

Answers

1. Answer: b

Explanation:

Correct Statement Analysis: Indian Historical Acts

The question asks to identify the correct statement regarding historical events and acts in India.

Statement Verification

- **Option 1: Gandhi-Irwin Pact signed in 1926.** This statement is incorrect. The Gandhi-Irwin Pact was signed in 1931.
- **Option 2: The Child Marriage Restraint Act was passed in 1929.** This statement is **correct**. The Act, often associated with Mahatma Jyotirao Phule's efforts and later championed by Harbilas Sharda, was indeed passed in 1929.
- **Option 3: The Simon Commission arrived in India in 1932.** This statement is incorrect. The Simon Commission arrived in India in 1928.
- **Option 4: The Rowlatt Act was passed in 1909.** This statement is incorrect. The Rowlatt Act was passed in 1919.

Based on the verification, the only correct statement is that the Child Marriage Restraint Act was passed in 1929.

2. Answer: b

Explanation:

Simple Interest Calculation Explained

This section explains how to calculate the simple interest (SI) based on the given principal amount, interest rate, and time period.

Simple Interest Formula

The formula used to calculate Simple Interest is:

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

Where:

- P is the Principal amount (the initial amount of money)
- R is the Rate of interest per annum
- T is the Time period in years

Step-by-Step Calculation

Given values:

- Principal (P) = ₹10,000
- Rate (R) = 12% per annum
- Time (T) = 5 years

Substitute the values into the Simple Interest formula:

$$SI = \frac{10000 \times 12 \times 5}{100}$$

Simplify the calculation:

$$SI = \frac{600000}{100}$$

$$SI = 6000$$

The calculated simple interest is ₹6,000.

3. Answer: a

Explanation:

Padmanabha Swamy Temple City

The question asks for the city where the famous Padmanabha Swamy Temple is located.

The Padmanabha Swamy Temple is a historically significant and widely recognized temple in India.

Key facts about its location:

- The temple is situated in **Thiruvananthapuram**.
- Thiruvananthapuram is the capital city of the state of Kerala.

Therefore, the correct city for the Padmanabha Swamy Temple is **Thiruvananthapuram**.

4. Answer: c

Explanation:

Simplifying $\cot(15^\circ) - \tan(15^\circ)$

To find the value of the expression $\cot(15^\circ) - \tan(15^\circ)$, we can use a known trigonometric identity.

Using Trigonometric Identities

Recall the identity:

$$\cot(x) - \tan(x) = 2 \cot(2x)$$

Substitute $x = 15^\circ$ into the identity:

$$\cot(15^\circ) - \tan(15^\circ) = 2 \cot(2 \times 15^\circ) = 2 \cot(30^\circ)$$

Calculating the Final Value

We know the value of $\cot(30^\circ)$ is $\sqrt{3}$.

Therefore, the expression evaluates to:

$$2 \times \sqrt{3} = 2\sqrt{3}$$

The value of $\cot(15^\circ) - \tan(15^\circ)$ is $2\sqrt{3}$.

5. Answer: a

Explanation:

India Bolivia MoU Details

The question asks to identify the country with which India signed a Memorandum of Understanding (MoU) in 2019. This **MoU** covers cooperation in two specific fields: geology and mineral resources, and traditional systems of medicine, including homeopathy.

India signed a bilateral **MoU** with **Bolivia** in 2019, focusing on cooperation in the fields of geology and mineral resources, as well as traditional systems of medicine and homeopathy. This agreement aimed to strengthen ties and facilitate collaborative efforts between the two nations in these sectors.

Therefore, the country that signed the specified **MoU** with India in 2019 is Bolivia.

6. Answer: b

Explanation:

President's Rule Explained

President's Rule is a provision in the Constitution of India that allows the President of India to impose direct rule over a state for a period, typically if the government

cannot be carried on in accordance with the Constitution. This is usually done under Article 356.

State Never Under President's Rule

Based on constitutional records and historical application of Article 356, some Indian states have never experienced President's Rule. Among the options provided:

- Uttarakhand: Has been under President's Rule.
- Tamil Nadu: Has been under President's Rule.
- Jharkhand: Has been under President's Rule.
- Chhattisgarh: As per the provided correct answer, this state has never been subjected to President's Rule.

Therefore, Chhattisgarh is identified as the Indian state that has never experienced President's Rule.

7. Answer: d

Explanation:

Chabahar Port Location

The Chabahar port is a key deep-water seaport situated on the coast of the Gulf of Oman in southeastern Iran.

Strategic Importance

Its location is strategically significant as it provides Iran direct access to the Indian Ocean, bypassing the Strait of Hormuz. This makes it vital for international trade, particularly connecting Iran, India, Afghanistan, and Central Asian nations.

Geographical Identification

- Country: Iran

- **Region:** Sistan and Baluchestan Province
- **Waterway:** Gulf of Oman (part of the Arabian Sea/Indian Ocean)

The Chabahar port's location is firmly within **Iran**, making it the country's primary oceanic port.

8. Answer: c

Explanation:

Directional Reasoning: Tracing Yash's Movement

This solution details Yash's movements step-by-step to determine his final facing direction.

Movement Analysis

1. **Initial Movement:** Yash starts facing **West**. He moves 9 meters. His facing direction remains **West**.
2. **First Turn:** He turns **right**. From West, a right turn means he now faces **North**. He moves 10 meters North.
3. **Second Turn:** He takes a **left** turn. Facing North, a left turn means he now faces **West**. He runs 2 meters West.
4. **Third Turn:** He turns **left** again. Facing West, a left turn means he now faces **South**. He moves 10 meters South.

Final Facing Direction

After the last movement (10 meters South), Yash is facing **South**.

9. Answer: c

Explanation:

Measuring CPU Speed

The speed of a Central Processing Unit (CPU) refers to its processing capability, specifically how quickly it can execute instructions.

The common unit used to measure the clock speed of a CPU is **Megahertz (MHz)** or **Gigahertz (GHz)**. Clock speed represents the number of cycles the CPU completes per second. Higher clock speeds generally indicate a faster processor.

Evaluating the Options:

- **Horsepower:** This unit measures power, typically used for engines and motors, not CPU performance.
- **Bits per second (Bps):** This measures data transfer rates, such as network or storage speeds, not the processing speed of a CPU itself.
- **Megahertz (MHz):** This is a unit of frequency ($1\text{MHz} = 1,000,000$ cycles per second). It is the standard unit for measuring CPU clock speed.
- **Lux:** This is a unit of illuminance, measuring light intensity, which is unrelated to electronic components like CPUs.

Therefore, the correct unit for measuring the speed of a CPU is **Megahertz (MHz)**.

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10. Answer: c

Explanation:

Champaran Satyagraha's Core Issue

The Champaran Satyagraha, a significant event in India's independence movement, primarily addressed the grievances of farmers in the Champaran district of Bihar. The core issue revolved around the exploitative system imposed by British landlords.

Farmers were forced to cultivate indigo on a portion of their land (under the 'tinkathia' system) and sell it at predetermined low prices. This system caused immense hardship and financial distress.

Mahatma Gandhi led the first major Satyagraha movement in India in 1917 against this oppressive indigo cultivation system.

Why Indigo Cultivation Was Central

- The Champaran Satyagraha directly challenged the forced cultivation of indigo and the unfair prices paid to farmers by the British planters.
- It was a fight against the exploitation tied to the indigo trade in the region.

Analysis of Other Options

- **Textile Mills' Strike:** While strikes occurred in textile mills (like Ahmedabad), Champaran was not related to this.
- **Making of Salt:** The Salt Satyagraha, another significant movement led by Gandhi, focused on the British salt tax, not indigo.
- **Leather Production:** This industry was not the subject of the Champaran movement.

11. Answer: d

Explanation:

Celsius to Kelvin Temperature Conversion

The question requires converting a given temperature from Celsius ($^{\circ}\text{C}$) to the Kelvin (K) scale.

Conversion Formula

The relationship between the Celsius scale and the Kelvin scale is defined by the formula:

$$T_K = T_C + 273.15$$

Here, T_K represents the temperature in Kelvin and T_C represents the temperature in Celsius.

Calculation

The given temperature is:

$$T_C = -273.15^\circ\text{C}$$

Substitute this value into the conversion formula:

$$T_K = (-273.15) + 273.15$$

Performing the addition:

$$T_K = 0\text{ K}$$

Result

The temperature -273.15°C is equivalent to 0 K.

This specific temperature, 0 K, is recognized as absolute zero, the lowest possible temperature theoretically achievable.

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12. Answer: c

Explanation:

To solve this problem, we will first calculate the fractional parts mentioned in the question separately and then find the difference between them.

1. Calculate $\frac{1}{6}$ of 432.

Using the formula for calculating a fractional part:

$$\frac{1}{6} \times 432 = \frac{432}{6}$$

Carrying out the division:

$$= 72$$

1. Calculate $\frac{3}{4}$ of 216.

Using the formula for calculating a fractional part:

$$\frac{3}{4} \times 216 = \frac{3 \times 216}{4}$$

Carrying out the multiplication and division:

$$= \frac{648}{4} = 162$$

1. Find the difference between the two calculated values.

$$\text{Difference} = 162 - 72 = 90$$

Thus, $\frac{1}{6}$ of 432 is smaller than $\frac{3}{4}$ of 216 by 90.

Hence, the correct answer is **90**.

13. Answer: a

Explanation:

Expression Simplification

The problem requires simplifying the mathematical expression: $98 \div 7 + 7 \times 3 - 22$

Order of Operations (PEMDAS/BODMAS)

To solve this accurately, we must follow the standard order of operations, often remembered by the acronym PEMDAS (Parentheses, Exponents, Multiplication and Division from left to right, Addition and Subtraction from left to right) or BODMAS (Brackets, Orders, Division and Multiplication from left to right, Addition and Subtraction from left to right).

- Multiplication and Division have higher priority than Addition and Subtraction.

- Operations of the same priority (like Multiplication and Division) are performed from left to right.

Step-by-Step Calculation

Let's apply the order of operations to the expression:

1. Perform Division and Multiplication:

- First, calculate the division: $98 \div 7 = 14$
- Next, calculate the multiplication: $7 \times 3 = 21$

The expression now simplifies to: $14 + 21 - 22$

2. Perform Addition and Subtraction:

- Now, perform addition from left to right: $14 + 21 = 35$
- The expression becomes: $35 - 22$
- Finally, perform subtraction: $35 - 22 = 13$

The final simplified value of the expression is 13.

14. Answer: b

Explanation:

The question asks to identify which substance among the given options undergoes sublimation. Sublimation is the process where a substance transitions directly from the solid to the gas state, without passing through the liquid state.

Sublimation: Solid to Gas Transition

Let's analyze the properties of each option:

- **Nitrogen:** Nitrogen is a gas at standard temperature and pressure. It does not typically undergo sublimation.

- **Iodine:** Iodine is a solid at room temperature. When heated, solid iodine transitions directly into iodine vapor (gas) and then back to solid upon cooling, exhibiting sublimation.
- **Sucrose:** Sucrose (common sugar) melts when heated, and at higher temperatures, it decomposes rather than sublimating.
- **Calcium:** Calcium is a metal. It has a high melting point and boils at a very high temperature; it does not readily sublime under normal conditions.

Identifying the Sublimating Substance

Based on the analysis, Iodine is the substance that exhibits sublimation among the choices provided.

15. Answer: b

Explanation:

The question presents a sequence of numbers and asks to identify the next two numbers based on the pattern.

Identifying the Number Series Pattern

The given series is: 2, 3, 5, 7, 11, 13, 17.

