- The minute hand is pointing at the 12. Its position is 0° .
- The hour hand is pointing at the 5. Since each hour mark represents $\frac{360^\circ}{12} = 30^\circ$, the hour hand's position is $5 \times 30^\circ = 150^\circ$ from the 12.

So, at 5:00, the minute hand needs to 'catch up' 150 degrees to coincide with the hour hand.

Calculating Time for Coincidence

We can use the relative speed to find out how long it takes for the minute hand to cover this 150-degree gap.

$$\text{Time} = \frac{\text{Angle to cover}}{\text{Relative Speed}}$$

$$\text{Time} = \frac{150^\circ}{5.5^\circ/\text{min}}$$

$$\text{Time} = \frac{150}{11/2} \text{ minutes}$$

$$\text{Time} = 150 \times \frac{2}{11} \text{ minutes}$$

$$\text{Time} = \frac{300}{11} \text{ minutes}$$

Converting Time to Mixed Fraction

To express this time in a more standard format, we convert the improper fraction $\frac{300}{11}$ minutes into a mixed number:

$$\frac{300}{11} = 27 \text{ with a remainder of } 300 - (11 \times 27) = 300 - 297 = 3.$$

So, the time is $27\frac{3}{11}$ minutes.

Final Time of Coincidence

The hands of the clock will coincide $27\frac{3}{11}$ minutes past 5 o'clock.

Comparing with Options

Let's compare our calculated time with the given options:

Option Number	Time	Matches Calculation
1	$21\frac{2}{11}$ minutes past 5	No
2	$27\frac{2}{11}$ minutes past 5	No
3	$27\frac{3}{11}$ minutes past 5	Yes
4	$23\frac{3}{11}$ minutes past 5	No

Our calculated time, $27\frac{3}{11}$ minutes past 5, matches option 3 exactly.

33. Answer: c

Explanation:

This solution explains how to find the **probability** of getting a **sum of more than 7** when **two dice are thrown simultaneously**.

Understanding the Sample Space

When **two dice** are rolled, each die has 6 possible outcomes: {1, 2, 3, 4, 5, 6}. Since the dice are thrown **simultaneously**, the total number of possible outcomes is the product of the outcomes for each die.

Total possible outcomes = (Outcomes of Die 1) $\times$ (Outcomes of Die 2)

Total possible outcomes = $6 \times 6 = 36$.

These 36 outcomes form the sample space, often represented as pairs (Die 1 result, Die 2 result).

Identifying Favorable Outcomes for a Sum Greater Than 7

We are interested in the event where the **sum of the numbers** shown on the two dice is **more than 7**. This means the sum can be 8, 9, 10, 11, or 12.

Let's list the combinations that result in these sums:

- **Sum = 8:** (2, 6), (3, 5), (4, 4), (5, 3), (6, 2) - There are 5 outcomes.
- **Sum = 9:** (3, 6), (4, 5), (5, 4), (6, 3) - There are 4 outcomes.
- **Sum = 10:** (4, 6), (5, 5), (6, 4) - There are 3 outcomes.
- **Sum = 11:** (5, 6), (6, 5) - There are 2 outcomes.
- **Sum = 12:** (6, 6) - There is 1 outcome.

The total number of favorable outcomes is the sum of the outcomes for each required sum:

Number of favorable outcomes = $5 + 4 + 3 + 2 + 1 = 15$.

Calculating the Probability

The **probability** of an event is calculated using the formula:

$$\text{Probability} = \frac{\text{Number of favorable outcomes}}{\text{Total number of possible outcomes}}$$

Plugging in the values we found:

$$\text{Probability (Sum} > 7) = \frac{15}{36}$$

To simplify this fraction, we can divide both the numerator and the denominator by their greatest common divisor, which is 3:

$$\text{Probability (Sum} > 7) = \frac{15 \div 3}{36 \div 3} = \frac{5}{12}$$

Conclusion

Therefore, the **probability** of getting a **sum of more than 7** when **two dice** are rolled **simultaneously** is $\frac{5}{12}$.

Explanation:

Bag Contents and Process Overview

This problem involves calculating the **probability** of an event happening through a sequence of steps. We start with two bags containing different numbers of white and black balls. The process involves drawing one ball from the first bag and transferring it to the second bag, and then drawing a ball from the second bag. We need to find the overall **probability** that the ball **drawn** from the second bag is **black**.

Let's define the initial contents:

- **Bag 1:** Contains 4 white balls (W) and 5 black balls (B). Total balls = $4 + 5 = 9$.
- **Bag 2:** Contains 4 white balls (W) and 3 black balls (B). Total balls = $4 + 3 = 7$.

The process has two stages:

1. A ball is randomly **drawn** from **Bag 1** and placed into **Bag 2**.
2. A ball is randomly **drawn** from **Bag 2**.

Probability Calculation: Transfer Step

First, we determine the probabilities of the two possible outcomes when drawing a ball from **Bag 1** for the transfer:

- The **probability** of drawing a **white** ball from **Bag 1** (let's call this event W_1) is:

$$P(W_1) = \frac{\text{Number of white balls in Bag 1}}{\text{Total balls in Bag 1}} = \frac{4}{9}$$
- The **probability** of drawing a **black** ball from **Bag 1** (let's call this event B_1) is:

$$P(B_1) = \frac{\text{Number of black balls in Bag 1}}{\text{Total balls in Bag 1}} = \frac{5}{9}$$

Notice that $P(W_1) + P(B_1) = \frac{4}{9} + \frac{5}{9} = \frac{9}{9} = 1$, which accounts for all possibilities.

Conditional Probability: Drawing from Bag 2

Next, we consider the state of **Bag 2** after the transfer and calculate the **probability** of drawing a **black** ball from it in each case.

- **Case 1:** A white ball is transferred from Bag 1.

- The **probability** of this case is $P(W_1) = \frac{4}{9}$.
- After the transfer, **Bag 2** has $4 + 1 = 5$ white balls and 3 black balls. The total number of balls is $5 + 3 = 8$.
- The **probability** of drawing a **black** ball from **Bag 2**, given that a white ball was transferred (denoted as $P(B_2|W_1)$), is: $P(B_2|W_1) = \frac{\text{Number of black balls in Bag 2}}{\text{Total balls in Bag 2}} = \frac{3}{8}$
- **Case 2: A black ball is transferred from Bag 1.**
 - The **probability** of this case is $P(B_1) = \frac{5}{9}$.
 - After the transfer, **Bag 2** has 4 white balls and $3 + 1 = 4$ black balls. The total number of balls is $4 + 4 = 8$.
 - The **probability** of drawing a **black** ball from **Bag 2**, given that a black ball was transferred (denoted as $P(B_2|B_1)$), is: $P(B_2|B_1) = \frac{\text{Number of black balls in Bag 2}}{\text{Total balls in Bag 2}} = \frac{4}{8} = \frac{1}{2}$

Total Probability for Black Ball Selection

To find the overall **probability** of drawing a **black** ball from **Bag 2** (event B_2), we use the Law of Total Probability. This law states that if we have several mutually exclusive scenarios that cover all possibilities (like transferring a white ball or a black ball), the total probability of an event is the sum of the probabilities of that event occurring under each scenario.

The formula is:

$$P(B_2) = P(B_2|W_1) \times P(W_1) + P(B_2|B_1) \times P(B_1)$$

Now, let's substitute the values we calculated:

$$P(B_2) = \left(\frac{3}{8}\right) \times \left(\frac{4}{9}\right) + \left(\frac{4}{8}\right) \times \left(\frac{5}{9}\right)$$

Calculate the products:

$$P(B_2) = \frac{3 \times 4}{8 \times 9} + \frac{4 \times 5}{8 \times 9} \quad P(B_2) = \frac{12}{72} + \frac{20}{72}$$

Add the fractions:

$$P(B_2) = \frac{12+20}{72} \quad P(B_2) = \frac{32}{72}$$

Final Result: Probability of Black Ball

Finally, we simplify the resulting fraction $\frac{32}{72}$. Both the numerator and the denominator are divisible by 8.

$$P(B_2) = \frac{32 \div 8}{72 \div 8} = \frac{4}{9}$$

Therefore, the **probability of choosing a black ball** from the second bag after the transfer is $\frac{4}{9}$.

35. Answer: c

Explanation:

Understanding the Difference Between Simple and Compound Interest

The problem requires us to calculate the principal amount (the initial sum of money) based on the difference between simple interest (SI) and compound interest (CI) earned over a specific period. We are given the time period (2 years), the interest rate (10% per annum), and the exact monetary difference between SI and CI (₹ 631).

Let's define the variables:

- Principal Sum = ' P '
- Annual Interest Rate = ' R '
- Time Period = ' T ' years

The given information is:

- Difference (CI - SI) for 2 years = ₹ 631
- Rate ' R ' = 10%
- Time ' T ' = 2 years

Formula for Interest Difference (2 Years)

For a duration of 2 years, the difference between Compound Interest (CI) and Simple Interest (SI) can be calculated using a direct formula involving the principal sum ' P ' and the rate ' R ':

$$\text{Difference} = P \times \left(\frac{R}{100} \right)^2$$

This formula arises because the compound interest calculation includes interest on the interest earned in the first year, while simple interest does not. The difference essentially captures this "interest on interest" for the first year.

Step-by-Step Calculation of the Principal Sum

We can find the principal sum ' P ' by rearranging the formula and substituting the known values.

1. **Substitute Known Values:** Plug the given difference and rate into the formula.

$$631 = P \times \left(\frac{10}{100} \right)^2$$

2. **Simplify the Rate Fraction:** Convert the percentage rate into a fraction.

$$\frac{10}{100} = \frac{1}{10}$$

The equation now looks like this:

$$631 = P \times \left(\frac{1}{10} \right)^2$$

3. **Calculate the Squared Term:** Square the simplified rate fraction.

$$\left(\frac{1}{10} \right)^2 = \frac{1^2}{10^2} = \frac{1}{100}$$

Substitute this back into the equation:

$$631 = P \times \frac{1}{100}$$

4. **Isolate and Calculate 'P':** To find the principal sum 'P', multiply both sides of the equation by 100.

$$P = 631 \times 100$$

$$P = 63100$$

So, the principal sum is ₹ 63,100.

Confirming the Calculation

To be sure, let's calculate the SI and CI separately for $P = ₹ 63,100$ and check if their difference is indeed ₹ 631.

Simple Interest Calculation:

$$SI = \frac{P \times R \times T}{100}$$

$$SI = \frac{63100 \times 10 \times 2}{100} = 631 \times 20 = 12620$$

The Simple Interest is ₹ 12,620.

Compound Interest Calculation:

$$CI = P \left(1 + \frac{R}{100} \right)^T - P$$

$$CI = 63100 \left(1 + \frac{10}{100} \right)^2 - 63100$$

$$CI = 63100 \left(1 + \frac{1}{10} \right)^2 - 63100$$

$$CI = 63100 \left(\frac{11}{10} \right)^2 - 63100$$

$$CI = 63100 \times \frac{121}{100} - 63100$$

$$CI = 631 \times 121 - 63100 = 76351 - 63100 = 13251$$

The Compound Interest is ₹ 13,251.

Verifying the Difference:

$$\text{Difference} = \text{CI} - \text{SI} = ₹ 13,251 - ₹ 12,620 = ₹ 631.$$

The calculated difference matches the value given in the question, confirming our principal sum calculation.

Conclusion

The principal sum of money is found to be ₹ 63,100. This result is obtained by using the specific formula for the difference between compound and simple interest over two years and solving for the principal amount ' P '.

36. Answer: c

Explanation:

Understanding the Simple Interest Problem

This question involves calculating the difference between two sums of money (principal amounts) lent by A to B and C. We are given the principal amount lent to B, the time period, the rate of simple interest, and the total interest received from both B and C after that period. We need to find the principal amount lent to C and then calculate the difference between this amount and the amount lent to B.

Key Terms Analysis:

- Principal lent to B (P_B): Rs. 4000
- Principal lent to C (P_C): Unknown
- Rate of Interest (R): 7% per annum (simple interest)
- Time Period (T): 5 years
- Total Interest Received (SI_{Total}): Rs. 3500
- Goal: Find the difference between the sums, $|P_B - P_C|$.

Calculating Interest Received from Borrower B

We can use the formula for simple interest (SI) to find out how much interest A received from B.

The formula is: $SI = \frac{P \times R \times T}{100}$

Here, $P = P_B = 4000$, $R = 7\%$, and $T = 5$ years.

Interest received from B (SI_B) is calculated as:

$$SI_B = \frac{4000 \times 7 \times 5}{100}$$

$$SI_B = \frac{140000}{100}$$

$$SI_B = 1400$$

So, A received Rs. 1400 as interest from B.

Determining Interest Received from Borrower C

We know the total interest received from both B and C is Rs. 3500. We have already calculated the interest from B.

Total Interest = Interest from B + Interest from C

$$SI_{Total} = SI_B + SI_C$$

$$\text{Rs. } 3500 = \text{Rs. } 1400 + SI_C$$

To find the interest received from C (SI_C), we rearrange the equation:

$$SI_C = SI_{Total} - SI_B$$

$$SI_C = 3500 - 1400$$

$$SI_C = 2100$$

Therefore, A received Rs. 2100 as interest from C.

Finding the Principal Sum Given to C

Now, we use the simple interest formula again to find the principal sum given to C (P_C), knowing the interest (SI_C), rate (R), and time (T).

The formula is $SI = \frac{P \times R \times T}{100}$.

We need to find P_C . Rearranging the formula gives:

$$P_C = \frac{SI_C \times 100}{R \times T}$$

Substituting the values:

$$P_C = \frac{2100 \times 100}{7 \times 5}$$

$$P_C = \frac{210000}{35}$$

To simplify the division:

$$P_C = \frac{21000 \times 10}{35}$$

Since $210/35 = 6$, we have:

$$P_C = 600 \times 10$$

$$P_C = 6000$$

So, the principal sum given to C was Rs. 6000.

Calculating the Difference in Loan Amounts

The question asks for the difference between the sums given to B and C.

Sum given to B (P_B) = Rs. 4000

Sum given to C (P_C) = Rs. 6000

The difference is:

$$Difference = |P_C - P_B|$$

$$Difference = |6000 - 4000|$$

$$\text{Difference} = 2000$$

The difference between the sums given to B and C is Rs. 2000.

Final Answer Explanation

The calculation shows that A lent Rs. 4000 to B and Rs. 6000 to C. The difference between these two principal amounts is Rs. 2000. This matches one of the options provided.

37. Answer: a

Explanation:

Average Age Calculation for Family Members

This problem involves calculating the ages of family members based on average ages at different times. We need to carefully track the total sum of ages as time passes and new members are added.

Calculating Initial Family Ages 10 Years Ago

We are given that 10 years ago, the average age of 4 family members was 24 years.

- Number of members 10 years ago = 4
- Average age 10 years ago = 24 years

The sum of the ages of these 4 members 10 years ago can be calculated as:

Sum of ages = Average Age $\times$ Number of Members

Sum_{10 years ago} = $24 \times 4 = 96$ years.

Determining Current Ages of Original Members

Now, let's consider the current situation. 10 years have passed since the initial calculation.

- Each of the original 4 members has aged by 10 years.
- Total increase in age for these 4 members = $4 \times 10 = 40$ years.

Therefore, the current sum of the ages of the original 4 members is:

Current Sum (original 4) = Sum_{10 years ago} + Total increase in age

Current Sum (original 4) = $96 + 40 = 136$ years.

Finding the Sum of Children's Ages

We are told that currently, there are 6 members in the family (the original 4 plus 2 newborn children), and the average age of these 6 members is 24 years.

- Current number of members = 6
- Current average age = 24 years

The total sum of the ages of all 6 members currently is:

Total Sum_{current} = Current Average Age $\times$ Current Number of Members

Total Sum_{current} = $24 \times 6 = 144$ years.

The sum of the ages of the two children is the difference between the total current sum and the current sum of the original 4 members:

Sum of children's ages = Total Sum_{current} - Current Sum (original 4)

Sum of children's ages = $144 - 136 = 8$ years.

Solving for the Younger Child's Age

We know the sum of the ages of the two children is 8 years, and their age difference is 2 years.

Let the age of the younger child be y years.

Let the age of the older child be o years.

From the information given:

- $o - y = 2$ (The age difference is 2 years)
- $o + y = 8$ (The sum of their ages is 8 years)

We can express the older child's age in terms of the younger child's age: $o = y + 2$.

Now, substitute this into the sum equation:

$$(y + 2) + y = 8$$

Combine the terms with y :

$$2y + 2 = 8$$

Subtract 2 from both sides:

$$2y = 8 - 2$$

$$2y = 6$$

Divide by 2 to find the age of the younger child:

$$y = \frac{6}{2}$$

$$y = 3 \text{ years.}$$

The older child's age would be $o = 3 + 2 = 5$ years. The sum is $3 + 5 = 8$, which matches our calculation.

Conclusion

Based on the calculations, the age of the younger child is 3 years.

38. Answer: b

Explanation:

Calculating the Average Weight of the Entire Class

This explanation details the process for determining the combined **average weight** of two distinct sections (A and B) within a class. We are provided with the number of students and the average weight for each section individually.

Understanding the Problem: Average Weight Calculation

We need to find the overall average weight when merging Section A and Section B. Key details provided are:

- Section A: Contains 40 students, with an average weight of 35 kg.
- Section B: Contains 44 students, with an average weight of 37 kg.

The task is to calculate the **average weight** of all students in the class combined.