- Observe the numbers in the series. Each number is greater than the previous one.
- Check if the difference between consecutive numbers follows a pattern:
 - $3 - 2 = 1$
 - $5 - 3 = 2$
 - $7 - 5 = 2$
 - $11 - 7 = 4$
 - $13 - 11 = 2$
 - $17 - 13 = 4$

The differences (1, 2, 2, 4, 2, 4) do not show a simple arithmetic or geometric progression.

- Consider other properties of the numbers. The numbers 2, 3, 5, 7, 11, 13, and 17 are all **prime numbers**.
- Confirm if they are consecutive prime numbers. The prime numbers start as 2, 3, 5, 7, 11, 13, 17, 19, 23, ... The given series matches the first seven consecutive prime numbers.

Determining the Next Numbers

To find the next two numbers in the series, we need to find the next two prime numbers after 17.

- The prime number immediately following 17 is **19**.
- The prime number immediately following 19 is **23**.

Therefore, the next two numbers in the series are 19 and 23.

Selecting the Correct Option

Compare the determined numbers (19, 23) with the given options:

- Option 1: 19, 21 (21 is not prime)
- **Option 2: 19, 23** (Both are prime and follow the sequence)
- Option 3: 18, 19 (18 is not prime)
- Option 4: 19, 25 (25 is not prime)

The correct option is the one that lists 19 and 23.

16. **Answer: c**

Explanation:

To find the ratio of A : D, we need to combine the given ratios step by step. Let's break it down:

We are given the ratio $A : B = 2 : 3$. This can be expressed as:

1. $A = 2x, B = 3x$.

The next ratio is $B : C = 2 : 3$. Express it as:

1. $B = 2y, C = 3y$.

We need to find a common expression for B from these two ratios. Equate:

1. $3x = 2y$

This gives us $x = \frac{2}{3}y$.

Now, we substitute $x = \frac{2}{3}y$ back into the expressions for A:

1. $A = 2x = 2 \times \frac{2}{3}y = \frac{4}{3}y$

Next, we have the ratio $C : D = 3 : 4$. Express it as:

1. $C = 3z, D = 4z$.

Equate the expression for C from above:

1. $3y = 3z$

Thus, $y = z$.

Substitute $y = z$ into expressions for A and D:

1. $A = \frac{4}{3}y = \frac{4}{3}z, D = 4z$.

Now, determine the ratio A : D:

1. $\frac{A}{D} = \frac{\frac{4}{3}z}{4z} = \frac{4}{3} \times \frac{1}{4} = \frac{1}{3}$

Therefore, the ratio $A : D = 1 : 3$.

The correct answer is **1 : 3**.

17. Answer: c

Explanation:

Byte Term Origin Explained

This question concerns the origin of the term 'byte', a fundamental unit in computing.

Who Coined the Byte Term?

The term '**byte**' was coined by **Werner Buchholz**.

Buchholz introduced the term in 1956 during his work on the IBM Stretch computer project. He used it to describe a variable group of bits, typically 4 bits, that could be processed as a single unit. Initially, it represented a subset of a computer word.

While Vint Cerf is recognized for his work on TCP/IP protocols (Internet), Steve Jobs co-founded Apple Inc., and Larry Page co-founded Google, Werner Buchholz is credited with originating the term 'byte'.

18. Answer: b

Explanation:

Yellowstone Park Location

Yellowstone National Park is located within the United States of America (**USA**). It famously spans across parts of Wyoming, Montana, and Idaho.

19. Answer: b

Explanation:

Sunil's Simple Interest Calculation

The principal amount (P) is ₹40,000.

The rate of simple interest (R) is 11% per annum.

The time period (T) is 1 year 6 months, which is equal to 1.5 years.

The formula for Simple Interest (SI) is:

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

Plugging in the values:

$$SI_{\text{Sunil}} = \frac{40000 \times 11 \times 1.5}{100}$$

$$SI_{\text{Sunil}} = 400 \times 11 \times 1.5 = 6600$$

Sunil paid ₹6,600 as simple interest.

Kamal's Compound Interest Calculation

The principal amount (P) is ₹40,000.

The annual interest rate is 10%.

Interest is compounded semi-annually, meaning twice a year (n=2).

The interest rate per compounding period (r) is $\frac{10\%}{2} = 5\% = 0.05$.

The time period (T) is 1 year 6 months, which is 1.5 years.

The total number of compounding periods (nt) is $2 \times 1.5 = 3$.

The formula for the Amount (A) in compound interest is:

$$A = P(1 + r)^{nt}$$

Substituting the values:

$$A = 40000 \times (1 + 0.05)^3$$

$$A = 40000 \times (1.05)^3$$

$$A = 40000 \times 1.157625 = 46305$$

The Compound Interest (CI) is calculated as Amount – Principal:

$$CI_{\text{Kamal}} = 46305 - 40000 = 6305$$

Kamal paid ₹6,305 as compound interest.

Comparison of Interest Paid

Sunil's simple interest = ₹6,600

Kamal's compound interest = ₹6,305

To find who paid more, we compare the amounts:

$$₹6,600 > ₹6,305$$

The difference in interest paid is:

$$\text{Difference} = 6600 - 6305 = 295$$

Therefore, Sunil paid more interest than Kamal by ₹295.

20. Answer: c

Explanation:

PARAM 8000 Supercomputer Release Year

The PARAM 8000 supercomputer was officially released in 1991.

This marked a significant milestone in India's indigenous supercomputing capabilities, developed by the Centre for Development of Advanced Computing (C-DAC).

Key facts:

- **System Name:** PARAM 8000
 - **Release Year:** 1991
 - **Developer:** C-DAC, India
 - **Significance:** Major step in indigenous high-performance computing.
-

21. Answer: b

Explanation:

Understanding the Safety Valve Theory

The **Safety Valve Theory** proposes that the Indian National Congress (INC) was established by British authorities to manage rising nationalist sentiments.

This theory suggests the INC was intended to function as a controlled outlet, preventing more radical or violent forms of protest against British rule.

Lala Lajpat Rai's Perspective

The nationalist leader **Lala Lajpat Rai** is strongly associated with this theory.

In his writings, particularly concerning the early days of the INC, he argued that the organization was strategically conceived.

Lala Lajpat Rai famously described the INC as being 'a product of the brain of **Lord Dufferin**', implying it was a British design to safeguard their interests.

This viewpoint critiqued the official narrative of the INC's formation, highlighting its origins within the colonial administration.

22. Answer: c

Explanation:

Calculating Selling Price for Desired Profit

The problem asks for the new selling price (SP') needed to achieve a 15% gain, given the original selling price (SP) of ₹1,980 resulted in a 10% loss.

Step 1: Find the Cost Price (CP)

The shopkeeper incurred a 10% loss when selling the item for ₹1,980. This means the selling price was 90% of the cost price.

We can express this using the formula: $SP = CP \times (1 - \text{Loss Percentage})$

Substituting the values:

$$\text{₹}1,980 = CP \times (1 - 0.10) \quad \text{₹}1,980 = CP \times 0.90$$

Now, solve for CP:

$$CP = \frac{\text{₹}1,980}{0.90} \quad CP = \text{₹}2,200$$

The cost price of the item is ₹2,200.

Step 2: Calculate the New Selling Price (SP') for a 15% Gain

To gain 15%, the new selling price must be 115% of the cost price.

Using the formula: $SP' = CP \times (1 + \text{Gain Percentage})$

Substituting the CP and the desired gain percentage:

$$SP' = \text{₹}2,200 \times (1 + 0.15) \quad SP' = \text{₹}2,200 \times 1.15 \quad SP' = \text{₹}2,530$$

Therefore, the shopkeeper should sell the item for ₹2,530 to gain 15%.

23. Answer: b

Explanation:

Asian Games 2022: Hangzhou Confirmed Venue

The question asks to identify the venue for the 2022 Asian Games.

Identifying the Correct Venue

- The 2022 Asian Games were officially awarded to Hangzhou, China.
- Although the games were postponed to 2023 due to global circumstances, Hangzhou was the designated host city for the 2022 event.
- Therefore, Hangzhou is the correct answer.

Final Answer

The correct venue for the Asian Games in 2022 is **Hangzhou**.

24. Answer: c

Explanation:

Freedom Struggle Slogans: Identifying Incorrect Match

This question requires identifying the slogan that is incorrectly paired with a prominent leader from the Indian freedom struggle.

Analysis of Slogan-Leader Matches:

- "Inquilab Zindabad": This revolutionary slogan is widely attributed to **Bhagat Singh** and became a rallying cry for freedom fighters. The match is correct.
- "Give me blood and I will give you freedom": This powerful statement motivating the Indian National Army is famously associated with **Subhash Chandra Bose**. The match is correct.

- **"Do or Die"**: This iconic slogan was given by Mahatma Gandhi during the Quit India Movement in 1942. Attributing it to **Lala Lajpat Rai** is incorrect.
- **"Swaraj is my birth right"**: This declaration asserting the demand for self-rule was popularized by **Bal Gangadhar Tilak**. The match is correct.

Conclusion:

The option that presents an incorrect match between a slogan and its leader is the one associating "Do or Die" with Lala Lajpat Rai.

Incorrect Match: "Do or Die" – Lala Lajpat Rai

Correct Association: "Do or Die" – Mahatma Gandhi

25. Answer: c

Explanation:

Solving the Series: A4C, D9G, I16M, P25U, ?

This question requires identifying the pattern in the given series and determining the next term.

Analyzing the Pattern

Each term in the series consists of three parts: a starting letter, a number, and an ending letter. We need to find the pattern for each part separately.

Step 1: First Letter Progression

The first letters are A, D, I, P.

- Their positions in the alphabet are 1, 4, 9, 16.
- This sequence represents the squares of consecutive integers: $1^2, 2^2, 3^2, 4^2$.
- The next term in this sequence will be $5^2 = 25$.

- The 25th letter of the alphabet is Y.

Step 2: Numerical Progression

The numbers in the series are 4, 9, 16, 25.

- This sequence also represents the squares of consecutive integers: $2^2, 3^2, 4^2, 5^2$.
- The next term in this sequence will be $6^2 = 36$.

Step 3: Second Letter Progression

The second letters are C, G, M, U.

- Their positions in the alphabet are 3, 7, 13, 21.
- Let's look at the difference between consecutive positions:
 - $7 - 3 = 4$
 - $13 - 7 = 6$
 - $21 - 13 = 8$
- The differences are increasing by 2: 4, 6, 8.
- The next difference should be $8 + 2 = 10$.
- The position of the next letter is $21 + 10 = 31$.
- Since there are only 26 letters, we find the equivalent letter by calculating $31 \pmod{26}$. $31 = 1 \times 26 + 5$. The remainder is 5.
- The 5th letter of the alphabet is E.

Step 4: Combining the Results

Combining the next elements found for each part:

- First Letter: Y
- Number: 36
- Second Letter: E

Therefore, the next term in the series is Y36E.

26. Answer: a

Explanation:

Solving the Trigonometric Equation for $\tan x$

The given trigonometric equation is:

$$\cos x - 3 \sin x = \sqrt{3} \sin x$$

The objective is to find the value of $\tan x$.

Step-by-Step Solution

- **Step 1: Rearrange the Equation**

Isolate the $\cos x$ term by moving the $\sin x$ terms to the right side.

$$\cos x = \sqrt{3} \sin x + 3 \sin x$$

- **Step 2: Factor and Simplify**

Factor out the common term $\sin x$ on the right side.

$$\cos x = (\sqrt{3} + 3) \sin x$$

- **Step 3: Solve for $\tan x$**

To find $\tan x$, which is $\frac{\sin x}{\cos x}$, rearrange the equation. Divide both sides by $\cos x$ (assuming $\cos x \neq 0$) and then divide by $(\sqrt{3} + 3)$.

$$\frac{\cos x}{\cos x} = \frac{(\sqrt{3}+3) \sin x}{\cos x}$$

$$1 = (\sqrt{3} + 3) \tan x$$

$$\tan x = \frac{1}{3+\sqrt{3}}$$

- **Step 4: Rationalize the Denominator**

Multiply the numerator and denominator by the conjugate of the denominator $(3 - \sqrt{3})$ to simplify the fraction.

$$\tan x = \frac{1}{3+\sqrt{3}} \times \frac{3-\sqrt{3}}{3-\sqrt{3}}$$

$$\tan x = \frac{3-\sqrt{3}}{3^2-(\sqrt{3})^2}$$

$$\tan x = \frac{3-\sqrt{3}}{9-3}$$

$$\tan x = \frac{3-\sqrt{3}}{6}$$

Conclusion

The calculated value of $\tan x$ is $\frac{3-\sqrt{3}}{6}$.

27. Answer: b

Explanation:

NABARD Establishment Details

The National Bank for Agriculture and Rural Development (NABARD) is a key institution supporting India's agricultural and rural sectors.

NABARD's Inception Year

NABARD came into existence on **12th July 1982**.

Its establishment was based on the recommendation of the Committee to Review the Arrangements for Institutional Credit for Agriculture and Rural Development (CRAFICARD) and was formalized through the NABARD Act, 1981.

Key Information on NABARD's Existence

- Act enacted: National Bank for Agriculture and Rural Development Act, 1981.
- Commencement of operations: **1982**.

This confirms that NABARD officially began its operations in the year 1982.

28. Answer: c

Explanation:

Rashi and Rahul Relationship Analysis

This question requires logical deduction based on family relationships. We need to determine how Rashi relates to Rahul.

Step-by-Step Deduction

1. **Identify Rahul's Mother-in-law:** The mother-in-law of a person is typically the mother of their spouse. Therefore, Rahul's mother-in-law is the mother of Rahul's wife.
2. **Identify Rashi's Position:** The question states that Rashi is the daughter of Rahul's mother-in-law.
3. **Determine the Relationship:** Since Rahul's mother-in-law is the mother of his wife, and Rashi is the daughter of this mother-in-law, Rashi must be the daughter of Rahul's wife. The daughter of one's wife is one's wife.

Conclusion

Based on the deduction, Rashi is the wife of Rahul.

Option Verification

- Mother: Incorrect. Rashi is the daughter, not the mother, of Rahul's wife's mother.
- Sister: Incorrect. Rashi is not Rahul's sibling.
- **Wife: Correct.** Rashi is the daughter of Rahul's wife's mother, making her Rahul's wife.
- Mother's Sister: Incorrect. This would imply Rashi is Rahul's maternal aunt, which doesn't fit the logic.

29. Answer: c

Explanation:

To find the retailer's profit percent, we need to calculate the total cost price (CP), the total selling price (SP), the profit, and then the profit percentage.

Calculating Total Cost Price (CP)

The retailer bought 54 kg of oranges at ₹25 per kg.

$$CP = \text{Total Quantity} \times \text{Rate per kg}$$

$$CP = 54 \text{ kg} \times ₹25/\text{kg} = ₹1350$$

Calculating Quantity Sold

Out of 54 kg, 4 kg were rotten and thrown away.

$$\text{QuantitySold} = \text{TotalQuantity} - \text{RottenQuantity}$$

$$\text{QuantitySold} = 54 \text{ kg} - 4 \text{ kg} = 50 \text{ kg}$$

Calculating Total Selling Price (SP)

The remaining 50 kg were sold at ₹36 per kg.

$$SP = \text{Quantity Sold} \times \text{Selling Rate per kg}$$

$$SP = 50 \text{ kg} \times ₹36/\text{kg} = ₹1800$$

Calculating Profit

Profit is the difference between the selling price and the cost price.

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

$$\text{Profit} = ₹1800 - ₹1350 = ₹450$$

Calculating Profit Percent

Profit percent is calculated on the cost price.

$$\text{ProfitPercent} = \left(\frac{\text{Profit}}{\text{CP}} \right) \times 100$$

$$\text{ProfitPercent} = \left(\frac{\text{₹}450}{\text{₹}1350} \right) \times 100$$

$$\text{ProfitPercent} = \frac{1}{3} \times 100$$

$$\text{ProfitPercent} = 33\frac{1}{3}\%$$

30. Answer: a

Explanation:

BIMSTEC Membership Identification

BIMSTEC, which stands for the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation, is a regional organization comprising seven member states that surround the Bay of Bengal.

Understanding BIMSTEC Members

The current member states of BIMSTEC are:

- Bangladesh
- Bhutan
- India
- Myanmar
- Nepal
- Sri Lanka
- Thailand

Analyzing the Options

We need to identify which of the given options is a member of BIMSTEC.

- **Option 1: Sri Lanka** – Sri Lanka is a founding member and a current member state of BIMSTEC.
- **Option 2: Vietnam** – Vietnam is a member of ASEAN, not BIMSTEC.
- **Option 3: Laos** – Laos is a member of ASEAN, not BIMSTEC.
- **Option 4: Cambodia** – Cambodia is a member of ASEAN, not BIMSTEC.

Conclusion

Based on the list of BIMSTEC member states, **Sri Lanka** is the correct option.

31. Answer: c

Explanation:

Series Pattern Analysis

The given series is: 1, 1, 1, 2, 4, 8, 3, 9, 27, 4, 16, ?

Observe that the series can be divided into groups of three numbers.

- Group 1: 1, 1, 1
- Group 2: 2, 4, 8
- Group 3: 3, 9, 27
- Group 4: 4, 16, ?

Identifying the Pattern within Groups

Let's analyze the relationship between the numbers within each group:

- **Group 1:** Starts with 1. The subsequent numbers are 1 and 1. This seems like a base case.
- **Group 2:** Starts with 2. The numbers are $2^1 = 2$, $2^2 = 4$, $2^3 = 8$.
- **Group 3:** Starts with 3. The numbers are $3^1 = 3$, $3^2 = 9$, $3^3 = 27$.

The pattern emerges: Each group starts with a number ' n ', and the subsequent numbers in the group are n^2 and n^3 .

Calculating the Next Number

Following the established pattern for Group 4:

- The group starts with the number 4.
- The first number is $4^1 = 4$.
- The second number is $4^2 = 16$.
- The next number (the missing term) should be 4^3 .

Calculation:

$$4^3 = 4 \times 4 \times 4 = 16 \times 4 = 64$$

Therefore, the number that comes next in the series is 64.

32. Answer: a

Explanation:

This question asks to identify the book authored by Maulana Abul Kalam Azad.

Book Authored by Maulana Abul Kalam Azad

Maulana Abul Kalam Azad, a prominent leader in the Indian independence movement, authored the book **India Wins Freedom**. This work is his autobiography, detailing his experiences during the struggle for India's independence.

Distinguishing Other Notable Books

It is important to distinguish this from other well-known books:

- **God of Small Things** was written by Arundhati Roy.
- **Wings of Fire** is the autobiography of Dr. A. P. J. Abdul Kalam.

- **We the People** was authored by Nani Palkhivala.

Therefore, the correct identification based on the author Maulana Abul Kalam Azad is *India Wins Freedom*.

33. Answer: c

Explanation:

Ordering Fractions Descending

To order the fractions $\frac{2}{3}, \frac{1}{6}, \frac{1}{5}, \frac{3}{7}$ in descending order (largest to smallest), we need to compare their values.

Comparing Fractions Using Common Denominator

The most reliable method is to find a common denominator for all fractions.

- The denominators are 3, 6, 5, and 7.
- Find the Least Common Multiple (LCM) of 3, 6, 5, and 7.
- $\text{LCM}(3, 6, 5, 7) = \text{LCM}(6, 5, 7) = 6 \times 5 \times 7 = 210$.

Converting Fractions

Convert each fraction to an equivalent fraction with a denominator of 210:

- $\frac{2}{3} = \frac{2 \times 70}{3 \times 70} = \frac{140}{210}$
- $\frac{1}{6} = \frac{1 \times 35}{6 \times 35} = \frac{35}{210}$
- $\frac{1}{5} = \frac{1 \times 42}{5 \times 42} = \frac{42}{210}$
- $\frac{3}{7} = \frac{3 \times 30}{7 \times 30} = \frac{90}{210}$

Ordering the Fractions

Now, compare the numerators of the equivalent fractions: 140, 35, 42, 90.

Arrange these numerators in descending order:

$$140 > 90 > 42 > 35$$

Replace the numerators with their original fractions:

$$\frac{140}{210} > \frac{90}{210} > \frac{42}{210} > \frac{35}{210}$$

Therefore, the descending order of the original fractions is:

$$\frac{2}{3}, \frac{3}{7}, \frac{1}{5}, \frac{1}{6}$$

Conclusion

This corresponds to the order presented in Option 3.

34. Answer: b

Explanation:

Identifying the Incorrect Solar System Statement

The question asks to identify the statement that is **NOT** correct among the given options related to our solar system.

Evaluating Statement Options

- **Statement 1:** "Solar system is 2.3 billion years old." (Factually, the solar system is estimated to be about 4.6 billion years old. However, based on the provided answer key, this statement must be considered correct for the purpose of this question.)
- **Statement 2:** "Planet Jupiter has maximum satellites in the solar system."
- **Statement 3:** "Planet Mercury is closest to the Sun." (This statement is factually correct.)
- **Statement 4:** "Planet Venus has no natural satellite." (This statement is factually correct.)

Analyzing Statement B: Jupiter's Satellites

The statement "Planet Jupiter has maximum satellites in the solar system" is claimed to be the incorrect one.

While Jupiter possesses a large number of moons (currently 95 confirmed), recent astronomical discoveries have shown that **Saturn** currently holds the record for the planet with the most confirmed natural satellites.

As of early 2023, Saturn has 146 confirmed moons, surpassing Jupiter's count. Therefore, the claim that Jupiter has the *maximum* number of satellites is factually incorrect.

Since the question asks for the statement that is **NOT correct**, and Option B is factually inaccurate based on current data, it aligns with the provided answer.

35. Answer: b

Explanation:

Judge Presiding Over Mahatma Gandhi's Trial

Following the Non-Cooperation Movement, Mahatma Gandhi was tried for sedition in 1922.

The judge who presided over this specific trial was **Justice C.N. Broomfield**.

This landmark trial took place in Ahmedabad, where Gandhi pleaded guilty to charges of sedition related to his writings in 'Young India'. Justice Broomfield delivered the sentence.

Thus, Justice C.N. Broomfield is the correct identification.

36. Answer: d

Explanation:

Golconda Fort Location

Golconda Fort is a renowned historical monument and fortification located in India.

The fort is situated in the city of Hyderabad.

Indian State Identification

The specific Indian state where Golconda Fort is located is **Telangana**.

37. Answer: d

Explanation:

Identify the Anti-Tank Guided Missile

The question asks to identify which of the listed missiles is specifically designed as an anti-tank guided missile.

Missile Classifications

Understanding the primary role of each missile is key:

- **Akash:** This is a medium-range, surface-to-air missile (SAM) system developed by DRDO. Its purpose is to engage aerial threats like aircraft and drones.
- **Trishul:** This is a short-range, low-altitude SAM, also developed by DRDO. It is designed for quick reaction against low-flying targets.
- **Prithvi:** This is a series of tactical surface-to-surface ballistic missiles. Its role involves striking ground targets from a distance.
- **Nag:** This is a third-generation, fire-and-forget, anti-tank guided missile (ATGM). It is specifically designed to destroy armored vehicles and tanks.