Step-by-Step Calculation for Average Weight

To find the combined average, we must first calculate the total weight contributed by each section.

Step 1: Calculate the Total Weight of Section A

The total weight for any group is calculated by multiplying the number of individuals in the group by their average weight.

For Section A, the calculation is:

$$\text{Total Weight}_A = (\text{Number of Students in A}) \times (\text{Average Weight of A})$$

Plugging in the values:

$$\text{Total Weight}_A = 40 \times 35 \text{ kg}$$

Resulting in:

$$\text{Total Weight}_A = 1400 \text{ kg}$$

Step 2: Calculate the Total Weight of Section B

Similarly, we calculate the total weight for Section B:

$$\text{Total Weight}_B = (\text{Number of Students in B}) \times (\text{Average Weight of B})$$

Using the given numbers:

$$\text{Total Weight}_B = 44 \times 37 \text{ kg}$$

Resulting in:

$$\text{Total Weight}_B = 1628 \text{ kg}$$

Step 3: Calculate the Total Weight of the Whole Class

To find the total weight of the entire class, we sum the total weights of Section A and Section B.

$$\text{Total Weight}_{\text{Class}} = \text{Total Weight}_A + \text{Total Weight}_B$$

Substituting the calculated values:

$$\text{Total Weight}_{\text{Class}} = 1400 \text{ kg} + 1628 \text{ kg}$$

Which gives:

$$\text{Total Weight}_{\text{Class}} = 3028 \text{ kg}$$

Step 4: Calculate the Total Number of Students in the Class

We also need the total count of students in the class by adding the numbers from both sections.

$$\text{Total Students}_{\text{Class}} = (\text{Number of Students in A}) + (\text{Number of Students in B})$$

Adding the student counts:

$$\text{Total Students}_{\text{Class}} = 40 + 44$$

Resulting in:

$$\text{Total Students}_{\text{Class}} = 84$$

Step 5: Calculate the Average Weight of the Whole Class

The final step is to calculate the average weight of the whole class using the total weight and the total number of students.

$$\text{Average Weight}_{\text{Class}} = \frac{\text{Total Weight}_{\text{Class}}}{\text{Total Students}_{\text{Class}}}$$

Using the values calculated above:

$$\text{Average Weight}_{\text{Class}} = \frac{3028 \text{ kg}}{84 \text{ students}}$$

Performing the division:

$$\text{Average Weight}_{\text{Class}} \approx 36.0476 \text{ kg}$$

When rounded to two decimal places, this value is approximately 36.05 kg. Comparing this result with the provided options, 36.04 kg is the closest value.

Summary of Calculations

Section	Number of Students	Average Weight (kg)	Total Weight (kg)
A	40	35	1400
B	44	37	1628
Whole Class	84	-	3028

Final Result: Average Weight of the Class

Based on the step-by-step calculations, the **average weight** of the entire class, when combining Section A and Section B, is approximately 36.04 kg. This calculation correctly weights the average based on the number of students in each section.

Comparison with Provided Options:

- Option 1: 38.1 Kg (Incorrect)

- Option 2: 36.04 kg (Correct)
- Option 3: 32.04 kg (Incorrect)
- Option 4: 39 kg (Incorrect)
- Option 5: (No value provided) (Incorrect)

39. Answer: d

Explanation:

Given:

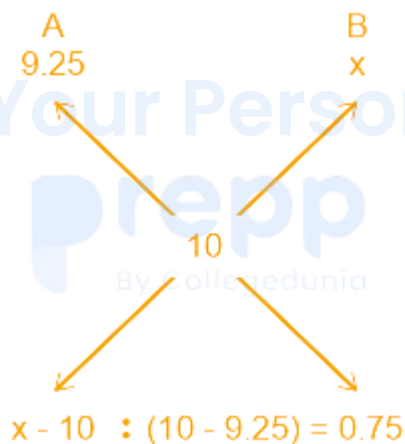
Cost of sugar A = 9.25 Rs/kg

Cost of the mixture = 10 Rs/kg

The ratio of both sugar = 17 : 15

Calculation:

Let the cost of another sugar be x Rs/kg.



According to the question,

$$\frac{x-10}{0.75} = \frac{17}{15}$$

$$\Rightarrow 15x - 150 = 12.75$$

$$\Rightarrow 15x = 162.75$$

$$\Rightarrow x = 10.85 \text{ Rs/kg}$$

$\therefore$ The cost of sugar B is 10.85 Rs/kg

40. Answer: a

Explanation:

Calculating 27.44% of 0.433%

This problem asks us to calculate the value of a percentage of another percentage, specifically finding what 27.44% of 0.433% is, and presenting the answer accurate to 6 decimal places.

Understanding the Calculation

To find a percentage of a number, we first convert the percentage to its decimal form by dividing by 100. Then, we multiply this decimal by the number.

In this case, the "number" we are taking a percentage of is itself a percentage (0.433%). So, the process involves:

- Converting 27.44% into a decimal.
- Converting 0.433% into a decimal.
- Multiplying these two decimal values together.
- Rounding the final result to 6 decimal places as specified.

Step-by-Step Calculation Breakdown

1. Convert 27.44% to decimal:

To convert the percentage 27.44% to a decimal, we divide it by 100.

$$\text{Decimal form of } 27.44\% = \frac{27.44}{100} = 0.2744$$

2. Convert 0.433% to decimal:

Similarly, we convert 0.433% to a decimal by dividing by 100.

$$\text{Decimal form of } 0.433\% = \frac{0.433}{100} = 0.00433$$

3. Multiply the decimals:

Now, we multiply the two decimal values we obtained.

$$0.2744 \times 0.00433$$

Let's perform the multiplication:

$$0.2744 \times 0.00433 = 0.001188112$$

4. Round to 6 decimal places:

The question requires the answer to be rounded to 6 decimal places. Our calculated value is 0.001188112.

We examine the 7th decimal place, which is 1. Since 1 is less than 5, we round down, meaning we keep the 6th decimal place as it is.

$$0.001188$$

Comparing Result with Options

The calculated value, rounded to 6 decimal places, is 0.001188.

Let's compare this with the given options:

- Option 1: 0.001188
- Option 2: 0.011882
- Option 3: 0.881112
- Option 4: None of these

Our calculated result, 0.001188, matches Option 1.

Conclusion

Therefore, 27.44% of 0.433% is approximately 0.001188 when rounded to 6 decimal places.

41. Answer: b

Explanation:

Given:

Speed of train P = 50 km/hr

Speed of train Q = 40 km/hr

Formula used:

Time = Distance/Speed

Calculation:

Let, the distance covered by train Q be x

Since P & Q take the same time t

$$T_P = T_Q$$

$$\frac{x+100}{50} = \frac{x}{40}$$

$$\Rightarrow 5x = 4x + 400$$

$$\Rightarrow x = 400$$

Hence initial distance b/w P & Q = $(x + 100) + x$

$$\Rightarrow 400 + 100 + 400 = 900 \text{ km}$$

$\therefore$ 900 km is the correct answer.

42. Answer: d

Explanation:

Understanding the Work Rate Problem

This question asks us to determine the number of days required for a specific group of women (11 women) to complete a task, given information about how long it takes for different combinations of men and women to finish the same task. We need to figure out the relative work efficiency of men and women.

Calculating Individual Work Rates

Let's define the work rate. Let M represent the amount of work one man completes in one day, and let W represent the amount of work one woman completes in one day. The total work done is calculated by multiplying the combined work rate of the group by the number of days they work.

Analyzing the First Scenario

According to the problem, 5 men and 4 women can complete the work in 10 days. The total work done can be expressed as:

$$\text{Total Work} = (5M + 4W) \times 10$$

Analyzing the Second Scenario

Similarly, the problem states that 4 men and 7 women can complete the same work in 8 days. This gives us:

$$\text{Total Work} = (4M + 7W) \times 8$$

Determining the Relationship Between Men's and Women's Work Rates

Since the task is the same in both scenarios, the total work done must be equal:

$$10 \times (5M + 4W) = 8 \times (4M + 7W)$$

Let's simplify this equation by distributing the numbers:

$$50M + 40W = 32M + 56W$$

Now, we rearrange the equation to find the relationship between M and W . We gather the M terms on one side and the W terms on the other:

$$50M - 32M = 56W - 40W$$

$$18M = 16W$$

We can simplify this by dividing both sides by 2:

$$9M = 8W$$

This equation tells us the ratio of work done by men and women. We can express the work rate of a man in terms of a woman's work rate:

$$M = \frac{8}{9}W$$

This means one man does $\frac{8}{9}$ of the work that one woman does in a single day.

Calculating the Total Work

Let's calculate the total amount of work required for the task using the information from the first scenario and the relationship we found:

$$\text{Total Work} = 10 \times (5M + 4W)$$

Substitute $M = \frac{8}{9}W$ into the equation:

$$\text{Total Work} = 10 \times (5 \times (\frac{8}{9}W) + 4W)$$

$$\text{Total Work} = 10 \times (\frac{40}{9}W + 4W)$$

To add the terms involving W , we find a common denominator:

$$\text{Total Work} = 10 \times \left(\frac{40}{9}W + \frac{36}{9}W \right)$$

$$\text{Total Work} = 10 \times \left(\frac{40+36}{9}W \right)$$

$$\text{Total Work} = 10 \times \left(\frac{76}{9}W \right)$$

$$\text{Total Work} = \frac{760}{9}W$$

The total work is equivalent to the amount of work $\frac{760}{9}$ women can do in one day.

Finding the Number of Days for 11 Women

We need to find how many days it takes for 11 women to complete the total work calculated $\left(\frac{760}{9}W \right)$. The work done by 11 women in one day is $11W$.

$$\text{Number of Days} = \frac{\text{Total Work}}{\text{Work done by 11 women per day}}$$

$$\text{Number of Days} = \frac{\frac{760}{9}W}{11W}$$

The W cancels out:

$$\text{Number of Days} = \frac{760}{9 \times 11}$$

$$\text{Number of Days} = \frac{760}{99}$$

Expressing the Answer as a Mixed Number

To convert the improper fraction $\frac{760}{99}$ into a mixed number, we perform the division:

$$760 \div 99$$

Divide 760 by 99:

$$760 = 7 \times 99 + 67$$

So, the number of days is 7 with a remainder of 67. This can be written as the mixed number $7\frac{67}{99}$.

Conclusion

It will take 11 women $7\frac{67}{99}$ days to complete the same piece of work.

43. Answer: d

Explanation:

Understanding the Work and Time Problem

This problem involves calculating the total time taken to complete a piece of work, considering different individuals working at different rates and joining at different times. We are given the time A and B take individually to complete the work, and the specific conditions under which they work together.

Calculating Individual Work Rates

First, let's determine the rate at which each person works. The rate is the amount of work done per day.

- A can complete the work in 16 days. So, A's work rate is $\frac{1}{16}$ of the work per day.
- B can complete the work in 10 days. So, B's work rate is $\frac{1}{10}$ of the work per day.

Work Done by A Initially

A starts the work alone and works for 4 days before B joins. We need to calculate how much work A completes during this period.

- Work done by A in 4 days = (A's rate) $\times$ (Number of days A worked alone)
- Work done by A = $\frac{1}{16} \times 4$
- Work done by A = $\frac{4}{16} = \frac{1}{4}$

So, A completes $\frac{1}{4}$ of the total work in the first 4 days.

Calculating Remaining Work

After A works for 4 days, we need to find out how much work is left to be done.

- Total work = 1 (representing the whole work)
- Remaining work = Total work - Work done by A
- Remaining work = $1 - \frac{1}{4}$
- Remaining work = $\frac{4}{4} - \frac{1}{4} = \frac{3}{4}$

There is $\frac{3}{4}$ of the work remaining.

Combined Work Rate of A and B

Now, A and B work together to complete the remaining work. We need to find their combined work rate.

- Combined rate = A's rate + B's rate
- Combined rate = $\frac{1}{16} + \frac{1}{10}$

To add these fractions, we find a common denominator, which is the Least Common Multiple (LCM) of 16 and 10. The LCM(16, 10) is 80.

- Combined rate = $\frac{1 \times 5}{16 \times 5} + \frac{1 \times 8}{10 \times 8}$
- Combined rate = $\frac{5}{80} + \frac{8}{80}$
- Combined rate = $\frac{5+8}{80} = \frac{13}{80}$

Together, A and B complete $\frac{13}{80}$ of the work per day.

Time Taken to Complete Remaining Work Together

We can now calculate the time it takes for A and B to complete the remaining $\frac{3}{4}$ of the work together.

- Time = $\frac{\text{Remaining Work}}{\text{Combined Rate}}$
- Time = $\frac{\frac{3}{4}}{\frac{13}{80}}$
- Time = $\frac{3}{4} \times \frac{80}{13}$
- Time = $\frac{3 \times 20}{13}$
- Time = $\frac{60}{13}$ days

Calculating Total Days to Complete the Entire Work

The total time taken to complete the entire work is the sum of the time A worked alone and the time A and B worked together.

- Total Time = Time A worked alone + Time A and B worked together
- Total Time = $4 + \frac{60}{13}$

To add these, we convert 4 into a fraction with a denominator of 13:

- $4 = \frac{4 \times 13}{13} = \frac{52}{13}$
- Total Time = $\frac{52}{13} + \frac{60}{13}$
- Total Time = $\frac{52+60}{13} = \frac{112}{13}$ days

To express this as a mixed fraction:

- $112 \div 13 = 8$ with a remainder of 8.
- Total Time = $8\frac{8}{13}$ days.

Conclusion

Therefore, the total number of days required to complete the entire work is $8\frac{8}{13}$ days.

44. Answer: c

Explanation:

Determining the Cost Price from Selling Price and Profit Percentage

This solution explains how to find the **Cost Price** (CP) of an article when the **Selling Price** (SP) is known, and the **Profit** percentage is numerically the same as the **Cost Price**.

Understanding the Problem

We are given:

- Selling Price (SP) = Rs. 96
- The value of the **Cost Price** (CP) is numerically equal to the **Profit** percentage.

Our goal is to calculate the actual **Cost Price** (CP) of the article.

Step-by-Step Solution for Cost Price Calculation

Let's denote the **Cost Price** as CP .

According to the problem statement, the **Profit** percentage is numerically the same as the **Cost Price**. So:

- Profit % = CP

Now, let's express the Profit amount using the formula:

$$\text{Profit} = (\text{Profit \%} / 100) * CP$$

Substituting Profit % = CP , we get:

$$\text{Profit} = (CP / 100) * CP$$

$$\text{Profit} = \frac{CP^2}{100}$$

We also know the relationship between Selling Price, Cost Price, and Profit:

$$SP = CP + \text{Profit}$$

Now, substitute the known values ($SP = 96$) and the expression for Profit into this equation:

$$96 = CP + \frac{CP^2}{100}$$

To solve for CP , let's rearrange the equation into a standard quadratic form ($ax^2 + bx + c = 0$). First, clear the fraction by multiplying the entire equation by 100:

$$96 * 100 = (CP * 100) + (\frac{CP^2}{100} * 100)$$

$$9600 = 100 \cdot CP + CP^2$$

Rearrange the terms to form the quadratic equation:

$$CP^2 + 100 \cdot CP - 9600 = 0$$

We can solve this quadratic equation by factoring. We need two numbers that multiply to -9600 and add up to 100 . These numbers are 160 and -60 :

$$160 * (-60) = -9600$$

$$160 + (-60) = 100$$

So, we can factor the equation as:

$$(CP + 160)(CP - 60) = 0$$

This gives two possible solutions for CP :

- $CP + 160 = 0 \implies CP = -160$
- $CP - 60 = 0 \implies CP = 60$

Interpreting the Result

Since the **Cost Price** must be a positive value, we discard the negative solution.

Therefore, the **Cost Price** (CP) is Rs. 60.

Verification of the Cost Price

Let's check if this **Cost Price** satisfies the condition given in the problem:

- If $CP = 60$, then Profit % = 60%.
- Calculate the Profit amount: Profit = $(60 / 100) * 60 = 0.6 * 60 = 36$.
- Calculate the Selling Price: SP = CP + Profit = $60 + 36 = 96$.

The calculated Selling Price (Rs. 96) matches the given Selling Price. Thus, our calculated **Cost Price** is correct.

Conclusion

The **Cost Price** of the article is Rs. 60.

45. Answer: a

Explanation:

Understanding the Article's Cost Price Calculation

This problem involves finding the **cost price** (CP) of an article when we know its **selling price** (SP) and the relationship between the profit and the cost price. We are given that the article was sold for Rs. 375, and the profit made was exactly one-fourth of the cost price.

Key Concepts:

- **Selling Price (SP):** The price at which an article is sold.
- **Cost Price (CP):** The original price paid for an article.
- **Profit:** The amount gained when SP is greater than CP. It's calculated as Profit = SP - CP.

Relationship Given:

The question states that the **profit** is one-fourth of the **cost price**. We can write this mathematically as:

$$\text{Profit} = \frac{1}{4} \times \text{CP}$$

Step-by-Step Solution to Find the Cost Price

Let's break down the calculation step-by-step:

1. Define the variables:

- Let CP represent the Cost Price.
- Let SP represent the Selling Price (given as Rs. 375).
- Let Profit represent the profit made.