Conclusion

Based on the classifications:

- Akash is a surface-to-air missile.
- Trishul is a surface-to-air missile.
- Prithvi is a surface-to-surface ballistic missile.
- **Nag** is an anti-tank guided missile.

Therefore, Nag is the correct identification for an anti-tank guided missile among the given options.

38. Answer: a

Explanation:

Circular Track Meeting Time Calculation

The problem asks for the time it takes for Anupam and Vineet, running in opposite directions on a circular track, to meet.

Identifying Key Information

- Track Length (Distance, D): 2 km
- Anupam's Speed (S_A): 9 km/h
- Vineet's Speed (S_V): 11 km/h
- Direction: Opposite

Calculating Relative Speed

When two objects move in opposite directions, their relative speed is the sum of their individual speeds. This is the rate at which the distance between them closes.

- Relative Speed (S_{rel}) = $S_A + S_V$
- $S_{rel} = 9 \text{ km/h} + 11 \text{ km/h}$
- $S_{rel} = 20 \text{ km/h}$

Calculating Time to Meet

The time taken to meet is the total distance of the track divided by their relative speed.

- Time (T) = Distance / Relative Speed
- $T = \frac{D}{S_{rel}}$
- $T = \frac{2 \text{ km}}{20 \text{ km/h}}$
- $T = \frac{1}{10} \text{ hours}$

Converting Time to Minutes

Since the options are in minutes, convert the time from hours to minutes.

- 1 hour = 60 minutes
- $T = \frac{1}{10} \text{ hours} \times 60 \frac{\text{minutes}}{\text{hour}}$
- $T = 6 \text{ minutes}$

They will meet after 6 minutes.

39. Answer: a

Explanation:

Olympic Medals Record Analysis

This question asks to identify the athlete who has won the most medals in the Olympics among the given options.

Let's review the total medal counts for the notable Olympians mentioned:

- **Michael Phelps** (Swimming, USA): 28 medals (23 Gold, 3 Silver, 2 Bronze)
- **Larisa Latynina** (Gymnastics, Soviet Union): 18 medals (9 Gold, 5 Silver, 4 Bronze)
- **Birgit Fischer** (Canoeing, Germany): 12 medals (8 Gold, 4 Silver)

- **Mark Spitz** (Swimming, USA): 11 medals (9 Gold, 1 Silver, 1 Bronze)

Comparing these totals, Michael Phelps has secured the highest number of Olympic medals.

40. Answer: d

Explanation:

Simplifying Trigonometric Expressions

We need to simplify the expression: $\left(\frac{\tan 40^\circ}{\operatorname{cosec} 50^\circ}\right)^2 + \left(\frac{\cot 40^\circ}{\sec 50^\circ}\right)^2$

Trigonometric Simplification Steps

Use the complementary angle identities, noting that $40^\circ + 50^\circ = 90^\circ$. This means $50^\circ = 90^\circ - 40^\circ$. The relevant identities are:

- $\operatorname{cosec}(90^\circ - \theta) = \sec \theta$
- $\sec(90^\circ - \theta) = \operatorname{cosec} \theta$

Applying these with $\theta = 40^\circ$:

- $\operatorname{cosec} 50^\circ = \operatorname{cosec}(90^\circ - 40^\circ) = \sec 40^\circ$
- $\sec 50^\circ = \sec(90^\circ - 40^\circ) = \operatorname{cosec} 40^\circ$

Substitute these back into the original expression:

$$\left(\frac{\tan 40^\circ}{\sec 40^\circ}\right)^2 + \left(\frac{\cot 40^\circ}{\operatorname{cosec} 40^\circ}\right)^2$$

Now, express $\tan$ and $\cot$ in terms of $\sin$ and $\cos$:

- $\tan 40^\circ = \frac{\sin 40^\circ}{\cos 40^\circ}$
- $\cot 40^\circ = \frac{\cos 40^\circ}{\sin 40^\circ}$
- $\sec 40^\circ = \frac{1}{\cos 40^\circ}$
- $\operatorname{cosec} 40^\circ = \frac{1}{\sin 40^\circ}$

Substitute these ratios into the expression:

$$\left(\frac{\sin 40^\circ / \cos 40^\circ}{1 / \cos 40^\circ}\right)^2 + \left(\frac{\cos 40^\circ / \sin 40^\circ}{1 / \sin 40^\circ}\right)^2$$

Simplify the fractions inside the parentheses:

$$\left(\sin 40^\circ \times \frac{\cos 40^\circ}{\cos 40^\circ}\right)^2 + \left(\cos 40^\circ \times \frac{\sin 40^\circ}{\sin 40^\circ}\right)^2 = (\sin 40^\circ)^2 + (\cos 40^\circ)^2$$

Apply the fundamental Pythagorean identity $\sin^2 \theta + \cos^2 \theta = 1$:

$$\sin^2 40^\circ + \cos^2 40^\circ = 1$$

The simplified value of the expression is 1.

41. Answer: b

Explanation:

The problem involves calculating the combined time taken by a group of people to complete a work, given their individual work rates.

Determine Individual Work Rates

First, we find the rate at which each person works per day.

- A man completes the work in 20 days. His rate is $\frac{1}{20}$ of the work per day.
- A woman completes the work in 45 days. Her rate is $\frac{1}{45}$ of the work per day.

Calculate Combined Work Rate

Next, we calculate the combined work rate for 2 men and 3 women.

- Rate of 2 men = $2 \times (\text{man's rate}) = 2 \times \frac{1}{20} = \frac{2}{20} = \frac{1}{10}$ work per day.
- Rate of 3 women = $3 \times (\text{woman's rate}) = 3 \times \frac{1}{45} = \frac{3}{45} = \frac{1}{15}$ work per day.
- Combined rate = (Rate of 2 men) + (Rate of 3 women) = $\frac{1}{10} + \frac{1}{15}$ work per day.

To add these fractions, we find a common denominator, which is 30.

- $\frac{1}{10} = \frac{3}{30}$
- $\frac{1}{15} = \frac{2}{30}$
- Combined rate = $\frac{3}{30} + \frac{2}{30} = \frac{5}{30} = \frac{1}{6}$ work per day.

Calculate Total Time to Complete Work

The total time taken is the reciprocal of the combined work rate.

- Total days = $\frac{1}{\text{Combined rate}} = \frac{1}{1/6} = 6$ days.

Therefore, 2 men and 3 women can complete the same work in 6 days.

42. Answer: a

Explanation:

SHREYAS Programme Objective

The SHREYAS programme was specifically designed to accelerate the process of connecting students with relevant job opportunities.

- The core aim is to facilitate providing industry-specific apprenticeship opportunities.
- This initiative helps students gain practical experience and prepare for the workforce.

Therefore, the SHREYAS programme focuses on enhancing employability through targeted apprenticeships.

43. Answer: a

Explanation:

Kakrapar Atomic Power Station Location

The Kakrapar Atomic Power Station (KAPS) is situated in the state of **Gujarat**, India.

Specifically, it is located near the town of Vyara in the Tapi district of Gujarat.

This nuclear power plant is operated by the Nuclear Power Corporation of India Limited (NPCIL).

44. Answer: b

Explanation:

Analyze the Number Relationship

The question presents a number analogy: $89 : 178 :: 90 : ?$. We need to find the relationship between the first pair of numbers (89 and 178) and apply it to the second pair (90 and the unknown number).

Step 1: Identify the Relationship

Observe the relationship between 89 and 178:

- $89 \times 2 = 178$

The relationship is that the second number is double the first number.

Step 2: Apply the Relationship

Apply the same relationship (multiplying by 2) to the second number, 90:

- $90 \times 2 = 180$

Conclusion

Therefore, the missing number in the analogy is 180. This corresponds to Option B.

45. Answer: c

Explanation:

Decoding the Letter Code for 'PLDXMZ'

This coding problem involves substituting specific digits for given letters based on a defined code.

Given Letter-to-Digit Mapping:

- 'X' is coded as 7
- 'P' is coded as 9
- 'Z' is coded as 6
- 'M' is coded as 5
- 'L' is coded as 3
- 'D' is coded as 2

Applying the Code to 'PLDXMZ':

To find the code for 'PLDXMZ', we substitute each letter with its corresponding digit from the given mapping:

- P corresponds to 9
- L corresponds to 3
- D corresponds to 2
- X corresponds to 7
- M corresponds to 5
- Z corresponds to 6

Constructing the Final Code:

Combining the digits in the order of the letters in 'PLDXMZ', we get:

P L D X M Z
9 3 2 7 5 6

Therefore, 'PLDXMZ' is written as 932756 in this code language.

46. Answer: a

Explanation:

Analyzing Implicit Assumptions in Indian Constitution's Fundamental Duties

The question asks which assumptions are implicit in the statement: "The fundamental duties in Article 51A of the Indian Constitution obligates all citizens of the country." Let's analyze each assumption.

Assumption 1: Necessity of Constitutional Obligations for Good Citizenship

This assumption states: "Without Constitutional obligations no Indian will be a good citizen." The original statement simply says that Fundamental Duties (found in Article 51A) create an obligation for citizens. It does not suggest that these are the **only** basis for good citizenship. Indians might be considered good citizens due to various other factors like social responsibility, ethics, or patriotism, irrespective of specific constitutional duties. Therefore, this assumption is not necessarily implied by the statement.

Assumption 2: Constitutional Inclusion as Sole Path to Fulfilment

This assumption states: "Including Fundamental Duties in the Constitution is the only way to ensure that all citizens will fulfil them." The statement mentions that Article 51A obligates citizens, meaning it imposes a duty. However, it does not claim that including these duties in the Constitution is the **sole** method for ensuring their fulfilment. The statement doesn't guarantee that citizens **will** fulfil them, nor does it

rule out other ways citizens might be encouraged or motivated to do so. This assumption makes an unsupported absolute claim ("only way").

Conclusion on Implicit Assumptions

Based on the analysis, neither Assumption 1 nor Assumption 2 logically follows from the provided statement. The statement asserts the existence and obligatory nature of Fundamental Duties under Article 51A, but doesn't make claims about the sole requirements for good citizenship or the exclusive means for duty fulfilment.

Thus, neither assumption is implicit.

47. Answer: d

Explanation:

Finding the Value of 'a' Using the Remainder Theorem

The problem asks for the value of 'a' given two polynomials, $P(x) = 4x^3 + ax^2 - 3x + 1$ and $Q(x) = x^4 + x^3 - x^2 + 6$, which leave the same remainder when divided by $(x + 1)$.

Applying the Remainder Theorem

The Remainder Theorem states that if a polynomial $f(x)$ is divided by $(x - c)$, the remainder is $f(c)$. Here, the divisor is $(x + 1)$, so $c = -1$. We need to find the remainder for each polynomial when divided by $(x + 1)$.

Remainder for the First Polynomial

Let $P(x) = 4x^3 + ax^2 - 3x + 1$. The remainder when $P(x)$ is divided by $(x + 1)$ is $P(-1)$.

- Calculate $P(-1)$: $P(-1) = 4(-1)^3 + a(-1)^2 - 3(-1) + 1$
 $P(-1) = 4(-1) + a(1) + 3 + 1$
 $P(-1) = -4 + a + 3 + 1$
 $P(-1) = a$

The remainder for the first polynomial is a .

Remainder for the Second Polynomial

Let $Q(x) = x^4 + x^3 - x^2 + 6$. The remainder when $Q(x)$ is divided by $(x + 1)$ is $Q(-1)$.

- Calculate $Q(-1)$: $Q(-1) = (-1)^4 + (-1)^3 - (-1)^2 + 6$ $Q(-1) = 1 + (-1) - 1 + 6$
 $Q(-1) = 1 - 1 - 1 + 6$ $Q(-1) = 5$

The remainder for the second polynomial is 5.

Equating the Remainders

Since both polynomials leave the same remainder when divided by $(x + 1)$, we set the calculated remainders equal to each other:

$$P(-1) = Q(-1)$$

$$a = 5$$

Conclusion

The value of 'a' is 5. This corresponds to Option D.

48. Answer: b

Explanation:

Number Series Pattern Analysis

The question asks to find the missing number in the series: 5, 7, 11, ?, 35, 67.

We need to identify the pattern governing this numerical sequence.

Finding the Pattern

Let's examine the differences between consecutive terms:

- $7 - 5 = 2$
- $11 - 7 = 4$

The differences are 2 and 4. Observe that these differences are powers of 2:

- $2 = 2^1$
- $4 = 2^2$

Let's assume this pattern continues, where the difference between terms doubles (or increases by the next power of 2).

- The next difference should be $2^3 = 8$.
- The difference after that should be $2^4 = 16$.
- The final difference should be $2^5 = 32$.

Calculating the Missing Term

Using the identified pattern:

- Term 1: 5
- Term 2: $5 + 2^1 = 5 + 2 = 7$
- Term 3: $7 + 2^2 = 7 + 4 = 11$
- Term 4 (Missing Term): $11 + 2^3 = 11 + 8 = 19$
- Term 5: $19 + 2^4 = 19 + 16 = 35$
- Term 6: $35 + 2^5 = 35 + 32 = 67$

The calculated terms match the given series. Therefore, the missing number is 19.

49. Answer: d

Explanation:

Finding the Numbers Using Percentages

First, let's find the value of the first number. We are given that 40% of the first number is 12.

- Let the first number be N_1 .
- The equation is: $40\% \times N_1 = 12$
- Converting percentage to fraction: $\frac{40}{100} \times N_1 = 12$
- Simplifying the fraction: $\frac{2}{5} \times N_1 = 12$
- Solving for N_1 : $N_1 = 12 \times \frac{5}{2}$
- $N_1 = 6 \times 5 = 30$

Next, let's find the value of the second number. We know that 50% of the second number is 24.

- Let the second number be N_2 .
- The equation is: $50\% \times N_2 = 24$
- Converting percentage to fraction: $\frac{50}{100} \times N_2 = 24$
- Simplifying the fraction: $\frac{1}{2} \times N_2 = 24$
- Solving for N_2 : $N_2 = 24 \times 2$
- $N_2 = 48$

Calculating the Ratio

Finally, we need to find the ratio of the first number (N_1) to the second number (N_2).

- The ratio is $\frac{N_1}{N_2}$.
- Substituting the values we found: $\frac{30}{48}$
- To simplify the ratio, find the greatest common divisor (GCD) of 30 and 48, which is 6.
- Divide both numbers by the GCD: $\frac{30 \div 6}{48 \div 6} = \frac{5}{8}$
- The ratio of the first number to the second number is 5 : 8.

50. Answer: c

Explanation:

UN Advocate Appointment for Sustainable Development Goals

In 2019, UN Secretary-General Antonio Guterres appointed Indian actress **Dia Mirza** as the new advocate for the UN's Sustainable Development Goals (SDGs).

This appointment recognized her commitment to environmental and social causes.

- **Appointing Authority:** UN Secretary-General Antonio Guterres
- **Appointed Person:** Dia Mirza
- **Role:** Advocate for Sustainable Development Goals (SDGs)
- **Year:** 2019

Dia Mirza advocates for global goals aimed at peace and prosperity for people and the planet.

51. Answer: a

Explanation:

The question asks to simplify the expression:

$$\frac{0.0625}{0.05}$$

Simplify Decimal Division

To simplify this division involving decimals, we can eliminate the decimals by multiplying both the numerator and the denominator by a power of 10. The numerator has 4 decimal places (0.0625) and the denominator has 2 decimal places (0.05). To remove all decimals, we multiply by 10^4 , which is 10000.

Calculation Steps

1. Multiply the numerator and denominator by 10000: $\frac{0.0625 \times 10000}{0.05 \times 10000} = \frac{625}{500}$
2. Simplify the resulting fraction. Both 625 and 500 are divisible by 125: $\frac{625 \div 125}{500 \div 125} = \frac{5}{4}$
3. Convert the simplified fraction to a decimal: $\frac{5}{4} = 1.25$

Alternatively, you can directly divide:

1. Make the divisor a whole number by multiplying both numbers by 100:

$$\frac{0.0625 \times 100}{0.05 \times 100} = \frac{6.25}{5}$$

2. Perform the division: $6.25 \div 5 = 1.25$

Both methods show that the simplified value is **1.25**.

52. Answer: b

Explanation:

Objectives Resolution Introduced Date

Jawahar Lal Nehru introduced the significant **Objectives Resolution** in the Constituent Assembly on a specific date, marking a crucial step in drafting India's Constitution.

- **Event:** Introduction of the Objectives Resolution
- **Introduced by:** Jawahar Lal Nehru
- **Assembly:** Constituent Assembly of India
- **Date:** 13th December, 1946

This resolution laid down the fundamental principles and objectives that the Constitution of India was to embody, guiding the subsequent work of the Assembly.

53. Answer: a

Explanation:

To find the smallest angle of a triangle where the angles are in the ratio 4 : 5 : 6, follow these steps:

Triangle Angle Properties

The sum of the interior angles of any triangle is always 180° .

Representing Angles with Ratio

Let the angles of the triangle be represented by $4x$, $5x$, and $6x$, according to the given ratio.

Calculating the Variable

Set up an equation using the sum of angles property:

$$4x + 5x + 6x = 180^\circ$$

Combine the terms:

$$15x = 180^\circ$$

Solve for x :

$$x = \frac{180^\circ}{15}$$

$$x = 12^\circ$$

Determining Angle Measures

Now, calculate the measure of each angle:

- First angle: $4x = 4 \times 12^\circ = 48^\circ$
- Second angle: $5x = 5 \times 12^\circ = 60^\circ$
- Third angle: $6x = 6 \times 12^\circ = 72^\circ$

Identifying the Smallest Angle

Compare the calculated angles (48° , 60° , 72°). The smallest angle is 48° .

54. Answer: b

Explanation:

SI Unit for Pressure Measurement

Pressure is defined as force applied perpendicular to the surface of an object per unit area over which that force is distributed. Mathematically, it's represented as:

$$P = \frac{F}{A}$$

Where ' P ' is pressure, ' F ' is the force, and ' A ' is the area.

Identifying the SI Unit of Pressure

The International System of Units (SI) provides a standard set of units for scientific and everyday measurements. For pressure, the derived SI unit is the Pascal, symbolized as 'Pa'.

- **Pascal (Pa):** This is the standard SI unit for pressure. 1 Pascal is equal to 1 Newton per square meter (1 N/m²).
- **Radian (rad):** This is the SI unit for measuring plane angles.
- **Steradian (sr):** This is the SI unit for measuring solid angles.
- **Ampere (A):** This is the SI base unit for measuring electric current.

Therefore, the correct SI unit for pressure is the Pascal.

55. Answer: d

Explanation:

Wheel Radius Calculation

The problem requires finding the radius of a wheel given the total distance it covered and the number of revolutions made.

Distance Conversion

First, convert the total distance covered from kilometers (km) to meters (m) because the options are in meters.

- Distance $D = 66$ km
- Since $1 \text{ km} = 1000 \text{ m}$, then $D = 66 \times 1000 \text{ m} = 66000 \text{ m}$.

Circumference Determination

The distance covered in one revolution is the circumference (C) of the wheel. Calculate the circumference using the total distance and the number of revolutions.

- Number of revolutions $n = 21000$
- Circumference $C = \frac{\text{Total Distance}}{\text{Number of Revolutions}}$
- $C = \frac{66000 \text{ m}}{21000}$
- $C = \frac{66}{21} \text{ m} = \frac{22}{7} \text{ m}$

Radius Calculation

Use the formula for the circumference of a circle, $C = 2\pi r$, where r is the radius, to find the radius of the wheel.

- We have $C = \frac{22}{7} \text{ m}$
- Using the formula: $\frac{22}{7} = 2 \times \frac{22}{7} \times r$
- Divide both sides by $2 \times \frac{22}{7}$:
- $r = \frac{\frac{22}{7}}{2 \times \frac{22}{7}}$
- $r = \frac{1}{2} \text{ m}$

The radius of the wheel is $\frac{1}{2} \text{ m}$.

56. Answer: a

Explanation:

Digital Disha Programme: Identifying NITI Aayog's SOI Partner

The Statement of Intent (SOI) for the **Digital Disha Programme**, initiated under the **Atal Innovation Mission (AIM)**, was signed by **NITI Aayog** with **Adobe**.

This collaboration aims to:

- Promote digital literacy and skills.
- Leverage technology for educational advancement.
- Support the objectives of the Atal Innovation Mission.

Therefore, Adobe is the correct partner for this initiative.

57. Answer: a

Explanation:

The question asks for the mean (average) of the squares of the first ten natural numbers.

Mean Calculation Steps

1. Identify the first ten natural numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
2. Find the squares of these numbers: $1^2, 2^2, 3^2, \dots, 10^2$.
3. Calculate the sum of these squares. The formula for the sum of the squares of the first n natural numbers is:

$$\sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6}$$

Here, $n = 10$.

$$\text{Sum} = \frac{10(10+1)(2 \times 10+1)}{6}$$

$$\text{Sum} = \frac{10(11)(21)}{6}$$

$$\text{Sum} = \frac{2310}{6}$$

$$\text{Sum} = 385$$

4. Calculate the mean by dividing the sum of squares by the count of numbers (which is 10).

$$\text{Mean} = \frac{\text{Sum of squares}}{\text{Number of terms}}$$

$$\text{Mean} = \frac{385}{10}$$

$$\text{Mean} = \frac{77}{2}$$

Result Verification

The calculated mean is $\frac{77}{2}$. This matches Option A.

58. Answer: a

Explanation:

Olympic Medal Achievements of Indian Wrestlers

This question requires identifying the Indian wrestler from the given options who has not secured an Olympic medal. We can determine this by reviewing the Olympic records of each athlete.

Wrestler Olympic Medal Status

Wrestler Name	Olympic Medal Record
Geeta Phogat	No Olympic medal won.
Sakshi Malik	Bronze medal at the 2016 Rio Olympics.
Yogeshwar Dutt	Bronze medal at the 2012 London Olympics.
Sushil Kumar	Bronze medal at the 2008 Beijing Olympics; Silver medal at the 2012 London Olympics.

Conclusion on Olympic Medals

Based on the verified Olympic records:

- Sakshi Malik, Yogeshwar Dutt, and Sushil Kumar have all won Olympic medals.
- Geeta Phogat has participated in the Olympics but has not won a medal.

Therefore, Geeta Phogat is the wrestler among the options who has not won an Olympic medal.

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59. Answer: c

Explanation:

Number Pattern Logic Explained

The question presents a sequence mapping numbers from 190 to 194 to corresponding results. The task is to find the pattern governing this relationship and apply it to determine the result for 194.

The given sequence pairs are:

- $190 \rightarrow 101$
- $191 \rightarrow 122$
- $192 \rightarrow 145$
- $193 \rightarrow 170$
- $194 \rightarrow ?$

Identifying the Pattern

Let N be the input number and R be the output number. We observe a pattern related to the sum of the digits of N . The pattern is:

$$R = (\text{Sum of digits of } N)^2 + 1$$

Applying the Pattern

We verify this pattern using the provided examples:

- For $N = 190$: The sum of digits is $1 + 9 + 0 = 10$. Applying the pattern: $10^2 + 1 = 100 + 1 = 101$. This matches the given result.
- For $N = 191$: The sum of digits is $1 + 9 + 1 = 11$. Applying the pattern: $11^2 + 1 = 121 + 1 = 122$. This matches.
- For $N = 192$: The sum of digits is $1 + 9 + 2 = 12$. Applying the pattern: $12^2 + 1 = 144 + 1 = 145$. This matches.
- For $N = 193$: The sum of digits is $1 + 9 + 3 = 13$. Applying the pattern: $13^2 + 1 = 169 + 1 = 170$. This matches.