2. State the formula for Selling Price:

The selling price is the cost price plus the profit earned:

$$SP = CP + \text{Profit}$$

3. Substitute the given profit condition:

We know Profit = $\frac{1}{4} \times CP$. Substitute this into the SP formula:

$$SP = CP + \left(\frac{1}{4} \times CP\right)$$

4. Combine the terms involving CP:

To add CP and $\frac{1}{4} CP$, find a common denominator:

$$SP = (1 \times CP) + \left(\frac{1}{4} \times CP\right)$$

$$SP = \left(\frac{4}{4} \times CP\right) + \left(\frac{1}{4} \times CP\right)$$

$$SP = \left(\frac{4}{4} + \frac{1}{4}\right) \times CP$$

$$SP = \frac{5}{4} \times CP$$

5. Use the given Selling Price:

We are given SP = Rs. 375. Substitute this value:

$$\text{Rs. } 375 = \frac{5}{4} \times CP$$

6. Solve for the Cost Price (CP):

To isolate CP, multiply both sides of the equation by $\frac{4}{5}$:

$$CP = \text{Rs. } 375 \times \frac{4}{5}$$

First, divide 375 by 5:

$$375 \div 5 = 75$$

Now, multiply the result by 4:

$$CP = 75 \times 4$$

$$CP = \text{Rs. } 300$$

Therefore, the **cost price** of the article is Rs. 300.

Final Answer Verification

If the Cost Price (CP) is Rs. 300:

- Profit = $\frac{1}{4} \times \text{CP} = \frac{1}{4} \times 300 = \text{Rs. } 75$.
- Selling Price (SP) = CP + Profit = Rs. 300 + Rs. 75 = Rs. 375.

This matches the given selling price, confirming our calculation for the **cost price** is correct.

46. Answer: b

Explanation:

Merchant's Sugar Profit Scenario Explained

This problem involves a merchant who has a total quantity of sugar, **1000 kg**. The merchant divides this sugar into two parts. One part is sold at a profit of **8%**, and the remaining part is sold at a profit of **18%**. The overall profit gained on the entire 1000 kg of sugar is **14%**. The goal is to determine the specific quantity of sugar sold at the higher profit rate of 18%.

Key Concepts: Profit and Mixtures

To solve this, we need to understand how profit percentages work and how they combine in a mixture scenario. The overall profit percentage is a weighted average of the individual profit percentages, weighted by the quantity of each part. This type of problem is often efficiently solved using the rule of alligation or basic algebra.

Sugar Quantity Calculation via Alligation

The rule of alligation is a method used to solve problems where two ingredients or quantities with different characteristics (like profit percentages) are mixed to

produce a mixture with a certain average characteristic.

Here's how we apply it:

- Identify the profit percentages for the two parts: **8%** and **18%**.
- Identify the overall profit percentage: **14%**.
- Set up the alligation diagram. Place the lower percentage (8%) and higher percentage (18%) on the left side and the mean (overall) percentage (14%) in the center.
- Calculate the difference between the higher percentage and the mean percentage ($18\% - 14\% = 4\%$).
- Calculate the difference between the mean percentage and the lower percentage ($14\% - 8\% = 6\%$).
- The ratio of the quantities sold at 8% profit to the quantities sold at 18% profit is the inverse of these differences.

The calculation using alligation can be visualized:

Profit % on Part 1 (Lower)	Overall Profit % (Mean)	Profit % on Part 2 (Higher)
8%	14%	18%
Calculation: $18 - 14 = 4$		Calculation: $14 - 8 = 6$
Ratio of Quantity at 8% : Quantity at 18%		4 : 6
Simplified Ratio: 2 : 3		

This ratio indicates that for every 2 parts of sugar sold at 8% profit, 3 parts were sold at 18% profit.

Calculating the Final Sugar Quantity

The total quantity of sugar is 1000 kg.

The ratio of the quantities is 2 : 3.

Total ratio parts = $2 + 3 = 5$.

The quantity sold at 18% profit corresponds to the '3' part of the ratio.

Quantity sold at 18% profit = $\frac{\text{Part for 18\%}}{\text{Total Parts}} \times \text{Total Quantity}$

Quantity sold at 18% profit = $\frac{3}{5} \times 1000 \text{ kg}$

Quantity sold at 18% profit = $3 \times \frac{1000}{5} \text{ kg}$

Quantity sold at 18% profit = $3 \times 200 \text{ kg}$

Quantity sold at 18% profit = **600 kg**

Algebraic Method for Sugar Profit Calculation

We can also solve this using algebraic equations to verify the result.

1. Let the quantity of sugar sold at 8% profit be Q_1 kg.
2. Let the quantity of sugar sold at 18% profit be Q_2 kg.
3. We know the total quantity: $Q_1 + Q_2 = 1000 \text{ kg}$.
4. Let the cost price (CP) per kg of sugar be C .
5. The total cost price (Total CP) is $1000 \times C$.
6. The overall profit is 14% on the whole quantity. So, Total Profit = $14\% \times (1000 \times C) = 0.14 \times 1000 \times C = 140C$.
7. The profit from the first part (Q_1) is $8\% \times (Q_1 \times C) = 0.08 \times Q_1 \times C$.
8. The profit from the second part (Q_2) is $18\% \times (Q_2 \times C) = 0.18 \times Q_2 \times C$.
9. The total profit is the sum of profits from both parts:

$$(0.08 \times Q_1 \times C) + (0.18 \times Q_2 \times C) = 140C$$

10. Divide the entire equation by C (assuming $C \neq 0$):

$$0.08Q_1 + 0.18Q_2 = 140$$

11. From the total quantity equation, we can express Q_1 in terms of Q_2 : $Q_1 = 1000 - Q_2$.
12. Substitute this into the profit equation:

$$0.08(1000 - Q_2) + 0.18Q_2 = 140$$

13. Simplify and solve for Q_2 :

$$80 - 0.08Q_2 + 0.18Q_2 = 140$$

$$0.10Q_2 = 140 - 80$$

$$0.10Q_2 = 60$$

$$Q_2 = \frac{60}{0.10}$$

$$Q_2 = 600 \text{ kg}$$

Conclusion on Sugar Quantity

Both the alligation method and the algebraic method confirm that the quantity of sugar sold at an 18% profit is 600 kg. The remaining quantity, 400 kg, was sold at an 8% profit.

47. Answer: a

Explanation:

Understanding the Ratio Problem

The problem tells us about two numbers that are related by a ratio. Initially, their ratio is 3 : 5. This means we can represent the two numbers as multiples of some unknown value, say x . The smaller number can be $3x$ and the larger number can be $5x$.

Effect of Subtracting 9

The problem then describes a change: 9 is subtracted from **each** of these two numbers. The new smaller number becomes $3x - 9$. The new larger number becomes $5x - 9$.

After this subtraction, the ratio of the new numbers is given as 12 : 23.

Setting up the Equation from the Ratio

The new ratio can be written as an equation:

$$\frac{\text{New smaller number}}{\text{New larger number}} = \frac{12}{23}$$

Substituting the expressions for the new numbers:

$$\frac{3x-9}{5x-9} = \frac{12}{23}$$

Solving for the Unknown 'x'

To solve for x , we can cross-multiply the equation:

$$23 \times (3x - 9) = 12 \times (5x - 9)$$

Now, distribute the numbers on both sides:

$$23 \times 3x - 23 \times 9 = 12 \times 5x - 12 \times 9$$

$$69x - 207 = 60x - 108$$

Next, we want to gather the terms with x on one side and the constant terms on the other. Subtract $60x$ from both sides:

$$69x - 60x - 207 = -108$$

$$9x - 207 = -108$$

Now, add 207 to both sides:

$$9x = -108 + 207$$

$$9x = 99$$

Finally, divide by 9 to find the value of x :

$$x = \frac{99}{9}$$

$$x = 11$$

Finding the Smaller Number

The question asks for the original smaller number. We defined the original numbers as $3x$ and $5x$. The smaller number is $3x$.

Substitute the value of $x = 11$ into the expression for the smaller number:

$$\text{Smaller number} = 3 \times x$$

$$\text{Smaller number} = 3 \times 11$$

$$\text{Smaller number} = 33$$

Verification (Optional but Recommended)

Let's check if our answer is correct. The original numbers are 33 and $5 \times 11 = 55$. Their ratio is 33:55, which simplifies to 3:5 (dividing both by 11).

Now, subtract 9 from each number:

- $33 - 9 = 24$
- $55 - 9 = 46$

The new ratio is 24:46. This ratio simplifies to 12:23 when both numbers are divided by 2.

This matches the ratio given in the problem, confirming that our value for x and the calculated numbers are correct.

Therefore, the smaller number is 33.

48. Answer: a

Explanation:

Finding the Difference in Shares for A and B

This problem involves distributing a total sum of money, Rs. 5625, among three individuals, A, B, and C. We are given specific conditions about how their shares relate to each other and need to find how much larger A's share is compared to B's share.

Understanding the Conditions for Share Distribution

Let A , B , and C represent the respective shares of the individuals A, B, and C. The total amount to be divided is Rs. 5625.

The problem provides two key conditions:

- **Condition 1:** A's share is half the combined shares of B and C. Mathematically, this is expressed as:

$$A = \frac{1}{2}(B + C)$$

This implies:

$$2A = B + C$$

- **Condition 2:** B's share is one-fourth of the combined shares of A and C. Mathematically, this is expressed as:

$$B = \frac{1}{4}(A + C)$$

This implies:

$$4B = A + C$$

- **Total Amount Constraint:** The sum of all shares must equal the total amount available.

$$A + B + C = 5625$$

Calculating A's Share

We can determine A's share using the first condition and the total amount constraint.

From the total amount constraint, we know:

$$A + B + C = 5625$$

Substitute the expression for $(B + C)$ from Condition 1 ($B + C = 2A$) into the total amount equation:

$$A + (2A) = 5625$$

Combine the terms with A:

$$3A = 5625$$

Solve for A by dividing the total amount by 3:

$$A = \frac{5625}{3}$$

$$A = 1875$$

Thus, A's share is Rs. 1875.

Calculating B's Share

We can determine B's share using the second condition and the total amount constraint.

Start with the total amount constraint:

$$A + B + C = 5625$$

Rearrange this to group A and C together:

$$(A + C) + B = 5625$$

Now substitute the expression for $(A + C)$ from Condition 2 ($A + C = 4B$) into the rearranged equation:

$$4B + B = 5625$$

Combine the terms with B :

$$5B = 5625$$

Solve for B by dividing the total amount by 5:

$$B = \frac{5625}{5}$$

$$B = 1125$$

Thus, B's share is Rs. 1125.

Calculating the Difference Between A's and B's Shares

The question asks by how much A's share is more than B's share. This requires calculating the difference between the amounts calculated for A and B.

$$\text{Difference} = A - B$$

Substitute the values we found:

$$\text{Difference} = 1875 - 1125$$

$$\text{Difference} = 750$$

So, A's share is Rs. 750 more than B's share.

Summary of Shares and Difference

We can summarize the calculated shares in a table for clarity:

Individual	Share Amount (Rs.)
A	1875
B	1125
Difference (A - B)	750

The difference between A's share (Rs. 1875) and B's share (Rs. 1125) is Rs. 750.

49. Answer: b

Explanation:

Understanding the Problem

We are given a scenario involving a rectangular park situated within a circular field. We know the dimensions of the park (length and breadth) and the area of the circular field that is outside the park. Our task is to determine the radius of this circular field. This problem requires us to use formulas for the area of a rectangle and a circle and solve an algebraic equation.

Calculating the Area of the Rectangular Park

First, let's find the area occupied by the rectangular park. The formula for the area of a rectangle is its length multiplied by its breadth.

- Given Length of the park = 180 m
- Given Breadth of the park = 120 m
- Area of the rectangular park ($\text{Area}_{\text{park}}$) = Length $\times$ Breadth
- $\text{Area}_{\text{park}} = 180 \text{ m} \times 120 \text{ m}$
- $\text{Area}_{\text{park}} = 21600 \text{ m}^2$

Relating Circular Field Area and Park Area

The problem states that the area of the circular field *excluding* the park is 40000 square meters. This means the difference between the total area of the circular field and the area of the rectangular park is 40000 m^2 .

- $\text{Area}_{\text{circle}} - \text{Area}_{\text{park}} = 40000 \text{ m}^2$

Finding the Total Area of the Circular Field

We can now find the total area of the circular field by adding the area of the park to the area outside the park.

- $\text{Area}_{\text{circle}} = \text{Area}_{\text{park}} + \text{Area outside the park}$
- $\text{Area}_{\text{circle}} = 21600 \text{ m}^2 + 40000 \text{ m}^2$
- $\text{Area}_{\text{circle}} = 61600 \text{ m}^2$

Calculating the Radius of the Circular Field

The formula for the area of a circle is πr^2 , where ' r ' is the radius. We can use the total area of the circular field we just calculated to find the radius.

- $\text{Area}_{\text{circle}} = \pi r^2$
- $61600 \text{ m}^2 = \pi r^2$

Now, we need to solve for ' r '. Let's rearrange the formula:

- $r^2 = \frac{61600}{\pi}$

We will use the approximate value of π as $\frac{22}{7}$ for calculation.

- $r^2 = \frac{61600}{\frac{22}{7}}$
- $r^2 = \frac{61600 \times 7}{22}$
- $r^2 = 2800 \times 7$
- $r^2 = 19600 \text{ m}^2$

Finally, to find the radius ' r ', we take the square root of r^2 .

- $r = \sqrt{19600 \text{ m}^2}$
- $r = 140 \text{ m}$

Conclusion

Based on the calculations, the radius of the circular field is 140 m.

50. Answer: d

Explanation:

Given:

Length : breadth = 3 : 2

Length is increased by 5 m keeping the breadth same

New area become 2600 m²

Formula used:

Area of rectangle = Length $\times$ breadth

Perimeter = 2 (Length + breadth)

Calculation:

Let length & breadth be '3y' & '2y' respectively.

According to the question

$$\Rightarrow (3y + 5) \times 2y = 2600$$

$$\Rightarrow 6y^2 + 10y = 2600$$

$$\Rightarrow 6y^2 + 10y - 2600 = 0$$

$$\Rightarrow 3y^2 + 5y - 1300 = 0$$

$$\Rightarrow 3y^2 - 60y + 65y - 1300 = 0$$

$$\Rightarrow 3y(y - 20) + 65(y - 20) = 0$$

$$\Rightarrow (3y + 65)(y - 20) = 0$$

$$\Rightarrow y = 20, y \neq - (65/3)$$

Since, length can not be negative.

Therefore, length & breadth of original rectangle

$$3y = 3 \times 20 = 60$$

$$2y = 2 \times 20 = 40$$

$$\text{Hence, perimeter} = 2(60 + 40) = 200$$

$\therefore$ Perimeter of the rectangle is 200 m.

51. Answer: d

Explanation:

Understanding the 'FACT Check Module's' Objective

This question asks us to identify the main purpose of a 'FACT Check Module'. In today's world, where information spreads very quickly, especially online, it's important to know how we can verify if that information is true or false. A fact-checking module is a tool designed specifically for this task.

Evaluating Potential Aims of the 'FACT Check Module'

Let's look at the different options provided to understand what the 'FACT Check Module' might be designed to do:

- Option 1: control activities of disruption by opposition political parties.

While checking facts might sometimes involve looking at information spread by political groups, the main goal isn't just to control opposition parties. The focus is on the truthfulness of the information itself, no matter who is spreading it.

- Option 2: regulate the economy.

Managing or controlling the economy involves things like setting interest rates, managing taxes, and creating jobs. A fact-checking module doesn't have the power or the function to handle economic matters.

- **Option 3: promote harmony in multicultural society**

Promoting social harmony is about making sure different cultural groups live together peacefully. While stopping the spread of false information can help reduce conflict, it's not the direct job of a fact-checking module. Its main task is about verifying information accuracy.

- **Option 4: protect the Indian Government from fake news.**

This option suggests that the module aims to safeguard the **Indian Government** by identifying and countering **fake news**. Fact-checking initiatives often play a crucial role in ensuring that information related to government actions, policies, or statements is accurate, thereby preventing misinformation from harming public trust or government functioning.

- **Option 5:**

This option is empty and cannot be considered.

Identifying the Primary Function: Tackling Fake News

The core purpose highlighted across many fact-checking systems, especially when linked to governmental or public information services, is the battle against misinformation and **fake news**. The '**FACT Check Module**' is designed to verify claims, debunk false narratives, and provide accurate information to the public. This directly helps in protecting institutions, like the government, from being undermined by untrue stories.

Conclusion on the 'FACT Check Module's' Purpose

Considering the options, the most fitting description for the aim of a '**FACT Check Module**' is its role in combating misinformation targeted at or concerning the government. Therefore, its purpose is to **protect the Indian Government from fake news** by ensuring the accuracy of information in the public domain.

52. Answer: b

Explanation:

Military Exercise Pairings Explained

This question requires matching specific military exercises with the countries involved. Understanding these joint exercises is crucial for comprehending international defense cooperation and strategy. Let's break down each exercise listed in List-I and find its corresponding partner country/countries from List-II.

Understanding the VARUNAI Exercise

The **VARUNAI** exercise is a significant bilateral naval exercise conducted between **India** and **France**. It focuses on enhancing interoperability and coordination between the naval forces of the two nations. Therefore, VARUNAI corresponds to India and France.

INDRA Exercise: India-Russia Military Cooperation

The **INDRA** exercise series includes various military domains (army, navy, air force) and is a collaborative effort between **India** and **Russia**. It aims to strengthen the strategic partnership and joint combat capabilities. Thus, INDRA matches with India and Russia.