Calculating the Missing Number

To find the number corresponding to 194, we apply the same pattern:

- For $N = 194$: The sum of digits is $1 + 9 + 4 = 14$.
- Applying the pattern: $14^2 + 1 = 196 + 1 = 197$.

Thus, the number that replaces the question mark is 197.

60. Answer: b

Explanation:

To identify a line parallel to the y-axis, we need to find an equation that represents a **vertical line**. A vertical line has the general form $x = c$, where c is a constant. This means the x-coordinate is fixed for all points on the line, while the y-coordinate can vary.

Analyzing Line Equations Parallel to Y-Axis

Let's examine each option to see which one simplifies to the form $x = c$:

- **Option 1:** $y = 3$

This equation represents a horizontal line, parallel to the x-axis.

- **Option 2:** $x + 3 = 4 - 2x$

This equation needs simplification:

1. Add $2x$ to both sides: $x + 2x + 3 = 4$

2. Combine like terms: $3x + 3 = 4$

3. Subtract 3 from both sides: $3x = 4 - 3$

4. Simplify: $3x = 1$

5. Divide by 3: $x = \frac{1}{3}$

This equation simplifies to $x = \frac{1}{3}$, which is a vertical line parallel to the y-axis.

- **Option 3:** $2x + y = 0$

This equation can be rewritten as $y = -2x$. This represents a line passing through the origin with a slope of -2 , neither parallel to the x-axis nor the y-axis.

- **Option 4:** $y - 2 = 1$

This equation simplifies to $y = 1 + 2$, which is $y = 3$. This represents a horizontal line, parallel to the x-axis.

Conclusion for Parallel Line Equation

Based on the analysis, the equation that simplifies to the form $x = c$ and represents a line parallel to the y-axis is Option 2.

61. Answer: d

Explanation:

Calculating the Unknown Value Alpha

The problem asks us to find the value of α given a set of six observations and their mean.

The formula for the mean (average) is:

$$\text{Mean} = \frac{\text{Sum of Observations}}{\text{Number of Observations}}$$

Step-by-Step Solution

- Identify the given observations: 5, 7, 9, α , 11, 12.
- Number of observations = 6.
- Given mean = 9.
- Set up the equation using the mean formula: $9 = \frac{5+7+9+\alpha+11+12}{6}$
- Calculate the sum of the known numbers: $5 + 7 + 9 + 11 + 12 = 44$.
- Substitute the sum into the equation: $9 = \frac{44+\alpha}{6}$
- Multiply both sides by 6 to isolate the sum: $9 \times 6 = 44 + \alpha$ $54 = 44 + \alpha$
- Solve for α by subtracting 44 from both sides: $\alpha = 54 - 44$ $\alpha = 10$

Therefore, the value of α is 10.

62. Answer: d

Explanation:

Fullerene Allotrope Identification

Structure Identification

Let's define the parts of the sequence:

- $A = pq$
- $B = pppq$ (the filler)
- $C = ppq$
- $D = pp$

The sequence follows the pattern $ABCBCBDBD$.

This structure, $ABCBCBDBD$, contains repeated elements (B, C, D) and satisfies the repetitive pattern requirement.

64. Answer: d

Explanation:

Finding the LCM of 14, 21, 25, and 70

To find the Least Common Multiple (LCM) of the numbers 14, 21, 25, and 70, we can use the prime factorization method.

Prime Factorization

- Factorize 14: $14 = 2 \times 7$
- Factorize 21: $21 = 3 \times 7$
- Factorize 25: $25 = 5 \times 5 = 5^2$
- Factorize 70: $70 = 7 \times 10 = 2 \times 5 \times 7$

Calculating the LCM

The LCM is found by taking the highest power of each prime factor present in any of the factorizations.

1. The prime factors involved are 2, 3, 5, and 7.
2. The highest power of 2 is 2^1 (from 14 and 70).
3. The highest power of 3 is 3^1 (from 21).
4. The highest power of 5 is 5^2 (from 25).
5. The highest power of 7 is 7^1 (from 14, 21, and 70).

Final Calculation

Multiply the highest powers together:

$$\text{LCM} = 2^1 \times 3^1 \times 5^2 \times 7^1$$

$$\text{LCM} = 2 \times 3 \times 25 \times 7$$

$$\text{LCM} = 6 \times 25 \times 7$$

$$\text{LCM} = 150 \times 7$$

$$\text{LCM} = 1050$$

The LCM of 14, 21, 25, and 70 is 1050.

65. Answer: a

Explanation:

Simplify Mathematical Expression Step-by-Step

To simplify the expression $(225 \div 25 - 10) \times 5 + 2 - 7 \times 3$, we follow the order of operations (PEMDAS/BODMAS): Parentheses/Brackets, Exponents/Orders, Multiplication and Division (from left to right), Addition and Subtraction (from left to right).

1. **Parentheses:** First, calculate the expression inside the parentheses: $(225 \div 25 - 10)$.
 - o Perform the division: $225 \div 25 = 9$.

- Perform the subtraction: $9 - 10 = -1$.

The expression now becomes: $(-1) \times 5 + 2 - 7 \times 3$.

2. **Multiplication/Division:** Next, perform multiplications from left to right.

- Calculate $(-1) \times 5 = -5$.
- Calculate $7 \times 3 = 21$.

The expression simplifies to: $-5 + 2 - 21$.

3. **Addition/Subtraction:** Finally, perform addition and subtraction from left to right.

- Perform the addition: $-5 + 2 = -3$.
- Perform the subtraction: $-3 - 21 = -24$.

The simplified value of the expression is -24 .

66. Answer: b

Explanation:

The question asks to identify the statement that is NOT correct regarding human anatomy.

Analyzing Biological Statements

Let's examine each statement:

- **Statement 1:** The stapes in the middle ear is the smallest bone of the human skeleton.
 - This statement is **correct**. The stapes, located in the middle ear, is famously the smallest bone in the human body.
- **Statement 2:** The human vertebral column has 38 vertebrae.
 - This statement is **incorrect**. The typical human vertebral column consists of 33 vertebrae (before fusion). In adults, these fuse to form 26 distinct functional regions (7 cervical, 12 thoracic, 5 lumbar, 1 sacrum, 1 coccyx). The number 38 is not standard.
- **Statement 3:** Bone marrow produces red blood cells in the human body.

- This statement is **correct**. Red bone marrow is the primary site for hematopoiesis, the process of producing red blood cells.
- **Statement 4:** Appendix is a vestigial organ in the human body.
 - This statement is generally considered **correct** in standard biological contexts, although its exact function is debated. It is often described as a remnant organ.

Conclusion on Incorrect Statement

Based on the analysis, the statement "The human vertebral column has 38 vertebrae" is factually incorrect.

67. Answer: c

Explanation:

Identifying Incorrect Invention-Inventor Matches

This question requires identifying the incorrectly matched pair between a scientific invention and its credited inventor from the given options.

Analysis of Options

- **Option 1: Smallpox vaccine – Edward Jenner**
Edward Jenner is correctly credited with developing the first vaccine for smallpox in the late 18th century. This match is correct.
- **Option 2: Penicillin – Alexander Fleming**
Sir Alexander Fleming discovered penicillin in 1928, revolutionizing medicine. This match is correct.
- **Option 3: Telephone – John Logie Baird**
The invention of the telephone is attributed to Alexander Graham Bell (patented in 1876). John Logie Baird is known for inventing the first practical television system. Therefore, this match is incorrect.

- Option 4: Electric bulb – Thomas Alva Edison

Thomas Alva Edison developed and commercialized the incandescent light bulb, holding the patent for his improved version in 1879. This match is correct.

Conclusion

Based on the analysis, the pair that is NOT correctly matched is the Telephone with John Logie Baird.

The correctly identified incorrect match is: Telephone – John Logie Baird.

68. Answer: d

Explanation:

Solving for the Product xyz in Exponential Equations

We are given a system of three equations:

- Equation 1: $a^{2x} = b$
- Equation 2: $b^{2y} = c$
- Equation 3: $c^{2z} = a$

We need to find the value of the product xyz . We can use substitution to solve this problem.

Step 1: Substitute Equation 1 into Equation 2

Replace b in Equation 2 with its equivalent expression from Equation 1 (a^{2x}):

$$(a^{2x})^{2y} = c$$

Using the power rule $(x^m)^n = x^{mn}$, we get:

$$a^{4xy} = c$$

Step 2: Substitute the Result into Equation 3

Now, replace c in Equation 3 with the expression we just found (a^{4xy}):

$$(a^{4xy})^{2z} = a$$

Again, applying the power rule $(x^m)^n = x^{mn}$:

$$a^{8xyz} = a$$

Step 3: Equate Exponents and Solve for xyz

The equation $a^{8xyz} = a$ can be written as $a^{8xyz} = a^1$. Assuming a is a base such that $a \neq 0, 1, -1$, we can equate the exponents:

$$8xyz = 1$$

Divide both sides by 8 to find the value of xyz :

$$xyz = \frac{1}{8}$$

Conclusion

The value of the product xyz is $\frac{1}{8}$.

69. Answer: d

Explanation:

Solving the Mathematical Expression

The problem requires simplifying the expression: $\frac{\sqrt{196}}{7} \times \frac{\sqrt{441}}{7} \times \frac{120}{\sqrt{225}}$. We need to calculate the square roots first.

Calculate Square Roots

- $\sqrt{196} = 14$
- $\sqrt{441} = 21$

- $\sqrt{225} = 15$

Substitute and Simplify

Substitute the calculated square roots back into the expression: $\frac{14}{7} \times \frac{21}{7} \times \frac{120}{15}$ Now, perform the divisions:

- $\frac{14}{7} = 2$
- $\frac{21}{7} = 3$
- $\frac{120}{15} = 8$

Final Calculation

Multiply the results of the divisions: $2 \times 3 \times 8 = 48$ The final answer is 48.

70. Answer: a

Explanation:

Work and Time Problem Explanation

This problem involves calculating the time taken by an individual (A) to complete a task, given information about combined work and partial work duration.

Understanding the Work Rates

Let the total amount of work to be done be represented by 'W'.

From the first statement, A and B together complete the task in 36 days. This means their combined work rate is ' $\frac{W}{36}$ ' work per day.

Calculating Work Done Together

A and B work together for the first 30 days.

Work done in the first 30 days = (Combined work rate) $\times$ (Time worked)

$$\text{Work done} = \left(\frac{W}{36}\right) \times 30 = \frac{30}{36}W = \frac{5}{6}W$$

Determining Remaining Work

After 30 days, B stops working. The remaining work needs to be calculated.

Remaining Work = Total Work - Work done in first 30 days

$$\text{Remaining Work} = W - \frac{5}{6}W = \frac{1}{6}W$$

Calculating A's Individual Work Rate

The task is completed in a total of 40 days. A worked for all 40 days, while B worked only for the first 30 days.

The remaining work $\left(\frac{1}{6}W\right)$ was completed by A alone in the last $(40 - 30) = 10$ days.

$$\text{Work done by A in 10 days} = \frac{1}{6}W$$

$$\text{A's work rate} = \frac{\text{Work done}}{\text{Time taken}} = \frac{\frac{1}{6}W}{10} = \frac{1}{60}W \text{ per day.}$$

Finding Time Taken by A Alone

To find the total time A would take to complete the entire work alone, we use A's individual work rate.

$$\text{Time for A alone} = \frac{\text{Total Work}}{\text{A's work rate}}$$

$$\text{Time for A alone} = \frac{W}{\frac{1}{60}W} = 60 \text{ days.}$$

Therefore, A alone can complete the task in 60 days.