MAITRI Exercise: India-Thailand Joint Drills

The term **MAITRI** signifies friendship or alliance. In the context of military exercises, the MAITRI exercise is a joint military drill between the armed forces of **India** and **Thailand**. Its objective is to enhance counter-insurgency and counter-terrorism capabilities. So, MAITRI pairs with India and Thailand.

GARUDA SHAKTI Exercise: India-Indonesia Collaboration

GARUDA SHAKTI is a notable joint military exercise focused on counter-terrorism operations and special forces training. This exercise is conducted between the military forces of **India** and **Indonesia**. Therefore, GARUDA SHAKTI corresponds to India and Indonesia.

Summary Table of Military Exercises

List-I (Military Exercise)	List-II (Countries)
A. VARUNAI	IV. India and France
B. INDRA	II. India and Russia
C. MAITRI	I. India and Thailand
D. GARUDA SHAKTI	III. India and Indonesia

Finalizing the Correct Match Code

Based on the detailed analysis of each military exercise:

- A (VARUNAI) matches with IV (India and France).
- B (INDRA) matches with II (India and Russia).
- C (MAITRI) matches with I (India and Thailand).
- D (GARUDA SHAKTI) matches with III (India and Indonesia).

This combination (A-IV, B-II, C-I, D-III) corresponds to the correct option that aligns these military exercises with their respective participating countries.

53. Answer: a

Explanation:

Olympic Rings Color Sequence Explained

The Olympic Games logo is one of the most recognized symbols globally, featuring five interlocking rings. These rings represent the continents and the unity of the Olympic movement. Understanding the correct sequence of colours used in the **Olympic Games logo rings** is key to identifying the official design.

Understanding the Olympic Rings Symbol

The symbol consists of five rings linked together, arranged in two rows. The top row has three rings, and the bottom row has two rings. The colours were chosen by Pierre de Coubertin in 1913. It's significant because at the time, at least one of these colours appeared on the national flag of every country participating in the Olympics. The interlocking nature signifies the union of continents and the universality of sports.

The Standard Color Sequence

The official sequence of colours for the Olympic rings, when viewed from left to right, is as follows:

- The first ring (top row, left) is **Blue**.
- The second ring (top row, middle) is **Yellow**.
- The third ring (top row, right) is **Black**.
- The fourth ring (bottom row, left) is **Green**.
- The fifth ring (bottom row, right) is **Red**.

So, the complete sequence is Blue, Yellow, Black, Green, Red.

Evaluating the Provided Options

Let's examine the options given in the question to find the one that matches the correct sequence:

Option Number	Sequence of Colors	Matches Standard Sequence?
1	Blue, Yellow, Black, Green, Red	Yes
2	Black, Green, Red, Yellow, Green	No
3	Yellow, Black, Blue, Red, Green	No
4	Green, Black, Blue, Yellow, Red	No
5	(No sequence provided)	No

Comparing the standard sequence with the options, Option 1 correctly lists the colours in the order they appear in the Olympic rings logo.

54. Answer: a

Explanation:

Understanding Earth's Largest Ecosystem

The question asks us to identify the **largest ecosystem** on Earth from the given options. An ecosystem is broadly defined as a community of living organisms interacting with their non-living physical environment. Let's break down the options to understand their scope and relationship to the concept of an ecosystem.

Defining Key Spheres and Biomes

To answer this correctly, we need clear definitions for each term:

- **Biosphere:** This term refers to the sum total of all life on Earth and the environments that support it. It includes all ecosystems, encompassing the land (part of the lithosphere), the water (hydrosphere), and the lower parts of the atmosphere where life can exist.
- **Hydrosphere:** This includes all the water on Earth. It covers oceans, seas, lakes, rivers, groundwater, ice caps, and water vapor in the atmosphere. While the

hydrosphere contains numerous aquatic ecosystems (like oceans and coral reefs), it represents only the water component of Earth's systems.

- **Lithosphere:** This is the rigid outer part of the Earth, consisting of the crust and the upper mantle. It includes all the landmasses and the ocean floor. The lithosphere provides habitats for terrestrial ecosystems but is only the solid, rocky component of the planet.
- **Biome:** A biome is a very large ecological area on the Earth's surface, characterized by specific climate conditions and dominant plant and animal communities. Examples include deserts, tundras, temperate forests, and tropical rainforests. Biomes are essentially large-scale ecosystems, but they are distinct regions *within* the larger Earth system.

Comparing the Scales

Now let's compare the sizes and scope:

- Biomes are large geographical regions, but Earth has many different biomes, each occupying a portion of the planet.
- The Lithosphere is a major physical component (the solid Earth), but life exists beyond it (in the hydrosphere and atmosphere).
- The Hydrosphere is another major physical component (all water), containing vast ecosystems, but it doesn't include terrestrial or atmospheric life.
- The Biosphere, however, is defined as the zone where life exists, integrating all living things and their interactions across all environments on Earth – land, water, and air. It encompasses all individual ecosystems and biomes.

Think of it like this: Biomes are like different types of neighborhoods, the Lithosphere and Hydrosphere are like the land and water infrastructure of a city, and the Biosphere is the entire planet considered as one interconnected living entity.

Identifying Earth's Largest Ecosystem

Based on the definitions and scale comparison, the **Biosphere** is the most encompassing term. It represents the global sum of all ecosystems, making it the largest ecosystem on Earth.

Comparison of Earth's Spheres and Biomes

Term	Scope	Relation to Ecosystems
Biosphere	All life and life-supporting environments on Earth	The largest, all-encompassing ecosystem; includes all others.
Hydrosphere	All water on Earth	Contains aquatic ecosystems; part of the Biosphere.
Lithosphere	The solid, rocky outer layer of Earth	Contains terrestrial ecosystems; part of the Biosphere.
Biome	Large distinct ecological regions (e.g., Tundra, Rainforest)	Specific types of large-scale ecosystems within the Biosphere.

55. Answer: b

Explanation:

This question asks us to identify which volcano is famously known as the 'lighthouse of the Mediterranean'. This nickname refers to a volcano that is consistently active and whose eruptions are easily visible from the sea, acting like a beacon.

Mediterranean Volcanoes and Their Nicknames

The nickname 'lighthouse of the Mediterranean' is given to a volcano due to its consistent and noticeable eruptive activity, particularly at night. This activity makes it visible from a distance, much like a lighthouse guides ships.

Analyzing the Volcanic Options

Let's examine the volcanoes listed in the options:

- **Etna:** Mount Etna is a very active volcano located in Sicily, Italy. It is one of the world's most active volcanoes and is known for its frequent eruptions. While

prominent, it's not the primary volcano referred to by the specific nickname 'lighthouse of the Mediterranean'.

- **Stromboli:** Stromboli is a small island volcano in the Aeolian Islands, Italy, north of Sicily. It has been in constant eruption for at least the past 2,000 years. Its eruptions are typically characterized by mild explosions that eject incandescent lava fragments into the air, which are clearly visible, especially at night. This consistent, visible activity is why Stromboli earned the nickname 'lighthouse of the Mediterranean'.
- **Vesuvius:** Mount Vesuvius is famous for its eruption in 79 AD, which destroyed Pompeii and Herculaneum. While it is a well-known volcano near the Mediterranean (located near Naples, Italy), it is currently dormant and not characterized by the constant, visible eruptions associated with the 'lighthouse' nickname.
- **Mauna Loa:** Mauna Loa is a massive shield volcano located in Hawaii, USA. It is one of the largest active volcanoes on Earth. However, it is situated in the Pacific Ocean, not the Mediterranean Sea, making it irrelevant to the question's context.

Stromboli: The 'Lighthouse' Explained

Stromboli's frequent, mild, and visible eruptions make it a natural navigational aid for sailors in the Tyrrhenian Sea. The glowing lava fragments ejected during its regular 'Strombolian' eruptions provide a constant light source, leading to its descriptive nickname.

Therefore, based on its consistent and visible eruptive behavior, **Stromboli** is the correct answer.

56. Answer: b

Explanation:

Author of Hindi Play 'Andher Nagri Chaupat Raja' Identified

This solution focuses on identifying the correct author of the famous Hindi play titled '*Andher Nagri Chaupat Raja*'. We will examine the options provided to understand who wrote this significant work of Hindi literature.

Understanding 'Andher Nagri Chaupat Raja'

'*Andher Nagri Chaupat Raja*' is a well-known one-act satirical play in Hindi. It critiques the foolishness of a ruler and the chaotic state of his kingdom where injustice prevails. The play is celebrated for its simple language, humor, and potent social commentary.

Analyzing the Playwright Options

Let's look at the potential authors and their contributions:

- **Munshi Premchand:** Munshi Premchand was a prolific writer, novelist, and playwright in Hindi and Urdu, known for his realistic portrayal of rural Indian life. While a giant of Hindi literature, '*Andher Nagri Chaupat Raja*' is not attributed to him.
- **Bhrtendu Harishchandra:** Bhrtendu Harishchandra is widely regarded as the father of modern Hindi literature and theatre. He was a prominent poet, writer, and playwright during the British colonial period. He authored '*Andher Nagri*' in 1881, which is often referred to as '*Andher Nagri Chaupat Raja*' based on its famous refrain.
- **Kalidasa:** Kalidasa was an ancient Indian Sanskrit playwright, poet, and dramatist. He lived during the Gupta period and is famous for works like '*Abhijnanashakuntalam*' and '*Meghaduta*'. His works belong to classical Sanskrit literature, not modern Hindi drama.
- **Surdas:** Surdas was a 16th-century blind devotional poet and saint in India, who was a follower of Lord Krishna. He is renowned for his epic poem '*Sur Sagar*'. His work is primarily devotional poetry, not drama in the style of '*Andher Nagri*'.

Conclusion on the Author

Based on literary history and attribution, the play '*Andher Nagri Chaupat Raja*' was written by **Bhrtendu Harishchandra**. He was a pivotal figure in the development of Hindi prose and drama, and this play remains one of his most iconic works, highlighting themes of governance and societal critique through satire.

57. Answer: d

Explanation:

Understanding the Joint Venture Space Probe to Saturn

This question asks us to identify a specific **space probe** sent to explore the planet **Saturn**. The key piece of information is that this mission was a **joint venture**, meaning it involved collaboration between multiple space agencies: **NASA** (the United States' space agency), the **European Space Agency (ESA)**, and the **Italian Space Agency (ASI)**.

Let's examine the options provided to determine which one fits this description:

Analyzing the Space Probe Options

- **Voyager 1**: Launched by NASA, Voyager 1 famously explored Jupiter and Saturn. While a significant mission, it was primarily a NASA project, not a joint venture involving ESA and ASI in the way described.
- **Sputnik**: Sputnik was the name given to the first artificial Earth satellite, launched by the Soviet Union. It had no connection to Saturn exploration or the agencies mentioned in the question.
- **New Horizons**: This NASA probe was designed to study Pluto and the Kuiper Belt. It performed a flyby of Jupiter on its way but its primary target was not Saturn, nor was it a NASA/ESA/ASI joint venture for Saturn exploration.
- **Cassini**: The Cassini mission was a sophisticated robotic spacecraft sent to study the planet **Saturn** and its system, including its moons and rings. Critically,

Cassini was an international collaboration. It was managed by NASA's Jet Propulsion Laboratory (JPL), but included significant contributions from ESA (providing the European instrument package and the Huygens probe for Titan) and the Italian Space Agency (ASI) (providing the Cassini High-Gain Antenna and other instruments). This perfectly matches the description of a **joint venture** involving **NASA, ESA, and the Italian space agency**.

Cassini Mission: A Collaborative Success

The **Cassini-Huygens** mission stands out as a landmark international collaboration in planetary science. Its primary objective was the detailed study of the Saturn system.

Mission Agencies and Roles:

Agency	Contribution
NASA	Overall mission management, Saturn orbiter (Cassini), launch vehicle
ESA	Atmospheric structure instrument, magnetometer, radar, camera instruments, and the Huygens probe (for landing on Titan)
ASI	Cassini's High-Gain Antenna, parts of radar, imaging system, and spectrometer instruments

The successful operation of the Cassini probe for over 13 years in the Saturn system, culminating in its final plunge into Saturn's atmosphere in 2017, was a testament to the power of international cooperation in space exploration. Therefore, the **space probe** that was the **joint venture** of **NASA, ESA, and the Italian space agency** to study **Saturn** was Cassini.

58. Answer: b

Explanation:

Understanding Humidity Measurement Instruments

Humidity refers to the amount of water vapor present in the air. Measuring humidity is important in various fields like meteorology, agriculture, and industrial settings. Different scientific instruments are used to measure different environmental parameters.

Identifying the Instrument to Measure Humidity

The core task is to identify the correct instrument specifically designed for measuring humidity from the given options. Let's analyze each instrument mentioned:

Instrument Functions Explained:

- **Hydrometer:** This device measures the specific gravity or relative density of liquids. It floats higher in denser liquids and lower in less dense liquids, based on Archimedes' principle. It does not measure air humidity.
- **Hygrometer:** This is the specialized instrument used for measuring humidity, which is the concentration of water vapor in the air. Hygrometers can be mechanical (like hair hygrometers) or electronic (using changes in electrical properties).
- **Pyrometer:** A pyrometer is used to measure extremely high temperatures, often those found in furnaces or stars. It works by sensing the thermal radiation emitted by an object.
- **Lactometer:** This instrument measures the purity of milk by determining its specific gravity. It helps identify if milk has been watered down.

Instrument Comparison Table

Instrument	Primary Measurement	Parameter Measured
Hydrometer	Liquid Density	Specific Gravity / Relative Density
Hygrometer	Air Moisture Content	Relative Humidity
Pyrometer	High Temperature	Temperature
Lactometer	Milk Purity	Specific Gravity of Milk

Conclusion on Humidity Measurement

By comparing the functions, it is clear that the **Hygrometer** is the specific instrument designated for the measurement of humidity in the air.

59. Answer: a

Explanation:

Matching Indian Maestros to Their Instruments

This explanation helps in correctly associating the famous Indian musicians from List I with the instruments they masterfully play, as listed in List II.

Identifying the Instruments of Famous Musicians

To solve this matching question, we need to recall the primary instruments associated with each artist:

- **Pandith Ravi Shankar** is world-renowned for his exceptional skill in playing the **Sitar**.
- **Bismillah Khan** is celebrated for his unparalleled contribution to popularizing the **Shehnai** in Indian classical music.

- Pandit Shiv Kumar Sharma is famous for reviving and popularizing the **Santoor**, a type of hammered dulcimer.
- Amjad Ali Khan is a distinguished artist known for his command over the **Sarod**.

Correct Musician and Instrument Pairs

Based on the established associations, the correct pairings are determined as follows:

List I – Artist	List II – Instrument
(a) Pandith Ravi Shankar	(iv) Sitar
(b) Bismillah Khan	(iii) Shehnai
(c) Pandit Shiv Kumar Sharma	(ii) Santoor
(d) Amjad Ali Khan	(i) Sarod

Final Match Summary

Combining these individual matches gives us the complete correct sequence:

(a) is matched with (iv), (b) is matched with (iii), (c) is matched with (ii), and (d) is matched with (i).

This corresponds to the option (a) – iv, (b) – iii, (c) – ii, (d) – i.

60. Answer: b

Explanation:

Understanding Key Constitutional Amendments of India

This question asks us to match significant amendments to the Constitution of India with their respective subjects. Understanding these amendments is crucial for studying the Indian political system and its evolution. Let's analyze each amendment listed and identify its primary purpose.

Matching Amendments with their Subjects

We need to establish the correct pairings between the amendments in List I and the subjects in List II. Here is a breakdown:

- **A. 52nd Amendment Act, 1985:** This amendment is famously known for introducing the Anti-Defection Law in India. It added the Tenth Schedule to the Constitution, which lays down the provisions for disqualification of Members of Parliament and State Legislatures on grounds of defection. This directly matches with the subject "Disqualification on grounds of defection".
- **B. 73rd Amendment Act, 1992:** This is a landmark amendment that gave constitutional status to the Panchayati Raj institutions in India. It added Part IX and the Eleventh Schedule to the Constitution, providing for a three-tier Panchayati Raj system at the village, intermediate, and district levels. This corresponds to the subject "Panchayati Raj".
- **C. 61st Amendment Act, 1988:** This amendment is significant because it lowered the minimum voting age for elections to the Lok Sabha and the Legislative Assemblies of States from 21 years to 18 years. This aligns with the subject "Reduction of voting age from 21 to 18".
- **D. 86th Amendment Act, 2002:** This crucial amendment made education a fundamental right for children between the ages of 6 and 14 years. It inserted Article 21A into the Constitution, which states that the State shall provide free and compulsory education to all children of this age group. This relates to the subject "Right to Education".

Creating the Correct Match Code

Based on the analysis above, we can create the correct pairings:

- 52nd Amendment Act, 1985 (A) matches with Disqualification on grounds of defection (4). So, A-4.

- 73rd Amendment Act, 1992 (B) matches with Panchayati Raj (3). So, B-3.
- 61st Amendment Act, 1988 (C) matches with Reduction of voting age from 21 to 18 (1). So, C-1.
- 86th Amendment Act, 2002 (D) matches with Right to Education (2). So, D-2.

The resulting code is A-4, B-3, C-1, D-2.

Summary Table of Constitutional Amendments

List I (Amendment to the Constitution of India)	List II (Subject)	Match
A. 52 nd Amendment Act, 1985	1. Reduction of voting age from 21 to 18	A-4
B. 73 rd Amendment Act, 1992	2. Right to Education	B-3
C. 61 st Amendment Act, 1988	3. Panchayati Raj	C-1
D. 86 th Amendment Act, 2002	4. Disqualification on grounds of defection	D-2

Conclusion

The correct combination of matches is A-4, B-3, C-1, D-2, which accurately pairs each significant amendment with its corresponding subject.

Revision Table: Key Constitutional Amendments

Amendment Act	Year	Subject Matter	Key Impact
52 nd Amendment	1985	Anti-Defection Law	Added Tenth Schedule; prevents legislators from switching parties easily.
73 rd Amendment	1992	Panchayati Raj Institutions	Granted constitutional status to PRIs; three-tier structure (Village, Block, District); provisions for elections, reservations, and finances.
61 st Amendment	1988	Voting Age Reduction	Reduced voting age from 21 to 18 for Lok Sabha and State Assembly elections.
86 th Amendment	2002	Right to Education	Inserted Article 21A making elementary education a Fundamental Right; duty of parents (Article 51A); directive principle for early childhood care (Article 45 amended).

Additional Information on Constitutional Amendments

The Constitution of India is a living document and has been amended many times since its adoption in 1950. Amendments are crucial for adapting the Constitution to changing social, political, and economic conditions. The procedure for amendment is laid down in Article 368 of the Constitution.

- Amendments can be simple (by simple majority, like citizenship laws), special (by special majority in Parliament, like most provisions), or special plus ratification by states (by special majority in Parliament and ratification by at least half of the state legislatures, for provisions affecting the federal structure).
- Significant amendments like the 73rd and 74th Amendments (Panchayati Raj and Urban Local Bodies) strengthened democratic decentralization.
- The 86th Amendment highlights the state's commitment to universal elementary education.

- The 52nd Amendment aimed to bring stability to governments by deterring political defections.

Studying these amendments helps understand the dynamic nature of the Indian Constitution and the continuous effort to strengthen democracy and fundamental rights.

61. Answer: c

Explanation:

Mahatma Gandhi's Sole INC Presidency at Belgaum

Mahatma Gandhi played a pivotal role in India's freedom struggle. While he was a key leader, he only presided over the **Indian National Congress (INC)** session once in his lifetime. Understanding this specific event is important for historical context.

Belgaum Session Significance

The historic session where Mahatma Gandhi served as the President of the **Indian National Congress** took place in **Belgaum** (also known as Belgaum). This unique event occurred in the year 1924. The choice of Belgaum for this significant session highlights the party's efforts to connect with various regions across India during the national movement.

Key Details of the Belgaum Congress

- **President:** Mahatma Gandhi
- **Year:** 1924
- **Location:** Belgaum (Present-day Karnataka)

This was the 39th session of the Indian National Congress. Gandhi's presidency at the **Belgaum Congress** marked a significant moment, as it was the only time he held the presidential post. The session focused on various issues related to the Non-

Cooperation Movement and the Swaraj Party's role within the Congress. The other options, Karachi, Nagpur, and Hyderabad, were venues for INC sessions presided over by other leaders in different years. For instance, the Karachi session of 1931 was presided over by Sardar Vallabhbhai Patel, and the Nagpur session of 1920 was presided over by Lala Lajpat Rai.

62. Answer: c

Explanation:

This question asks about the fundamental scientific process that powers a Hydrogen bomb. Understanding the core principles is key to identifying the correct answer.

Hydrogen Bomb Principle Explained

A Hydrogen bomb, also known as a thermonuclear weapon, operates on the principle of **Nuclear Fusion**. This process involves the merging of atomic nuclei, releasing a tremendous amount of energy.

Understanding Nuclear Fusion

Nuclear fusion is the reaction where two or more light atomic nuclei combine to form one or more different atomic nuclei and subatomic particles (neutrons or protons). In the context of a Hydrogen bomb:

- The process typically involves isotopes of hydrogen, such as Deuterium (^2H) and Tritium (^3H).
- Under extreme conditions of high temperature and pressure (often initiated by a fission bomb acting as a trigger), these light nuclei collide with enough force to overcome their mutual electrical repulsion.
- When they fuse, they form a heavier nucleus (like Helium) and release a significant amount of energy, along with particles like neutrons.

- The reaction can be represented as:
- $H +$
- $H \rightarrow$
- $He + \text{neutron} + \text{Energy}$
- This release of energy is far greater than that obtained from nuclear fission.

Contrasting with Nuclear Fission

Nuclear Fission is a different process where the nucleus of a heavy atom (like Uranium-235 or Plutonium-239) splits into two or more smaller nuclei, releasing energy and neutrons.

- Nuclear fission is the principle behind atomic bombs (like those used in World War II).
- While fission might be used to initiate the fusion reaction in a Hydrogen bomb (by creating the necessary high temperatures and pressures), it is not the primary energy-generating mechanism of the Hydrogen bomb itself.

Role of Chain Reaction

A **Chain Reaction** is a self-sustaining sequence of events. In nuclear physics, it typically refers to a process where neutrons released from nuclear fission cause further fission reactions.

- Chain reactions are characteristic of nuclear fission reactors and atomic bombs.
- While the fusion reaction in a Hydrogen bomb releases neutrons that can cause further fissions in a surrounding material (like Uranium-238), the core energy release comes from the fusion process itself, not primarily from a fission-based chain reaction.

Nuclear Explosion as an Outcome

Nuclear Explosion describes the result or the event itself, rather than the underlying physical principle that causes the explosion. Both fission and fusion bombs result in

a nuclear explosion, but fusion is the specific principle powering the Hydrogen bomb.

Conclusion

Therefore, the principle that a Hydrogen bomb is based on is **Nuclear Fusion**, the process of combining light atomic nuclei under extreme conditions to release vast amounts of energy.

63. Answer: a

Explanation:

Important Points

- Based on historical seismic activity, the Bureau of Indian Standards (BIS) has classified India into **four seismic zones**: Zone II, Zone III, Zone IV, and Zone V.
- Among these, **Zone V** is the most seismically active and Zone II is the least active.
- India has a long history of destructive earthquakes due to its geological setting.
- The main reason for high seismic activity is the movement of the Indian Plate towards the Eurasian Plate at a rate of about **47 mm/year**.

Additional Information

- Geological data suggests that about **54% of India's land area** is vulnerable to earthquakes.
- According to World Bank and UN studies, around 200 million urban residents in India may be exposed to earthquakes and storms by 2050.
- The seismic zoning map is included in the Indian earthquake-resistant design code **IS 1893 (Part 1): 2002**.
- The revised seismic zoning map divides India into Zones II, III, IV, and V, unlike earlier versions that had more categories.

- Zone V represents the highest level of seismicity, while Zone II represents the lowest.

Conclusion

India is divided into **four seismic zones** based on earthquake risk classification.

Correct Answer : **4 Seismic Zones**

64. Answer: d

Explanation:

This solution provides a detailed analysis of the statements concerning the Light Combat Aircraft (LCA) Tejas, aiming to clarify its features and capabilities.

Evaluating LCA Tejas Supersonic Capability (Statement I)

Statement I claims that most LCA Tejas aircraft are capable of flying at supersonic speeds, reaching nearly Mach 1.5. The LCA Tejas is designed with supersonic flight capabilities. Its maximum speed is generally cited as being around Mach 1.6. While this indicates supersonic performance, the phrasing "most of them" could be interpreted in different ways, potentially referring to specific operational versions or initial developmental stages. However, the core capability for supersonic flight exists.

Understanding LCA Tejas Design and Origin (Statement II)

Statement II correctly identifies the LCA Tejas as a **single-engine, multi-role light fighter**. Critically, it also accurately states that it was **designed by the Aeronautical Development Agency (ADA)** of India. The indigenous design and development by

ADA are defining characteristics of the Tejas program. Its role as a versatile, single-engine fighter platform is well-established.

Confirming LCA Tejas Armament (Statement III)

Statement III asserts that the LCA Tejas is equipped with the **Python-5 Air-to-Air Missile** and the **Derby Beyond Visual Range (BVR) Missile**. This statement is accurate. The Tejas aircraft is designed to integrate a variety of modern armaments, and the Python-5 (a short-range, heat-seeking missile) and the Derby (a medium-range BVR missile) are among the key air-to-air missiles fitted onto the aircraft, enhancing its combat effectiveness.

Conclusion on Correct Statements

Based on the detailed analysis:

- Statement I discusses supersonic speed, which the Tejas possesses (around Mach 1.6), making the claim of "nearly Mach 1.5" factually close, although the qualifier "most of them" might introduce ambiguity depending on context.
- Statement II is factually correct regarding the aircraft's configuration (single-engine, multi-role light fighter) and its design origin (ADA).
- Statement III is also factually correct, confirming the integration of specific advanced missiles like the Python-5 and Derby.

Considering the provided options and the factual accuracy of the statements, statements II and III are definitively correct descriptions of the LCA Tejas. Therefore, the correct option combines these two statements.

65. Answer: c

Explanation:

Pradhan Mantri Kaushal Vikas Yojana (PMKVY)
Statements Explained

This solution analyzes the given statements about the Pradhan Mantri Kaushal Vikas Yojana (PMKVY) to determine which ones are correct.

Statement Analysis

- **Statement I: It is the flagship scheme of the Ministry of Labour and Employment.**

This statement is incorrect. The Pradhan Mantri Kaushal Vikas Yojana (PMKVY) is the flagship scheme of the **Ministry of Skill Development and Entrepreneurship (MSDE)**, not the Ministry of Labour and Employment.

- **Statement II: It was launched in the year 2014.**

This statement is incorrect. PMKVY was launched in **2015** as part of the government's commitment to skill development. The scheme aimed to provide vocational training to Indian youth.

- **Statement III: Among other things, it will also impart training in soft skills, entrepreneurship, financial and digital literacy.**

This statement is correct. PMKVY focuses on comprehensive skill development. Beyond technical training, the scheme emphasizes imparting crucial **soft skills**, fostering **entrepreneurship** abilities, and promoting **financial** and **digital literacy** to enhance overall employability and personal development.

- **Statement IV: It aims to align the competencies of the unregulated workforce of the country to the National Skill Qualification Framework.**

This statement is correct. A major goal of PMKVY is to enhance the skills of the youth, including those in the informal or **unregulated workforce**. By providing standardized training and certification, the scheme aims to align their competencies with the nationally recognized **National Skill Qualification Framework (NSQF)**, thereby improving their job prospects and career progression.

Correct Statements Identification

Based on the analysis, statements III and IV are correct. Statements I and II are incorrect because PMKVY is managed by the Ministry of Skill Development and Entrepreneurship and was launched in 2015.

Conclusion on PMKVY Statements

The statements that accurately describe the Pradhan Mantri Kaushal Vikas Yojana are III and IV.

Final Answer Determination

Considering the correctness of each statement:

- Statement I is incorrect.
- Statement II is incorrect.
- Statement III is correct.
- Statement IV is correct.

Therefore, the correct combination is that only statements III and IV are correct.

66. Answer: a

Explanation:

United News of India Headquarters Location

This question requires identifying the specific city that serves as the **headquarter** for the news agency known as the **United News of India (UNI)**.

About United News of India (UNI)

The United News of India (UNI) is a prominent news agency operating within India. It plays a vital role in disseminating news across various media platforms, providing essential information services nationwide.

Determining the Headquarters City

The central administrative and operational base for the United News of India is established in a key city within India. Based on factual information regarding the agency's infrastructure:

- The **headquarter** of the United News of India is located in **New Delhi**. As the capital of India, New Delhi hosts the main offices and central command for numerous national organizations, including UNI, facilitating its nationwide news operations.

Evaluating Location Options

The options provided represent different cities, and understanding their geographical and administrative significance helps in confirming the correct location for UNI's headquarters.

- **New Delhi**: India's capital city, serving as the administrative center.
- **Manila**: The capital city of the Philippines.
- **Singapore**: A major financial center and city-state in Southeast Asia.
- **Mumbai**: A significant economic and cultural hub in India, but not the location of UNI's headquarters.

Based on the information that UNI's central operations are based in India's capital, New Delhi is identified as the correct location for its headquarters.

67. Answer: a

Explanation:

Understanding the Assertion and Reason regarding the Quit India Movement This section aims to clarify the historical significance of the Quit India movement, examining both the assertion about its role as a culmination point and the reason concerning its impact on the eventual transfer of power in India.

Assertion Significance: Quit India Movement Culmination

The Assertion (A) states that the **Quit India movement**, launched in **August 1942**, signified the peak or end point of the Indian freedom struggle.

- The Quit India movement was a pivotal moment initiated by Mahatma Gandhi, calling for the end of British rule in India.
- It involved widespread civil disobedience, strikes, and protests across the country.
- This movement demonstrated the Indian populace's unwavering demand for independence and put significant pressure on the British government.
- While the struggle continued after 1942, the movement severely weakened the British administrative grip and morale, making future colonial rule unsustainable. It represented a mass awakening and resolve that paved the way for independence. Therefore, it can be viewed as a major culmination, marking the beginning of the end of British rule.

Reason Impact: Transfer of Power Mechanics

The Reason (R) suggests that following the **Quit India movement**, the process of determining the methods for the **transfer of power** became inevitable.

- The Quit India movement intensified the demand for independence and made it clear to the British that ruling India against the will of its people was no longer feasible, especially in the post-World War II era.
- The widespread and intense nature of the movement demonstrated that the British could no longer rely on the loyalty or cooperation of the Indian population for administration.
- Consequently, the British administration had to seriously consider the eventual withdrawal from India. The question shifted from **if** independence would happen to **how** and **when** the power would be transferred.
- This perspective supports the idea that the movement created conditions where the transfer of power was a logical and unavoidable next step.

Analysis of Assertion and Reason Relationship

The question asks whether the Reason (R) correctly explains the Assertion (A).

- The **Quit India movement's** success in mobilizing the masses and highlighting the British government's vulnerability made the eventual **transfer of power** an unavoidable consequence.
- The movement's intensity and the subsequent repression significantly impacted the British resolve and capacity to hold onto India.
- Therefore, the fact that the transfer of power mechanics needed to be determined (Reason R) directly explains **why** the Quit India movement can be seen as a culmination point (Assertion A). It marked the stage where independence became a certainty, with the focus shifting to the practicalities of the handover.

Based on this analysis, both the Assertion and the Reason are historically accurate, and the Reason effectively explains the significance of the Assertion in the context of the Indian freedom struggle.

68. Answer: a

Explanation:

Understanding Ministry of Defence Departments

The question asks us to identify which of the listed options is NOT a department or organization operating directly under the **Ministry of Defence**. The **Ministry of Defence** is the government body responsible for policy, planning, execution, and administration of defence-related activities of the country. It oversees various departments and organizations crucial for national security and military operations.

Analysis of Options under Ministry of Defence

Let's examine each option to determine its affiliation with the **Ministry of Defence**:

- **Department of Ex-servicemen Welfare:** This department is a key part of the **Ministry of Defence**. Its main purpose is to ensure the welfare, rehabilitation, and resettlement of ex-servicemen (retired military personnel) and their dependents.
- **Department of Defence Production:** This department also falls under the **Ministry of Defence**. It focuses on strengthening India's defence industrial base and promoting indigenous defence manufacturing and production capabilities.
- **Defence Research and Development Organization (DRDO):** DRDO is the premier R&D agency dedicated to enhancing India's defence capabilities through research and development of advanced technologies and systems. It functions under the administrative control of the **Ministry of Defence**.
- **Department of Defence Intelligence:** While defence intelligence is a critical function managed and coordinated within the overall framework of the **Ministry of Defence** (often through specific directorates or agencies like the Defence Intelligence Agency), a distinct entity named "Department of Defence Intelligence" is not typically listed as one of the main, separate departments of the **Ministry of Defence** in the same way as the others. Defence intelligence activities are usually integrated within the military branches or specific intelligence agencies that report up through the Ministry. Compared to the other options, this is the most likely entity not structured as a primary department.

Identifying the Correct Option

Based on the structure and functions of the Indian **Ministry of Defence**:

- The Department of Ex-servicemen Welfare is under the Ministry.
- The Department of Defence Production is under the Ministry.
- The Defence Research and Development Organization (DRDO) is under the Ministry.
- A specific "Department of Defence Intelligence" is not a standard primary department within the Ministry's structure, although intelligence functions are managed under its umbrella.

Therefore, the **Department of Defence Intelligence** is the entity not typically classified as a direct department under the **Ministry of Defence**, unlike the other options provided.

Conclusion

The question requires identifying the organization **not** under the **Ministry of Defence**. While defence intelligence is a vital area overseen by the Ministry, the specific designation "Department of Defence Intelligence" is not among the primary, distinct departments established within the Ministry's structure. The other options, the Department of Ex-servicemen Welfare, the Department of Defence Production, and the DRDO, are all clearly defined and integral parts of the **Ministry of Defence**.

69. Answer: c

Explanation:

Indian Air Force Aircraft: Long-Range Multi-Role Capabilities

The question asks us to identify a specific type of aircraft within the Indian Air Force (IAF): one that serves as a **long-range, multi-role** fighter, with a focus on **air superiority**. Let's examine the options provided to understand which aircraft best fits this description.

The Sukhoi 30 MKI: Defining Long-Range Air Superiority

The **Sukhoi 30 MKI** is a significant platform in the Indian Air Force's fleet. It is a twin-engine, all-weather, multi-role fighter aircraft developed by Russia's Sukhoi and manufactured under license by Hindustan Aeronautics Limited (HAL) in India. Key features that align it with the question's criteria include:

- **Long Range:** The Su-30 MKI possesses a substantial combat radius and ferry range, allowing it to operate deep into enemy territory and cover vast

operational areas. This inherent long-range capability is crucial for sustained air operations.