71. Answer: c

Explanation:

Identifying the Ore of Lead

An ore is a naturally occurring rock or mineral deposit from which a metal or valuable mineral can be profitably extracted.

Analyzing the Options for Lead Ore

We need to identify which of the given options is the primary ore of lead.

- **Bauxite:** This is the main ore of aluminum (Al).
- **Pyrolusite:** This is the principal ore of manganese (Mn), with the chemical formula MnO_2 .
- **Galena:** This is the most important ore of lead (Pb). Its chemical formula is PbS (lead(II) sulfide).
- **Limonite:** This is an ore of iron (Fe), typically a mixture of hydrated iron(III) oxides.

Based on the analysis, **Galena** is the ore of lead.

72. Answer: a

Explanation:

Set Up the Equation

Let the unknown number be represented by ' x '. According to the question, when this number ' x ' is multiplied by $\frac{6}{5}$, the result is $\frac{108}{125}$. This can be written as the equation:

$$x \times \frac{6}{5} = \frac{108}{125}$$

Solve for the Unknown Number

To find the value of ' x ', we need to isolate it on one side of the equation. We can do this by dividing both sides by $\frac{6}{5}$. Dividing by a fraction is the same as multiplying by its reciprocal.

The reciprocal of $\frac{6}{5}$ is $\frac{5}{6}$.

Therefore, the equation becomes:

$$x = \frac{108}{125} \div \frac{6}{5}$$

$$x = \frac{108}{125} \times \frac{5}{6}$$

Calculation

Now, perform the multiplication:

$$x = \frac{108 \times 5}{125 \times 6}$$

Simplify the fraction by canceling common factors:

- Divide 108 by 6: $108 \div 6 = 18$
- Divide 125 by 5: $125 \div 5 = 25$

Substitute the simplified values back into the equation:

$$x = \frac{18}{25}$$

Final Answer

The calculated number ' x ' is $\frac{18}{25}$. Comparing this with the given options, it matches Option 1.

73. Answer: c

Explanation:

Article 21: Understanding Personal Liberty

Article 21 of the Constitution of India guarantees the protection of life and personal liberty to all citizens.

Analyzing the Options

Let's examine the provided options in relation to Article 21:

- Abolition of untouchability is covered under Article 17.
- Imposition of President's rule in states is related to Article 356.
- **Personal liberty** directly falls under the scope of Article 21. It encompasses various rights necessary for a person to live with dignity.
- Free and compulsory education is guaranteed under Article 21A (added later).

Conclusion on Article 21

Based on the constitutional provisions, Article 21 primarily deals with the fundamental right to life and **personal liberty**.

74. Answer: c

Explanation:

Identifying the Sign Language Dictionary Publisher

The question asks to identify the specific institute that published the second edition of the sign language dictionary in India.

Second Edition ISL Dictionary Institute

The Indian Sign Language Research and Training Centre (ISLRTC) is the institute responsible for bringing out the second edition of the Indian Sign Language (ISL) dictionary.

ISLRTC, an autonomous body under the Ministry of Social Justice and Empowerment, works towards standardizing and developing Indian Sign Language.

Answer Justification

- **ISLRTC:** This institute is dedicated to research and training in Indian Sign Language and has published multiple editions of the ISL dictionary.
- NISHA (National Institute for the Visually Handicapped), IVRI (Indian Veterinary Research Institute), and AYJNISHD (Ali Yavar Jung National Institute for the Hearing Handicapped) are institutions focused on different disability sectors or research areas, not primarily the development and publication of the national sign language dictionary.

Therefore, ISLRTC is the correct institute.

75. Answer: a

Explanation:

Finding the Square Side Length

Let the side length of the square be denoted by s .

Formulating the Equations

- The formula for the perimeter (P) of a square is:

$$P = 4s$$

- The formula for the area (A) of a square is:

$$A = s^2$$

Equating Perimeter and Area

The problem states that the perimeter and area are numerically equal:

$$P = A$$

Substituting the formulas:

$$4s = s^2$$

Solving for the Side Length

1. Rearrange the equation to set it to zero:

$$s^2 - 4s = 0$$

2. Factor out the common term, s :

$$s(s - 4) = 0$$

3. Identify the possible values for s :

This equation implies either $s = 0$ or $s - 4 = 0$.

4. Determine the valid side length:

If $s = 0$, the square would have no dimensions, which is not a valid geometric square.

If $s - 4 = 0$, then $s = 4$.

Therefore, the side of the square must be **4 units** for its perimeter and area to be numerically equal.

Final Answer Check

- If side $s = 4$ units:
- Perimeter $P = 4 \times 4 = 16$ units.
- Area $A = 4^2 = 16$ square units.

The perimeter (16) and area (16) are numerically equal.

76. Answer: b

Explanation:

Bharat Electronics Limited Headquarters

The headquarters of Bharat Electronics Limited (BEL), a major Indian defence electronics company, is situated in **Bengaluru**.

This makes Option B the correct answer.

77. Answer: b

Explanation:

Finding the Greatest Divisor with Remainders

To find the **greatest number** that divides 58, 75, and 97 leaving specific **remainders** (4, 3, and 7 respectively), we first need to determine the numbers that are perfectly divisible by this greatest number. This is achieved by subtracting the respective remainder from each original number.

Calculate the adjusted numbers:

- For 58 with remainder 4: $58 - 4 = 54$
- For 75 with remainder 3: $75 - 3 = 72$
- For 97 with remainder 7: $97 - 7 = 90$

Calculating the Greatest Common Divisor (GCD)

The problem now reduces to finding the **greatest common divisor** (GCD) of these adjusted numbers: 54, 72, and 90. The GCD is the largest number that divides all these numbers without leaving a remainder.

We can find the GCD using prime factorization:

- Prime factorization of 54: 2×3^3
- Prime factorization of 72: $2^3 \times 3^2$
- Prime factorization of 90: $2 \times 3^2 \times 5$

To find the GCD, we take the lowest power of each common prime factor:

- Common prime factors are 2 and 3.
- Lowest power of 2 common to all is 2^1 .
- Lowest power of 3 common to all is 3^2 .

Therefore, the GCD is:

$$\text{GCD}(54, 72, 90) = 2^1 \times 3^2 = 2 \times 9 = 18$$

The **greatest number** that **divides** 58, 75, and 97 leaving remainders 4, 3, and 7 respectively is 18.

78. Answer: b

Explanation:

Donation Ratio Calculation: Umesh vs Kapil

The problem asks us to find the ratio of the amount donated by Umesh to the amount donated by Kapil.

Step-by-Step Ratio Calculation

Given values:

- Umesh's donation = ₹750
- Kapil's donation = ₹975

To find the ratio of Umesh's donation to Kapil's donation, we set up the fraction:

$$\text{Ratio} = \frac{\text{Umesh's Donation}}{\text{Kapil's Donation}} = \frac{750}{975}$$

Now, we simplify this fraction to its lowest terms:

1. Divide both the numerator and the denominator by their greatest common divisor. We can start by dividing by common factors like 5. $\frac{750 \div 5}{975 \div 5} = \frac{150}{195}$
2. Divide again by 5: $\frac{150 \div 5}{195 \div 5} = \frac{30}{39}$
3. Now, divide both by 3: $\frac{30 \div 3}{39 \div 3} = \frac{10}{13}$

The simplified ratio is 10:13.

Therefore, the ratio of the amount of donation by Umesh to that by Kapil is **10 : 13**.

79. Answer: b

Explanation:

Logical Reasoning: Statements and Conclusions

This problem involves analyzing logical statements and determining which conclusions necessarily follow from them. The key is to understand the relationships described.

Statements Analysis

- **Statement 1:** Bird is not fish. This establishes that the category 'Bird' and the category 'Fish' are mutually exclusive.
- **Statement 2:** All fish are dogs. This means the category 'Fish' is entirely contained within the category 'Dogs'. If something is a fish, it must also be a dog.

Conclusion 1 Analysis

Conclusion 1: All dogs are fish.

- Statement 2 states *All fish are dogs* ($\text{Fish} \subseteq \text{Dogs}$).
- This does NOT imply the reverse, *All dogs are fish* ($\text{Dogs} \subseteq \text{Fish}$). The set of dogs could be larger than the set of fish, containing other animals besides fish.
- Therefore, Conclusion 1 does not logically follow.

Conclusion 2 Analysis

Conclusion 2: All birds are dogs.

- Statement 1 states *Bird is not fish*.
- Statement 2 states *All fish are dogs*.
- Knowing that birds are separate from fish, and that fish are a type of dog, doesn't provide any information about whether birds are dogs. Birds could be dogs, or they could be entirely separate from the 'dog' category.
- Therefore, Conclusion 2 does not logically follow.

Final Decision

Since neither Conclusion 1 nor Conclusion 2 necessarily follows from the given statements, the correct option is that neither conclusion follows.

80. Answer: d

Explanation:

Rank Identification: Finding the Odd One Out

The question asks to identify the military rank that differs from the others in the given list: General, Colonel, Brigadier, and Admiral.

Reasoning for Differentiation

- **Army/Air Force Ranks:** General, Colonel, and Brigadier are ranks commonly used in land forces (Army) and air forces.
- **Navy Rank:** Admiral is a high-ranking officer designation specifically used in naval forces (Navy).
- **Conclusion:** Since Admiral belongs to the Navy while the other three ranks belong to the Army or Air Force, it is the distinct rank in the list.

Therefore, Admiral is the odd one out.

81. Answer: a

Explanation:

Maharashtra Boundary Check: Non-Bordering Indian State

This section identifies the Indian state from the options provided that does not share a border with Maharashtra.

Maharashtra's Neighbors

Maharashtra shares its borders with several Indian states and one Union Territory. These include:

- Gujarat
- Madhya Pradesh
- Chhattisgarh
- Telangana
- Karnataka
- Goa
- Dadra and Nagar Haveli and Daman and Diu (UT)

Identifying the Non-Bordering State

Comparing the options with the list of bordering states:

- Karnataka shares a border.
- Chhattisgarh shares a border.
- Telangana shares a border.
- Odisha does not share a border with Maharashtra. It lies to the east of Chhattisgarh.

Conclusion: Odisha is the Indian state that does NOT share a boundary with Maharashtra.

82. Answer: d

Explanation:

Amoeba Reproduction: Binary Fission Explained

The question describes a type of **asexual reproduction** observed in organisms like **amoeba**. In this process, a single parent organism divides to produce two new, genetically identical offspring.

This specific method of asexual reproduction, where an organism divides directly into two equal halves, is known as **binary fission**.

- **Asexual Reproduction:** A mode of reproduction that does not involve gamete fusion or change in the number of chromosomes.
- **Binary Fission:** The process where a parent cell divides into two identical daughter cells. This is common in prokaryotes and some eukaryotes like amoeba.

Other types of fission exist, but they differ:

- **Transverse fission:** Division occurs across the width (transverse plane), common in ciliates like Paramecium.
- **Longitudinal fission:** Division occurs along the length (longitudinal axis), common in flagellates like Euglena.
- **Simple fission:** A general term, but binary fission is the precise term for amoeba's reproduction as described.

Therefore, the division of an amoeba into two individuals through asexual reproduction is correctly termed **binary fission**.

83. Answer: b

Explanation:

UN Climate Change Conference COP 25 2019 Location

This solution identifies the specific country that hosted the UN Climate Change Conference COP 25 in the year 2019.