- **Multi-Role Capability:** It is designed to perform a wide array of missions. This includes air-to-air combat (air superiority), air-to-ground attacks, anti-ship strikes, reconnaissance, and electronic warfare. Its versatility makes it a true multi-role platform.
- **Air Superiority Focus:** While capable in multiple roles, the Su-30 MKI is heavily armed and equipped with advanced avionics and radar systems (like the PESA radar) to effectively engage and defeat enemy aircraft, contributing significantly to achieving air superiority. Its aerodynamic design and thrust vectoring also enhance its maneuverability in air combat.

Therefore, the **Sukhoi 30 MKI** strongly matches the description of a long-range, multi-role air superiority aircraft.

Comparing Aircraft Roles in the Indian Air Force

To further clarify why the Sukhoi 30 MKI is the correct choice, let's briefly look at the primary roles of the other aircraft mentioned:

- **Tejas:** The HAL Tejas is a lightweight, fourth-generation, multi-role fighter aircraft. While versatile, it is generally considered a shorter-range platform compared to the Su-30 MKI and is often positioned for air-to-air combat and ground attack roles within its range envelope.
- **Mirage 2000:** The Dassault Mirage 2000 is a highly capable multi-role fighter known for its agility and performance. It has served effectively in air superiority and ground attack roles for the IAF. While it can be configured for longer ranges with external fuel tanks, the Su-30 MKI is typically regarded as the IAF's primary long-range air superiority platform.
- **Jaguar:** The SEPECAT Jaguar is primarily a strike aircraft, optimized for ground attack and tactical reconnaissance missions. It is not designed primarily for air superiority roles.

Based on this comparison, the **Sukhoi 30 MKI** stands out as the aircraft that best fits the description of a **long-range, multi-role Air Superiority Aircraft** in the Indian Air Force.

70. Answer: b

Explanation:

Datia District Recognized for Excellence in Public Administration by Prime Minister's Award

The Prime Minister's Award for Excellence in Public Administration is a significant honor bestowed upon districts and individuals for their remarkable achievements and innovative approaches in public service delivery and governance. This award celebrates the dedication and effective implementation of various government initiatives aimed at improving the lives of citizens.

Understanding the Award and the Winning District

The question specifically asks to identify which district received the Prime Minister's Award for Excellence in Public Administration. This award focuses on recognizing outstanding contributions in the field of public administration.

- **Award Name:** Prime Minister's Award for Excellence in Public Administration
- **Objective:** To acknowledge and award outstanding work in public administration, promoting good governance and citizen-centric service delivery.
- **Recognized District:** Based on the provided correct answer, **Datia** district is the recipient of this prestigious award.

Significance of Datia's Achievement

The selection of Datia district signifies its success in implementing effective administrative practices and achieving notable results in public service. This recognition serves as an encouragement for other districts to strive for similar levels of excellence in governance. The award highlights Datia's commitment to improving public administration, potentially through specific projects or schemes that were evaluated positively.

While Dhar, Bhind, and Alirajpur are also districts, the specific award mentioned in the question was received by Datia, highlighting its exemplary performance in public administration.

71. Answer: d

Explanation:

Steel Authority of India Limited (SAIL) Plants

The question requires identifying which of the listed Iron and Steel Plants does not operate under the management of the **Steel Authority of India Limited (SAIL)**. SAIL is a significant public sector undertaking in India, overseeing numerous vital steel production facilities across the nation.

Comparing Plant Operations: SAIL vs. Jamshedpur

To determine the correct answer, let's review the operational status of each plant mentioned in the options:

- **Durgapur Steel Plant:** This facility is located in Durgapur, West Bengal. It is a key production unit that operates under the administrative control of SAIL.
- **Rourkela Steel Plant:** Situated in Rourkela, Odisha, this plant is another major integrated steel facility managed by SAIL.
- **Bhilai Steel Plant:** Located in Bhilai, Chhattisgarh, this plant is a well-known steel producer and functions as an integral part of SAIL's operations.
- **Jamshedpur Steel Plant:** The steelworks located in Jamshedpur, Jharkhand, is historically significant as India's first integrated iron and steel plant. It was founded by Jamsetji Tata and is currently operated by Tata Steel. Tata Steel is a company in the private sector and is not managed by SAIL.

Identifying the Non-SAIL Plant: Jamshedpur

Based on the operational structure, the **Durgapur**, **Rourkela**, and **Bhilai** steel plants are all units functioning under the Steel Authority of India Limited (SAIL). In contrast, the **Jamshedpur** steel plant is operated by Tata Steel, a private entity. Therefore, Jamshedpur is the correct answer as it does not fall under SAIL's management.

72. Answer: d

Explanation:

Exploring Cricket's Historical Accuracy

This solution examines the historical accuracy of statements concerning the development of cricket. Understanding these key facts is crucial for anyone interested in the sport's rich past.

Statement I: Cricket's Status in 18th Century London

Let's evaluate the claim that **cricket** became a **leading sport** in **London** during the first half of the **18th Century**.

- Historical records indicate that cricket's popularity grew significantly during this period.
- By the early 1700s, organized matches were being played, attracting considerable attention in London and surrounding areas.
- Sources confirm that cricket was indeed establishing itself as a major sport, rivaling other popular pastimes in London during the first half of the 18th Century.

Therefore, statement I is historically accurate.

Statement II: The Foundation and Revision of Cricket Laws

Next, we look at the timeline of the official **Laws of Cricket**, specifically the years **1744** and **1774**.

- The earliest known codified version of the Laws of Cricket dates back to **1744**. This was a significant step in standardizing the game.
- These foundational laws were later revised and updated. The year **1774** marks an important revision, introducing key changes and clarifications that further shaped the game. For instance, the 1774 code included the famous "long stop" rule and specified the width of the bat and stumps.

Consequently, statement II, noting the initial writing in 1744 and subsequent amendment in 1774, is correct.

Statement III: The Inaugural Cricket Test Match

Finally, we verify the details surrounding the first **Test match**, particularly the teams involved (**Australia and England**), the venue (**Melbourne**), and the year (**1877**).

- The first official Test match, recognized internationally, was contested between two **national teams: Australia and England**.
- This historic match took place from March 15th to 19th, **1877**.
- The venue was the Melbourne Cricket Ground in **Melbourne**, Australia.

Statement III accurately reflects the facts about the beginning of Test cricket.

Conclusion on Cricket Historical Statements

Based on the detailed examination, all three statements (I, II, and III) present accurate historical information regarding the development and key milestones of cricket, including its rise in popularity in 18th Century London, the codification of its laws in 1744 and 1774, and the commencement of Test matches in 1877 between Australia and England.

73. Answer: a

Explanation:

What is a Sedimentary Rock?

A **sedimentary rock** is one of the main types of rock. It is formed when fragments of other rocks, minerals, or organic matter (called sediment) are compressed and cemented together over a long period. These rocks often form in layers and can contain fossils. Common processes include weathering, erosion, deposition, compaction, and cementation. Sedimentary rocks are classified based on how the sediment was formed, such as clastic (from fragments), chemical (from precipitation), or organic (from living things).

Analyzing the Options for Sedimentary Rocks

Let's examine each option to determine if it is a **sedimentary rock**:

- **Gypsum:** This is a mineral composed of hydrated calcium sulfate ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$). It often forms as a precipitate from water, especially in arid environments where evaporation is high. Because it forms from chemical precipitation, Gypsum is classified as a chemical **sedimentary rock**.
- **Quartzite:** This rock is formed when sandstone (a clastic sedimentary rock) is subjected to heat and pressure. This process transforms it into quartzite, which is classified as a metamorphic rock, not a **sedimentary rock**.
- **Pumice:** Pumice is a lightweight, volcanic rock formed when molten lava rapidly cools and solidifies. It contains many gas bubbles, giving it a frothy appearance. Pumice is classified as an igneous rock (specifically, extrusive igneous).
- **Granite:** Granite is a common type of intrusive igneous rock, meaning it forms when molten magma cools slowly beneath the Earth's surface. It is composed mainly of quartz and feldspar. Granite is definitely not a **sedimentary rock**.

Conclusion: Identifying the Sedimentary Rock

Based on the analysis, Gypsum is formed through precipitation and is therefore classified as a **sedimentary rock**. The other options, Quartzite (metamorphic), Pumice (igneous), and Granite (igneous), belong to different rock classifications. Thus, Gypsum is the correct answer when asked to identify a **sedimentary rock** among the choices.

74. Answer: b

Explanation:

Indian Constitution: Locating Directive Principles of State Policy

The Indian Constitution is divided into various Parts, each covering different aspects of governance, rights, and duties. Understanding these divisions is crucial for grasping the framework of Indian law and administration. This explanation focuses on identifying the specific Part that outlines the Directive Principles of State Policy (DPSP).

Understanding Part IV: Directive Principles of State Policy

The Directive Principles of State Policy represent a unique feature of the Indian Constitution. They are fundamental guidelines and principles that the State (government) should consider while formulating laws and policies. The goal is to establish a comprehensive social and economic democracy in the country, promoting welfare and ensuring justice.

- **Constitutional Location:** These important principles are enshrined in **Part IV** of the Constitution of India.
- **Article Range:** Part IV covers Articles 36 to 51.
- **Purpose:** DPSP aims to secure socio-economic justice for the citizens and guide the State towards creating a society based on principles of equity and fairness, even though they are not directly enforceable in courts like Fundamental Rights.

Analysis of Other Constitutional Parts Mentioned

To confirm the correct location of the Directive Principles, let's briefly look at the other Parts mentioned in the options:

- **Part III:** This Part deals with Fundamental Rights, which are justiciable rights guaranteed to citizens (e.g., Right to Equality, Right to Freedom).
- **Part V:** This significant Part covers the 'Union' government, including the Executive (President, Prime Minister), the Parliament (Rajya Sabha, Lok Sabha), and the Judiciary (Supreme Court).
- **Part VI:** This Part focuses on the 'States' and their governance, including the State Executive (Governor, Chief Minister), State Legislature, and High Courts.

Conclusion on Directive Principles' Location

Based on the structure and content of the Indian Constitution, **Part IV** is exclusively dedicated to the Directive Principles of State Policy. It provides the constitutional basis for the government's duty to work towards the welfare of the people by implementing these guidelines in governance.

75. Answer: b

Explanation:

Key Inflation Measures in India

Inflation refers to the sustained increase in the general price level of goods and services in an economy over a period of time. When the general price level rises, each unit of currency buys fewer goods and services; consequently, inflation reflects a reduction in the purchasing power per unit of money. Understanding how inflation is measured is crucial for assessing economic health.

Analyzing Inflation Measurement Options in India

Several indices are used globally and in India to measure inflation. Let's look at the options provided in the context of India:

1. Wholesale Price Index (WPI)

The Wholesale Price Index measures the average change in prices of commodities **at the wholesale level**. It tracks inflation from the perspective of producers and wholesalers. WPI in India primarily covers goods (commodities) and does not typically include services.

2. Consumer Price Index (CPI)

The Consumer Price Index measures the average change over time in the prices paid by **urban consumers** for a representative basket of consumer goods and services. This basket includes food, housing, clothing, transportation, medical care, education, and recreation. The CPI is considered a key indicator of retail inflation, reflecting the actual price changes experienced by households.

3. Consumer Price Index for Agricultural Workers (CPI-IW)

This is a specific type of Consumer Price Index calculated for **agricultural workers**. It tracks the change in retail prices of a fixed basket of goods and services consumed by the agricultural labour population. While important for this specific demographic, it's not the primary measure for overall inflation.

4. National Income Deflation

National income deflation is a process used to convert a nation's nominal income into real income. It involves dividing the nominal national income (calculated at current prices) by a price index, such as the GDP deflator. While related to price levels, its primary purpose is to adjust national accounts for inflation, rather than being a direct measure of consumer inflation itself.

Primary Measure of Inflation in India

In India, the **Consumer Price Index (CPI)** is the primary measure used by the government and the Reserve Bank of India (RBI) to track and manage retail inflation. The CPI reflects the cost of living for consumers and is the benchmark inflation rate often reported in the news and used for policy decisions impacting households.

76. Answer: c

Explanation:

Determining Om's Initial Walking Direction

This solution explains how to find the initial direction Om was walking based on his movements and final facing direction. We need to carefully trace his path to determine where he began.

Step-by-Step Movement Analysis

Let's break down Om's journey step by step:

- Om starts walking in an unknown direction and covers 9m.
- He then turns left and walks 10m.
- After that, he turns left again and walks 9m.
- Finally, he is facing the South direction.

Tracing the Path Backwards

To find the initial direction, we can work backward from his final position and facing direction.

1. **Final State:** Om is facing South after his second left turn and walking 9m.
2. **Before the Second Left Turn:** He walked 9m facing South. This means the 9m walk was completed while facing South. Therefore, just before completing this 9m walk, he must have been facing the direction from which he arrived at the point where he made the second turn. Since he turned left to face South, he must have been facing North before this turn.
3. **Before the First Left Turn:** He walked 10m after the first left turn and ended up facing North (before the second turn). If he turned left and ended up facing North, he must have been facing South before making the first left turn.
4. **Initial Movement:** He walked 9m initially, and then turned left from that direction to face South. If he was facing South after turning left, his initial direction must have been East. Let's re-verify this.

Verifying the Initial Direction

Let's test the starting direction "North" based on the options provided:

1. Assume Start Direction: North

- Om walks 9m North.
- He turns left (now facing West) and walks 10m West.
- He turns left again (now facing South) and walks 9m South.
- His final facing direction is South. This matches the information given in the question.

Conclusion

Based on the step-by-step analysis and verification, Om started walking in the North direction.

Keywords Recap

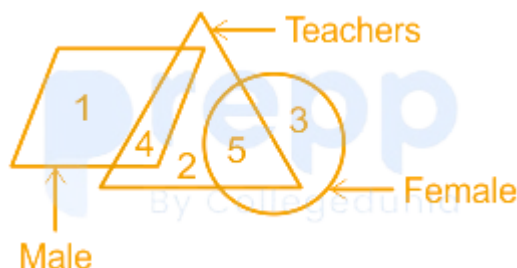
The key elements considered were Om's initial walk, the left turns he made, the distances covered, and his final facing direction (South) to determine his starting direction.

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77. Answer: b

Explanation:

The logic followed here is:



Sum of males who are not teachers = 1

Sum of female teachers = 5

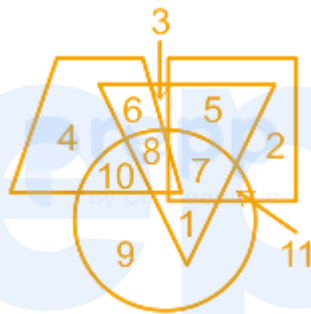
Ratio of sum of males who are not teachers and sum of female teachers = 1 : 5

Hence, the correct answer is "option (2)".

78. Answer: b

Explanation:

The logic followed here is:



Sum of the numbers surrounded by one figure = $4 + 2 + 3 + 9 = 18$

Sum of the numbers surrounded by two figures = $6 + 5 + 11 + 10 + 1 = 33$

Difference of Sum of the numbers surrounded by two figures and Sum of the numbers surrounded by one figure = $33 - 18 = 15$

79. Answer: d

Explanation:

The logic followed here is:

Figure 1: $3 + 9 = 12(L)$

Figure 2: $4 + 5 = 9(I)$

Figure 3: $4 + 4 = 8(H)$

Hence, the correct answer is "option (4)".

★ Additional Information

80. Answer: b

Explanation:

Understanding the Symbol Substitution and Statement Evaluation

This question tests our ability to substitute given symbols with mathematical operations and evaluate the resulting expressions following the correct order of operations (often remembered by acronyms like BODMAS or PEMDAS).

Symbol Mapping Rule

First, let's clearly define the mapping between the letters and the operations:

- P = Addition (+)
- Q = Division ($\div$)
- R = Multiplication ($\times$)
- S = Subtraction ($-$)

Order of Operations (BODMAS/PEMDAS)

To correctly evaluate the statements, we must follow the standard order of operations:

1. Brackets / Parentheses
2. Orders / Exponents

3. Division and Multiplication (from left to right)
4. Addition and Subtraction (from left to right)

Evaluating Statement I

Statement I is: $44 \div 11 + 6 - 2 \times 2 = 16$

Substituting the symbols with their corresponding operations:

$$44 \div 11 + 6 - 2 \times 2$$

Now, let's evaluate this expression step-by-step using the order of operations:

1. **Division:** $44 \div 11 = 4$
2. **Multiplication:** $2 \times 2 = 4$
3. The expression becomes: $4 + 6 - 4$
4. **Addition:** $4 + 6 = 10$
5. **Subtraction:** $10 - 4 = 6$

The calculated result is 6. The statement claims the result is 16. Since $6 \neq 16$, Statement I is incorrect.

Evaluating Statement II

Statement II is: $36 \div 3 \times 2 + 2 - 10 = 16$

Substituting the symbols with their corresponding operations:

$$36 \div 3 \times 2 + 2 - 10$$

Evaluating this expression step-by-step:

1. **Division:** $36 \div 3 = 12$
2. **Multiplication:** $12 \times 2 = 24$
3. The expression becomes: $24 + 2 - 10$
4. **Addition:** $24 + 2 = 26$
5. **Subtraction:** $26 - 10 = 16$

The calculated result is 16. The statement claims the result is 16. Since $16 = 16$, Statement II is **correct**.

Conclusion on Statements

Based on our evaluations:

- Statement I: Calculated value is 6, claimed value is 16. (Incorrect)
- Statement II: Calculated value is 16, claimed value is 16. (Correct)

Final Answer Determination

Since only Statement II is correct, the correct option is the one that states "Only Statement II".

Statement	Evaluation	Result	Claimed Value	Correctness
I: 44 Q 11 P 6 S 2 R 2	$44 \div 11 + 6 - 2 \times 2$	6	16	Incorrect
II: 36 Q 3 R 2 P 2 S 10	$36 \div 3 \times 2 + 2 - 10$	16	16	Correct

Therefore, the correct choice is the one that includes only Statement II.

81. Answer: b

Explanation:

Understanding the Analogy: Injury and Helmet

This question asks us to identify an analogy. We need to figure out the relationship between the first pair of words, **Injury** and **Helmet**, and then apply that same

relationship to find the missing word related to **Flood**.

A **Helmet** is an item of protective equipment. Its purpose is to safeguard the wearer's head from **Injury** caused by impacts or falling objects.

So, the relationship is: **Helmet** provides **protection** against **Injury**.

Applying the Protection Principle to Flood

We must now find a word that relates to **Flood** in the same way that a **Helmet** relates to **Injury**. We are looking for something that offers **protection** against the hazard of a **Flood**.

Analyzing the Options for Flood Protection

Let's examine the given options:

- **Cape:** This is a type of clothing, usually worn over other clothes. It doesn't protect against floods.
- **Levee:** A **levee** is an embankment, either natural or man-made, built along the banks of a river or coast. Its primary function is to prevent flood waters from inundating the surrounding land. This fits the role of protection against floods.
- **Cave:** A cave is a natural underground chamber. It is not related to flood protection.
- **Estuary:** An estuary is where a river meets the sea. While associated with water, it's a geographical feature, not a protective measure against floods.

Based on the analysis, a **Levee** is designed to protect areas from **Floods**.

Conclusion: The Correct Analogy

The relationship identified is protection against a hazard:

- **Injury : Helmet** (Helmet protects against Injury)
- **Flood : Levee** (Levee protects against Flood)

Therefore, the word that completes the analogy is **Levee**.

82. Answer: b

Explanation:

After arranging all the letters in a meaningful word:

- 1) ARCHM $\Rightarrow$ MARCH (31 Days)
- 2) BMERNVOE $\Rightarrow$ NOVEMBER (30 Days)
- 3) GUASUT $\Rightarrow$ AUGUST (31 Days)
- 4) NAJRAUY $\Rightarrow$ JANUARY (31 Days)

All the months have 31 days except November.

Hence, the correct answer is "option (2)".

83. Answer: b

Explanation:



If exact figure is not shown in options, mark the most appropriate option present.

On observing the given figure carefully, we get:

In the question figure (X),

- 1. One dot is in the common area of the triangle and rectangle.
- 2. One dot is in the common area of the circle and rectangle.
- 3. One dot is in the common area of the arrow, circle and rectangle.

Figure (A) $\rightarrow$ Common area of the arrow, circle and rectangle isn't present.

Figure (B) → All the required conditions are fulfilled as shown below:



Figure (C) → Common area of the triangle and rectangle isn't present.

Figure (D) → Common area of the circle and rectangle isn't present.

Hence, the correct answer is "Figure (B)".



Important Point

We should not think of the exact shape and size of the figures in these questions.

Just resemblance will work like if an Equilateral triangle is given in the question figure, any shape of the triangle in the answer figure will work, be it right triangle or scalene triangle.

84. Answer: c

Explanation:

- The question asks us to rearrange jumbled letters to form meaningful words and identify the word that doesn't belong with the others.
- We need to carefully unscramble each set of letters provided in the options.

Unscrambling Jumbled Letters

Let's unscramble each option:

- **RPISM:** These letters can be rearranged to spell **PRISM**.
- **UBEC:** These letters rearrange to form **CUBE**.
- **QSUAER:** These letters can be rearranged to spell **SQUARE**.
- **OCNE:** These letters rearrange to form **CONE**.

Identifying the Odd One Out: Shape Dimensions

After unscrambling, we have the words: PRISM, CUBE, SQUARE, and CONE. These are all terms related to geometry.

Let's analyze the type of shape each word represents:

- **PRISM:** This is a three-dimensional (3D) solid object with two identical ends and flat sides.
- **CUBE:** This is also a three-dimensional (3D) solid object, specifically a regular hexahedron with six square faces.
- **SQUARE:** This is a two-dimensional (2D) shape, a flat figure with four equal sides and four right angles.
- **CONE:** This is a three-dimensional (3D) geometric shape tapering smoothly from a flat base (usually circular) to a point called the apex or vertex.

Comparing the shapes:

- PRISM, CUBE, and CONE are all 3D shapes.
- SQUARE is a 2D shape.

Therefore, the odd one out is **SQUARE** because it is a two-dimensional shape, while the others are three-dimensional shapes.

85. Answer: c

Explanation:

Understanding the Architect–Building Analogy

This question asks us to identify a relationship between two pairs of words. The first pair is "Architect : Building". We need to find a word that relates to "Museum" in the exact same way an architect relates to a building.

Relationship between Architect and Building

An **Architect** is a professional who designs, plans, and oversees the construction of a **Building**. They are responsible for the structure, function, and overall appearance of the building.

Finding the Parallel Role for a Museum

We are looking for a similar role for a **Museum**. This role should involve the management, planning, and presentation of the museum's core components, much like an architect does for a building.

Evaluating the Options for the Museum Role

Let's examine each option to see which one best fits the analogy:

- **Manager:** While a museum has managers who handle administrative tasks and operations, this term is very general and doesn't specifically describe someone responsible for the collections or exhibits, which are central to a museum's purpose.
- **Gardner:** A gardener's expertise lies in maintaining gardens and plants. This role is unrelated to the function or content of a museum.
- **Curator:** A **Curator** is a professional responsible for a collection of exhibits in a museum or gallery. They manage, research, and interpret the items, often designing the layout and narrative of the exhibitions. This role is very similar to how an architect manages the design and purpose of a building.
- **Supervisor:** A supervisor oversees the work of others. While a museum employs supervisors, this title doesn't capture the specific responsibility for the museum's collections and presentation like the architect's role for a building.

Identifying the Correct Museum Role

Based on the analysis, the role most analogous to an **Architect** managing a **Building** is that of a **Curator** managing a **Museum**. The curator is responsible for the collections and exhibits, defining the museum's purpose and presentation to the public.

Therefore, the correct option that completes the analogy is Curator.

86. Answer: a

Explanation:

This question involves tracking the movement and final orientation of a person, Ram, based on a series of directional changes and distances walked. We need to determine both the direction Ram is facing at the end of his journey and his final displacement from his starting point.

Analyzing Ram's Walking Path

To solve this, we will track Ram's movements step by step. We can imagine a coordinate system where Ram starts at the origin (0, 0). Let's assume North corresponds to the positive y-axis and East corresponds to the positive x-axis. Consequently, South is the negative y-axis and West is the negative x-axis.

Detailed Steps of Ram's Journey

- **Step 1: Start** – Ram begins at (0, 0).
- **Step 2: 15 m West** – Ram moves 15 meters West. His new position is (-15, 0). He is facing West.
- **Step 3: Turn Left** – Facing West, turning left means he now faces South.
- **Step 4: Walks 5 m** – Ram walks 5 meters South. His position changes from (-15, 0) to (-15, -5). He is facing South.
- **Step 5: Turn Left** – Facing South, turning left means he now faces East.

- **Step 6: Walks 4 m** – Ram walks 4 meters East. His position changes from $(-15, -5)$ to $(-15 + 4, -5)$, which is $(-11, -5)$. He is facing East.
- **Step 7: Turn Left** – Facing East, turning left means he now faces North.
- **Step 8: Walks 2 m** – Ram walks 2 meters North. His position changes from $(-11, -5)$ to $(-11, -5 + 2)$, which is $(-11, -3)$. He is facing North.
- **Step 9: Turn Right** – Facing North, turning right means he now faces East.
- **Step 10: Runs 7 m** – Ram runs 7 meters East. His position changes from $(-11, -3)$ to $(-11 + 7, -3)$, which is $(-4, -3)$. He is facing East.
- **Step 11: Turn Left** – Facing East, turning left means he now faces North.
- **Step 12: Runs 3 m** – Ram runs 3 meters North. His position changes from $(-4, -3)$ to $(-4, -3 + 3)$, which is $(-4, 0)$. He is facing North.

Determining Ram's Final Facing Direction

After the last step (walking 3 m North), Ram is facing North.

Calculating Distance from Initial Point

Ram started at the origin $(0, 0)$ and his final position is $(-4, 0)$.

We can calculate the distance between the initial point $(x_1, y_1) = (0, 0)$ and the final point $(x_2, y_2) = (-4, 0)$ using the distance formula:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Substituting the coordinates:

$$d = \sqrt{(-4 - 0)^2 + (0 - 0)^2}$$

$$d = \sqrt{(-4)^2 + (0)^2}$$

$$d = \sqrt{16 + 0}$$

$$d = \sqrt{16}$$

$$d = 4 \text{ m}$$

So, Ram is 4 meters away from his initial position.

Final Direction and Distance

Based on the step-by-step analysis:

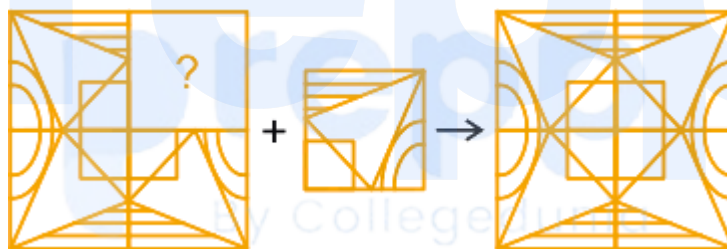
- Ram's final facing direction is **North**.
- The distance Ram is from his initial position is **4 m**.

Therefore, Ram is facing North and is 4 m from his starting point.

87. Answer: d

Explanation:

The figure that will replace the question mark (?) in the following figure series is shown below:

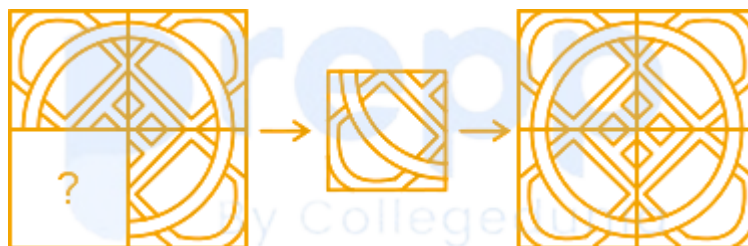


Hence, 'option 4' is the correct answer.

88. Answer: c

Explanation:

In the given question first of all four squares are given, in which in the place of question mark only half square of the given square is taken, So in answer figure firstly we complete the square and then another line which covers the four square is taken then remaining circle. So the pattern follows here is



Hence, the correct answer is **option 3**.

89. Answer: a

Explanation:

Tracing Ravish Kumar's Running Path

This solution explains how to determine Ravish Kumar's final position relative to his starting point after a series of movements and turns. We will break down each step of his journey.

Understanding the Movements

Ravish starts by facing South and makes several 90-degree left turns. We need to calculate his net displacement from the starting point.

Step-by-Step Path Analysis

Let's track Ravish's position assuming the starting point is the origin (0,0) on a coordinate plane. We'll consider South as the negative y-direction, North as the positive y-direction, East as the positive x-direction, and West as the negative x-direction.

- **Initial Movement:** Ravish starts facing South and runs *20 m*.
 - Direction: South
 - Distance: *20 m*
 - Change in Coordinates: (0, -20)
 - Current Position: (0, -20)

- Current Facing Direction: South
- **First Turn and Movement:** Ravish takes a *90-degree left turn*. Turning left from South means he now faces East. He runs for *30 m*.
 - Direction: East
 - Distance: *30 m*
 - Change in Coordinates: $(+30, 0)$
 - Current Position: $(0 + 30, -20 + 0) = (30, -20)$
 - Current Facing Direction: East
- **Second Turn and Movement:** He takes another *90-degree left turn*. Turning left from East means he now faces North. He runs for *70 m*.
 - Direction: North
 - Distance: *70 m*
 - Change in Coordinates: $(0, +70)$
 - Current Position: $(30 + 0, -20 + 70) = (30, 50)$
 - Current Facing Direction: North
- **Third Turn and Movement:** Finally, he takes a *left turn* again (90 degrees). Turning left from North means he now faces West. He walks *30 m*.
 - Direction: West
 - Distance: *30 m*
 - Change in Coordinates: $(-30, 0)$
 - Current Position: $(30 - 30, 50 + 0) = (0, 50)$
 - Current Facing Direction: West

Calculating Net Displacement

To find the position relative to the starting point $(0,0)$, we sum the displacements in the North-South and East-West directions.

- **East-West Displacement:** Ravish moved *30 m* East $(+30)$ and then *30 m* West (-30) .

$$\text{Total East-West Displacement} = 30 \text{ m} - 30 \text{ m} = 0 \text{ m}$$

- **North-South Displacement:** Ravish moved *20 m* South (-20) and then *70 m* North $(+70)$.

$$\text{Total North-South Displacement} = -20 \text{ m} + 70 \text{ m} = 50 \text{ m}$$

A positive value indicates displacement towards the North.

Final Position Relative to Starting Point

Combining the displacements:

- The net movement along the East-West axis is 0 m.
- The net movement along the North-South axis is 50 m towards North.

Therefore, Ravish Kumar's current position is *50 m* North of his starting point.

90. Answer: d

Explanation:

Decoding the Mathematical Expression

This question asks us to evaluate a mathematical expression where letters represent different arithmetic operations. We need to decode the expression first.

The defined code is:

- 'A' stands for addition ($+\$).
- 'B' stands for subtraction ($-$).
- 'C' stands for multiplication ($\times$).
- 'D' stands for division ($\div$).

The given expression is: $81 \div 9 \times 5 \div 15 + 8 - 11$.

By substituting the letters with their corresponding operators, the expression becomes:

$$81 \div 9 \times 5 \div 15 + 8 - 11.$$

For clarity in calculation, we represent this using standard mathematical notation with LaTeX:

$81 \div 9 \times 5 \div 15 + 8 - 11$.

Applying BODMAS for Evaluation

To ensure the expression is evaluated correctly, we must follow the standard order of operations. This is often remembered by the acronym BODMAS:

- Brackets
- Orders (powers and square roots, etc.)
- Division and Multiplication (performed from left to right)
- Addition and Subtraction (performed from left to right)

According to BODMAS, we perform all divisions and multiplications first, working from the left side of the expression to the right, before moving on to additions and subtractions.

Step-by-Step Calculation

Let's evaluate the expression $81 \div 9 \times 5 \div 15 + 8 - 11$ step-by-step:

1. Division and Multiplication (Left to Right):

- First, we encounter division: $81 \div 9$.

The result is 9 .

The expression is now: $9 \times 5 \div 15 + 8 - 11$.

- Next, we have multiplication: 9×5 .

The result is 45 .

The expression becomes: $45 \div 15 + 8 - 11$.

- We continue with division: $45 \div 15$.

The result is 3 .

The expression simplifies to: $3 + 8 - 11$.

2. Addition and Subtraction (Left to Right):

- Now, we perform addition: $3 + 8$.

The result is 11 .

The expression is now: $11 - 11$.

- Finally, we perform subtraction: $11 - 11$.

The result is `$0$`.

Final Result Explanation

After meticulously applying the BODMAS order of operations, the calculation proceeds as follows:

- `$81 \div 9 = 9$`
- `$9 \times 5 = 45$`
- `$45 \div 15 = 3$`
- `$3 + 8 = 11$`
- `$11 - 11 = 0$`

The final evaluated value of the expression `$81 \div 9 \times 5 \div 15 + 8 - 11$` is `0`.

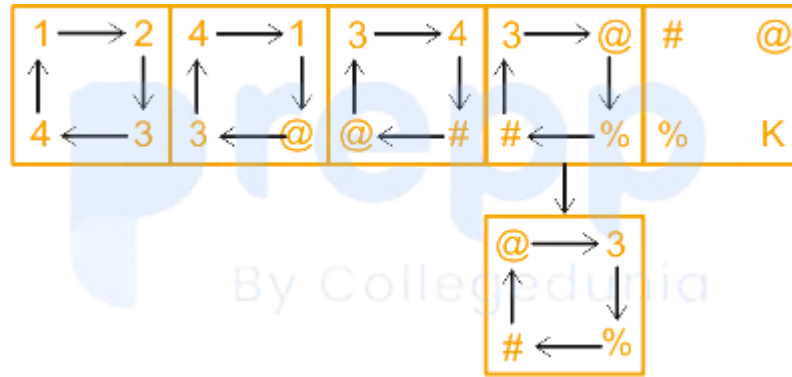
Therefore, the value of the original coded expression `81 D 9 C 5 D 15 A 8 B 11` is 0.

91. Answer: b

Explanation:

The Logic here is as follows:

- The numbers are shifted in a clockwise direction.
- When the upper right side letter shifted to the lower right side its replaced by a symbol.



Hence, the correct answer is "Option 2".

92. Answer: d

Explanation:

Decoding the Coding Pattern for SAMPLE and MAPLE

The question presents a coding challenge where we are given two examples: 'SAMPLE' is coded as 'RYJLGY', and 'MAPLE' is coded as 'LYMHZ'. Our task is to decipher the underlying coding logic and apply it to find the code for the word 'PEOPLE'. We need to look for a consistent pattern between the original words and their coded versions.

Analyzing the Letter Shifts in SAMPLE

Let's examine the transformation of 'SAMPLE' into 'RYJLGY' by considering the shift in the position of each letter in the English alphabet (where A=1, B=2, ..., Z=26).

- **S** (1st letter of SAMPLE) is the 19th letter. It corresponds to **R** (18th letter) in the code. The shift is $18 - 19 = -1$.
- **A** (2nd letter of SAMPLE) is the 1st letter. It corresponds to **Y** (25th letter). The shift calculation is $1 - 2 = -1$. When we wrap around the alphabet backwards from A, we get Z (shift -1) and then Y (shift -2). So, the shift is -2.
- **M** (3rd letter of SAMPLE) is the 13th letter. It corresponds to **J** (10th letter). The shift is $10 - 13 = -3$.

- **P** (4th letter of SAMPLE) is the 16th letter. It corresponds to **L** (12th letter). The shift is $12 - 16 = -4$.
- **L** (5th letter of SAMPLE) is the 12th letter. It corresponds to **G** (7th letter). The shift is $7 - 12 = -5$.
- **E** (6th letter of SAMPLE) is the 5th letter. It corresponds to **Y** (25th letter). The shift calculation is $5 - 6 = -1$. Wrapping around backwards from E, we get D (-1), C (-2), B (-3), A (-4), Z (-5), Y (-6). So, the shift is -6.

From this analysis, we can see a clear pattern: the shift applied to each letter decreases sequentially by one (-1, -2, -3, -4, -5, -6).

Verifying the Pattern with MAPLE

To confirm this pattern, let's apply it to the second example: 'MAPLE' coded as 'LYMHZ'.

- **M** (1st letter) is the 13th letter. Maps to **L** (12th letter). Shift = $12 - 13 = -1$. (Consistent)
- **A** (2nd letter) is the 1st letter. Maps to **Y** (25th letter). Shift = $1 - 2 = -1 \rightarrow 25$ (Y). Shift = -2. (Consistent)
- **P** (3rd letter) is the 16th letter. Maps to **M** (13th letter). Shift = $13 - 16 = -3$. (Consistent)
- **L** (4th letter) is the 12th letter. Maps to **H** (8th letter). Shift = $8 - 12 = -4$. (Consistent)
- **E** (5th letter) is the 5th letter. Maps to **Z** (26th letter). Shift = $5 - 5 = 0$. Wrapping around, 0 corresponds to the 26th letter (Z). Shift = -5. (Consistent)

The pattern holds true for both examples. The coding rule involves subtracting the letter's position number (starting from 1) from its alphabetical position, with wrap-around for negative results.

Encoding the word PEOPLE

Now, we apply this established pattern to the target word 'PEOPLE'. This word has 6 letters, so we will use the sequence of shifts: -1, -2, -3, -4, -5, -6.

Original Letter	Position in Word	Alphabetical Position	Required Shift	Calculation	Resulting Position	Coded Letter
P	1	16	-1	$16 - 1$	15	O
E	2	5	-2	$5 - 2$	3	C
O	3	15	-3	$15 - 3$	12	L
P	4	16	-4	$16 - 4$	12	L
L	5	12	-5	$12 - 5$	7	G
E	6	5	-6	$5 - 6 = -1$. Using wrap-around: $26 + (-1) = 25$.	25	Y

By applying the shifts sequentially, we find the coded letters for 'PEOPLE' are O, C, L, L, G, Y.

Final Answer Identification

Combining these letters, the coded word for 'PEOPLE' is **OCLLGY**.

Let's check this result against the provided options:

- Option 1: OCLLGY
- Option 2: GCLLGY
- Option 3: OBGLGY
- Option 4: OCLLGY

Our calculated code, **OCLLGY**, exactly matches Option 1 and Option 4.

93. Answer: a

Explanation:

Solving Blood Relation Puzzles

This question is a classic example of a blood relation puzzle. We need to carefully trace the relationship described by Reena to determine how the woman she is pointing to is related to her.

Understanding Reena's Statement

Reena says, "She is the only daughter of my father-in-law."

- "She" refers to the woman Reena is pointing towards.
- "my father-in-law" refers to Reena's father-in-law.
- The statement describes the woman as "the only daughter of my father-in-law."

Step-by-Step Relationship Analysis

Let's break down the relationship from Reena's perspective:

1. **Reena's father-in-law:** This is the father of Reena's husband.
2. **The only daughter of Reena's father-in-law:** Reena's father-in-law has only one daughter among his children. This daughter could be his son's wife (Reena) or his son's sister.
3. **Identifying the "She":** The problem states Reena is "Pointing towards a woman". This implies the woman is distinct from Reena herself unless the context strongly suggests otherwise (which it doesn't here). Therefore, "the only daughter of my father-in-law" refers to a person other than Reena.
4. **Conclusion:** If Reena's father-in-law has only one daughter and that daughter is not Reena, then that daughter must be his son's sister. Since Reena's husband is his son, the woman must be Reena's husband's sister.

Determining the Final Relation to Reena

The woman is Reena's husband's sister.

A husband's sister is known as a sister-in-law.

Person	Relation to Reena
Reena's husband	Husband
Reena's father-in-law	Husband's father
The only daughter of Reena's father-in-law	Husband's sister (since she's not Reena)
The woman (She)	Same as the only daughter of father-in-law
The woman	Sister-in-law

Conclusion on the Relation

Based on the step-by-step analysis of Reena's statement, the woman being pointed to is the sister of Reena's husband. Therefore, the woman is Reena's sister-in-law.

Revision Table: Key Relationships

Term	Definition/Relation
Father-in-law	Father of one's spouse.
Mother-in-law	Mother of one's spouse.
Sister-in-law	Sister of one's spouse, or the wife of one's sibling.
Brother-in-law	Brother of one's spouse, or the husband of one's sibling.

Additional Information on Blood Relations

Blood relation questions test your ability to understand and trace family connections. These problems often involve indirect relationships that require careful

deduction. Here are some tips for solving blood relation puzzles:

- Draw a diagram or a family tree. This can help visualize the relationships.
- Break down the statement into smaller parts.
- Identify the starting person (in this case, Reena) and trace the relationships step-by-step.
- Pay close attention to words like "only", "my", "his", "her".
- Work backward from the end of the statement if helpful.
- Consider all possibilities, but eliminate those that contradict the information given (like the woman being Reena herself when the setup implies pointing to another person).

Practicing different types of blood relation questions can significantly improve your speed and accuracy in solving them.

94. Answer: c

Explanation:

Understanding the Family Connections in the Puzzle

This question requires careful examination of the described family relationships. We need to determine how Rani is related to Ritu by piecing together the given information about Shivam, Rani, Ritu, Ana, Anil, and Aparna.

Mapping the Relationships Step-by-Step

Let's break down the statements to build the family tree:

- **Statement I:** "Shivam is the son of the brother of Rani's mother."
 - This means Rani's mother has a brother.
 - This brother is Shivam's father (assuming traditional naming conventions).
 - Rani's mother's brother is Rani's maternal uncle.

- Therefore, Shivam is the son of Rani's maternal uncle, making Shivam Rani's **maternal cousin**.
- **Statement 2:** "Anil is married to Aparna, who is Ana's mother."
 - Aparna is Ana's mother.
 - Anil is married to Aparna, making him Ana's father.
- **Statement 3:** "Ritu and Ana are the sisters of Shivam."
 - This tells us that Shivam, Ritu, and Ana are siblings. They share the same parents.
 - Since Aparna is Ana's mother and Anil is Ana's father, Aparna and Anil are the parents of Ana, Ritu, and Shivam.

Connecting Rani's Family to Ritu's Family

Now, let's link the information:

- From Statement 1, Shivam's father is Rani's mother's brother (Rani's maternal uncle).
- From Statement 3, Ritu is Shivam's sister.
- Since Ritu and Shivam are siblings, they have the same parents.
- This means Ritu's father is the same person as Shivam's father.
- Therefore, Ritu's father is also Rani's mother's brother.
- Children of one's maternal uncle are one's maternal cousins.
- So, Ritu is Rani's maternal cousin.

Final Determination of Rani's Relation to Ritu

Based on the established connections:

- Ritu's parent (father) is the brother of Rani's mother.
- This directly makes Ritu a **cousin** to Rani.

Therefore, Rani is related to Ritu as a **cousin**.

95. Answer: a

Explanation:

Understanding the Teak : Pine Relationship

The first part of the analogy is **Teak : Pine**.

- **Teak** is a type of tropical hardwood tree.
- **Pine** is a type of coniferous tree.

The key relationship here is that both **Teak** and **Pine** are specific examples of **trees**. They belong to the same broad category but are distinct types within it.

Applying the Analogy to Lily

We need to find a word that relates to **Lily** in the same way **Pine** relates to **Teak**.

- **Lily** is a specific type of flowering plant, typically known for its large, prominent blooms.

Following the pattern, we need to find another specific example that belongs to the same category as **Lily**. Since **Lily** is a flower, we should look for another type of flower.

Analyzing the Options

Let's evaluate the given options:

- **Option 1: Lotus** – A **Lotus** is also a specific type of aquatic flowering plant. It shares the same category (flower) as **Lily** and represents a comparable specific example.
- **Option 2: Flower** – '**Flower**' is the general category to which **Lily** belongs. The analogy is between specific types (**Teak**, **Pine**), not between a specific type and its general category.
- **Option 3: Tree** – A **Tree** is a plant, but **Lily** is not a tree. This option does not match the category relationship.
- **Option 4: Garden** – A **Garden** is a place where plants grow. It is not a type of plant or flower itself.

Final Answer Determination

The relationship between **Teak** and **Pine** is that they are both specific types of **trees**. The correct option should provide another specific type related to **Lily**. Among the choices, **Lotus** is the most fitting because it is also a specific type of flower, mirroring the relationship between **Teak** and **Pine** (specific types of trees).

Therefore, the analogy **Teak : Pine :: Lily : Lotus** holds true, as both pairs represent specific examples within the same plant category (trees and flowers, respectively).

96. Answer: a

Explanation:

This question involves a coding-decoding problem where we need to find the rule used to transform words into a coded format and then apply it to a new word.

Coding Pattern Analysis for HONEY and LIVER

We are given two examples: 1. 'HONEY' is coded as 'XCKKC'. 2. 'LIVER' is coded as 'QCSEG'. We need to find the code for 'FLOWER'.

Let's analyze the relationship between the letters of the original words and their corresponding coded words. We can represent the letters by their position in the English alphabet (A=1, B=2, ..., Z=26).

Analyzing Example 1: HONEY → XCKKC

Let's consider reversing the word 'HONEY' first.

- Reverse of 'HONEY' is 'YENOH'.

Now let's compare 'YENOH' with the code 'XCKKC' position by position:

- Y (position 25) becomes X (position 24). The change is $24 - 25 = -1$.
- E (position 5) becomes C (position 3). The change is $3 - 5 = -2$.

- N (position 14) becomes K (position 11). The change is $11 - 14 = -3$.
- O (position 15) becomes K (position 11). The change is $11 - 15 = -4$.
- H (position 8) becomes C (position 3). The change is $3 - 8 = -5$.

The pattern observed here is that after reversing the word, each letter is shifted backward by a decreasing amount: -1, -2, -3, -4, -5.

Analyzing Example 2: LIVER → QCSEG

Let's apply the same suspected pattern to the second example 'LIVER'.

- Reverse of 'LIVER' is 'REVIL'.

Now let's compare 'REVIL' with the code 'QCSEG' position by position:

- R (position 18) becomes Q (position 17). The change is $17 - 18 = -1$.
- E (position 5) becomes C (position 3). The change is $3 - 5 = -2$.
- V (position 22) becomes S (position 19). The change is $19 - 22 = -3$.
- I (position 9) becomes E (position 5). The change is $5 - 9 = -4$.
- L (position 12) becomes G (position 7). The change is $7 - 12 = -5$.

The pattern holds true for the second example as well. The rule is confirmed: Reverse the word and then apply sequential backward shifts starting from -1.

Logic Revealed: Word Reversal and Sequential Shifts

The coding scheme involves two main steps:

1. **Word Reversal:** The original word is written in reverse order.
2. **Sequential Letter Shift:** Each letter in the reversed word is shifted backward in the alphabet. The shift value increases by 1 for each subsequent letter, starting with a shift of -1.

Specifically, for a word of length n , the shifts applied to the reversed letters are $-1, -2, -3, \dots, -n$. We need to handle wrapping around the alphabet if the shift results in a position less than 1 (e.g., position 0 corresponds to 'Z', position -1 corresponds to 'Y', etc., or using the formula $(\text{position} + 26)$).

FLOWER Coding: Step-by-Step Application

Now, let's apply the confirmed pattern to the word 'FLOWER'.

1. **Reverse the word 'FLOWER':** The reverse of 'FLOWER' is 'REWOLF'. This word has 6 letters.
2. **Apply sequential backward shifts:** We need to apply shifts -1, -2, -3, -4, -5, and -6 to the letters of 'REWOLF'.

Let's perform the calculation for each letter:

- R (position 18): Apply shift -1. Calculation: $18 - 1 = 17$. The 17th letter is 'Q'.
- E (position 5): Apply shift -2. Calculation: $5 - 2 = 3$. The 3rd letter is 'C'.
- W (position 23): Apply shift -3. Calculation: $23 - 3 = 20$. The 20th letter is 'T'.
- O (position 15): Apply shift -4. Calculation: $15 - 4 = 11$. The 11th letter is 'K'.
- L (position 12): Apply shift -5. Calculation: $12 - 5 = 7$. The 7th letter is 'G'.
- F (position 6): Apply shift -6. Calculation: $6 - 6 = 0$. Since position 0 wraps around to the end of the alphabet, the 0th position corresponds to 'Z' (which is the 26th letter).

Result: The Coded Word for FLOWER

Combining the resulting letters, we get the coded word 'QCTKGZ'.

Comparing this result with the given options:

- Option 1: QCTKGZ
- Option 2: QCTLGZ
- Option 3: QBTKGZ
- Option 4: QBTOGZ

Our derived code 'QCTKGZ' matches Option 1.

97. Answer: d

Explanation:

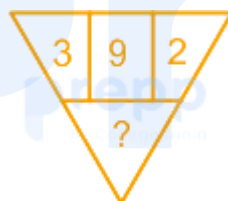
The logic followed here is:



$$\Rightarrow \frac{4 \times 7}{4} = 7$$



$$\Rightarrow \frac{6 \times 2}{3} = 4$$



$$\Rightarrow \frac{9 \times 2}{3} = 6$$

Hence, the correct answer is "option (4)".

98. Answer: a

Explanation:

★ Hint

If exact figure is not shown in options, mark the most appropriate option present.

On observing the given figure carefully, we get:

In the question figure (X),

1. One dot is in the common area of the triangle and rectangle.
2. One dot is in the common area of the arrow and rectangle.
3. One dot is in the common area of the star and triangle.

Figure (A) → Common area of the star and triangle isn't present.

Figure (B) → Common area of the triangle and rectangle isn't present.

Figure (C) → All the required conditions are fulfilled as shown below:



Figure (D) → Common area of the triangle and rectangle isn't present.

Hence, the correct answer is "Figure (C)".



Important Point

We should not think of the exact shape and size of the figures in these questions.

Just resemblance will work like if an Equilateral triangle is given in the question figure, any shape of the triangle in the answer figure will work, be it right triangle or scalene triangle.

99. Answer: b

Explanation:

The pattern followed is,

Triangle changes its position in a clockwise direction in each step.

Circle changes its position in an anticlockwise direction in each step.

The direction of one arrow changes in each figure from the right side.



Hence, option (2) is the correct answer.

100. Answer: a

Explanation:

Rearranging Jumbled Letters to Find the Odd Word

The task is to unscramble the jumbled letters given in each option to form a meaningful word. Once we have the correct words, we need to identify which one is the 'odd one out' based on its meaning or type.

Unscrambling the Jumbled Letter Sets

Let's unscramble each option:

- REABTH can be rearranged to form the word **BREATH**.
- YALP can be rearranged to form the word **PLAY**.
- GINS can be rearranged to form the word **SING**.
- TEIRW can be rearranged to form the word **WRITE**.

Identifying the Pattern: Word Types

We now examine the type of each unscrambled word:

- **PLAY:** This is typically a verb, indicating an action.
- **SING:** This is also a verb, representing an action.
- **WRITE:** This is another verb, describing an action.
- **BREATH:** This word is most commonly used as a noun, referring to the air taken into or expelled from the lungs. While 'to breath' exists as a verb, the noun form is standard and distinct from the other actions listed.

Finding the Odd One Out

By comparing the words:

- PLAY, SING, and WRITE are all verbs that describe actions.
- BREATH is a noun.

Therefore, the word **BREATH**, formed from the jumbled letters **REABTH**, is the odd one out because it belongs to a different grammatical category (noun) compared to the others (verbs).

Summary of Rearranged Words

Here's a summary table:

Jumbled Letters	Meaningful Word	Category
REABTH	BREATH	Noun
YALP	PLAY	Verb
GINs	SING	Verb
TEIRW	WRITE	Verb

The analysis clearly shows that **REABTH** leads to the odd word out.