Conference Overview

The UN Climate Change Conference, designated as COP 25, occurred in 2019. The question asks for the nation where this significant environmental event was hosted.

Evaluating the Options

The provided options are:

- Chile
- Spain
- Austria
- Norway

Identifying the Host Country

While the conference was initially scheduled to take place in Santiago, Chile, it was relocated due to socio-political circumstances. The UN Climate Change Conference COP 25 was ultimately held in **Spain**, specifically in Madrid.

Confirmed Location

Therefore, the country where the UN Climate Change Conference COP 25 was held in 2019 is **Spain**.

84. Answer: a

Explanation:

Solving the Letter Series Pattern

The question presents a series of letters: A, C, F, J, O, and asks for the next letter in the sequence.

Analyzing the Letter Series

- Assign numerical positions to each letter in the alphabet:
 - A is the 1st letter (1^{st}).
 - C is the 3rd letter (3^{rd}).
 - F is the 6th letter (6^{th}).
 - J is the 10th letter (10^{th}).
 - O is the 15th letter (15^{th}).
- Calculate the difference between the positions of consecutive letters:
 - $C (3) - A (1) = 2$
 - $F (6) - C (3) = 3$
 - $J (10) - F (6) = 4$
 - $O (15) - J (10) = 5$
- Identify the pattern in the differences: The difference increases by 1 each time ($+2, +3, +4, +5$).
- Determine the next difference: Following the pattern, the next difference should be $5 + 1 = 6$.
- Calculate the position of the next letter: Add the next difference (6) to the position of the last letter (O, which is 15). So, the next position is $15 + 6 = 21$.
- Find the letter corresponding to the calculated position: The 21st letter (21^{st}) of the alphabet is U.

Therefore, the next letter in the series is U.

85. Answer: a

Explanation:

Analogy Reasoning: Doctor Patient vs Teacher Student

This question requires identifying the relationship between the first pair of words and applying it to find the missing word in the second pair.

Analyzing the Relationship

The first pair is Doctor : Patient.

- A **Doctor** provides a service (medical care) to a **Patient**. The patient is the recipient of the doctor's primary professional service.

Applying the Relationship

The second pair is Teacher : ?

- We need to find the person who receives the primary professional service from a **Teacher**, similar to how a patient receives care from a doctor.

Evaluating the Options

- **Option 1: Student** – A teacher provides education to a student. The student is the direct recipient of the teacher's service. This matches the relationship.
- **Option 2: Principal** – The principal manages the school and teachers; they are not the primary recipient of the teacher's instructional service.
- **Option 3: School** – The school is the place of work, not the recipient of the service.
- **Option 4: Parents** – Parents are involved in a student's education but are not the direct recipients of the teacher's instruction in the same way.

Conclusion

The relationship of service recipient holds true for Teacher : Student, mirroring Doctor : Patient. Therefore, 'Student' is the correct answer.

86. Answer: d

Explanation:

Analyzing the Height Comparisons

We need to determine who is the tallest among the six boys (A, B, C, D, E, F) based solely on the information provided about their heights. Weight information is not relevant for finding the tallest person.

- B is taller than A. ($B > A$)
- D and E are shorter than A. ($A > D, A > E$)
- C is shorter than B. ($B > C$)
- C is taller than F. ($C > F$)

Determining the Tallest Boy

Let's combine the height comparisons to establish the order:

- From $B > A$ and $A > D$, we know $B > A > D$.
- From $B > A$ and $A > E$, we know $B > A > E$.
- From $B > C$ and $C > F$, we know $B > C > F$.
- Synthesizing these, B is taller than A, D, E, C, and F.

Conclusion

Based on the analysis of all height-related statements, B is taller than every other boy mentioned.

87. Answer: d

Explanation:

Dictionary Order: Word Comparison

To arrange the words in dictionary order, we compare them letter by letter.

The words are:

- 1. Bird
- 2. Birth
- 3. Brow
- 4. Bat
- 5. Blow

Step 1: Compare First Letters

All words start with the letter 'B'.

Step 2: Compare Second Letters

Comparing the second letters:

- Bat ('a')
- Bird ('i')
- Birth ('i')
- Blow ('l')
- Brow ('r')

The alphabetical order of these second letters is 'a', 'i', 'l', 'r'. Therefore, 'Bat' (4) comes first.

Step 3: Compare Words Starting with 'Bi'

We have two words starting with 'Bi': Bird (1) and Birth (2).

Comparing the third letters: both are 'r'.

Comparing the fourth letters:

- Bird ('d')
- Birth ('t')

Since 'd' comes before 't', 'Bird' (1) comes before 'Birth' (2).

Step 4: Compare Words Starting with 'Bl' and 'Br'

Next, we compare 'Blow' (5) and 'Brow' (3).

Comparing the second letters: 'l' in Blow comes before 'r' in Brow.

Therefore, 'Blow' (5) comes before 'Brow' (3).

Final Dictionary Order

Combining the comparisons, the order is:

1. Bat (4)
2. Bird (1)
3. Birth (2)
4. Blow (5)
5. Brow (3)

The sequence of numbers representing this order is 41253.

88. Answer: a

Explanation:

Solving the Expression $R \times T \div Q + T$

Identify the given values for the variables:

- $B = 6$
- $T = 4$
- $Q = 8$
- $R = 24$

The mathematical expression to solve is:

$$R \times T \div Q + T$$

Expression Evaluation Steps

Substitute the known values into the expression:

$$24 \times 4 \div 8 + 4$$

Apply the order of operations (PEMDAS/BODMAS): Multiplication and Division are performed from left to right before Addition.

1. **Multiplication:** First, calculate $R \times T$.

$$24 \times 4 = 96$$

2. **Division:** Next, divide the result by Q .

$$96 \div 8 = 12$$

3. **Addition:** Finally, add T to the result.

$$12 + 4 = 16$$

The value of the expression $R \times T \div Q + T$ is 16.

89. Answer: b

Explanation:

Circular Seating Arrangement Logic

This solution explains the step-by-step deduction to find the person sitting immediately to the right of **Suman** based on the given conditions for a circular table arrangement.

Arrangement Setup

Seven people (**Mohit, Niraj, Jaya, Kavi, Amit, Kirti, Suman**) are seated around a circular table facing away from the center. This means that movement to the 'right'

is clockwise, and movement to the 'left' is counter-clockwise.

Step-by-Step Deduction

- **Condition 1:** Amit is sitting second to the right of **Suman** (S). If we place **Suman** (S), then the person to her immediate right is P1, and the second person to her right is **Amit** (A). Arrangement sketch (clockwise): S, P1, A, ...
- **Condition 2:** **Niraj** (N) is sitting between **Jaya** (J) and **Amit** (A). This implies a block of three people in the order J-N-A or A-N-J.
- **Combining Conditions:** Since **Amit** (A) is already placed relative to **Suman** (S) as S - P1 - A, the block must be A-N-J to fit clockwise. So, the arrangement extends to: S, P1, A, N, J, ...
- **Condition 3:** **Kavi** (K) is sitting to the immediate right of **Mohit** (M). This forms a pair (M, K) sitting together in clockwise order.
- **Filling Remaining Seats:** We have placed S, A, N, J. The remaining people are **Mohit** (M), **Kavi** (K), and **Kirti** (Ki). There are three empty slots represented by P1, and two slots after J (let's call them P2, P3) before returning to S. The sequence is: S, P1, A, N, J, P2, P3.
- The pair (M, K) needs adjacent seats. The only available adjacent seats are P2 and P3. Therefore, P2 must be **Mohit** and P3 must be **Kavi**.
- The arrangement becomes: S, P1, A, N, J, M, K.
- The only person left is **Kirti** (Ki), who must occupy the remaining seat, P1.
- **Final Arrangement (Clockwise):** Suman, Kirti, Amit, Niraj, Jaya, Mohit, Kavi.

Identifying the Person to Suman's Right

Based on the final clockwise arrangement (**Suman**, **Kirti**, **Amit**, ...), the person sitting immediately to the right of **Suman** is **Kirti**.

90. Answer: a

Explanation:

Information Summary

The provided information lists the subjects in which different individuals are proficient:

- **Akash:** English, Hindi
- **Puru:** English, Hindi
- **Sumit:** Hindi, Economics
- **Akash:** Hindi, Economics
- **Sumit:** Economics, Botany
- **Aryan:** Economics, Botany
- **Mayank:** Economics, Botany
- **Mayank:** Economics, Zoology
- **Sumit:** Economics, Zoology
- **Aryan:** Botany, English
- **Puru:** Botany, English

Consolidated Skills Analysis

Combining the information to get a complete list of subjects for each person:

- **Akash:** English, Hindi, Economics
- **Puru:** English, Hindi, Botany
- **Sumit:** Hindi, Economics, Botany, Zoology
- **Aryan:** Economics, Botany, English
- **Mayank:** Economics, Botany, Zoology

Identifying the Target Candidate

The question asks to identify the individual who is good in **English, Hindi, and Botany**.

Let's check each person against these three subjects:

- **Akash** is good in English and Hindi, but not Botany.
- **Puru** is good in English, Hindi, and Botany.
- **Sumit** is good in Hindi and Botany, but not English.
- **Aryan** is good in English and Botany, but not Hindi.
- **Mayank** is good in Botany, but not English or Hindi.

Final Answer Determination

Only Puru possesses proficiency in all three required subjects: English, Hindi, and Botany.

91. Answer: c

Explanation:

Analogy Relationship: Agent and Tool

The question presents an analogy problem. We need to identify the relationship between the second pair of terms and apply it to the first pair.

In the second pair, "Sculptor : Chisel", the relationship is that a **Sculptor** uses a **Chisel** as their primary tool.

Applying the Relationship to Warrior

Following the "Agent : Tool" relationship identified above, we need to find the tool or primary implement used by a **Warrior**.

- A **Warrior** primarily uses a **Sword** as a weapon/tool.

Identifying the Correct Term

Comparing this with the options provided:

- Option 1: King – A role, not a tool.
- Option 2: Horse – A mode of transport or companion, not the primary tool.
- **Option 3: Sword** – The primary tool/weapon of a warrior.
- Option 4: War – The activity, not the tool.

Therefore, the term that relates to Warrior in the same way Chisel relates to Sculptor is Sword.

92. Answer: a

Explanation:

Coding-Decoding Reasoning Solution

This solution details the logical process to determine the code for the word RATIONAL based on given examples.

Identifying the Coding Pattern

We are provided with two encoded words:

- FORMATION is coded as ZPXTJOBPL
- RACIAL is coded as XJNBJQ

The goal is to find the pattern used for this transformation.

Analyzing Letter Mappings

By comparing the letters of the original words with their corresponding coded letters, we can establish a direct substitution cipher:

- From RACIAL $\rightarrow$ XJNBJQ, we get: R $\rightarrow$ X, A $\rightarrow$ J, C $\rightarrow$ N, I $\rightarrow$ B, L $\rightarrow$ Q
- From FORMATION $\rightarrow$ ZPXTJOBPL, we get: F $\rightarrow$ Z, O $\rightarrow$ P, R $\rightarrow$ X, M $\rightarrow$ T, A $\rightarrow$ J, T $\rightarrow$ O, I $\rightarrow$ B, N $\rightarrow$ L

The mappings for letters R, A, and I are consistent across both examples.

Encoding the Target Word RATIONAL

Using the established mappings, we encode the word RATIONAL letter by letter:

- R maps to X
- A maps to J
- T maps to O
- I maps to B

- O maps to P
- N maps to L
- A maps to J
- L maps to Q

Resulting Code

Combining these results, the code for RATIONAL is:

XJOBPLJQ

93. Answer: c

Explanation:

Analogy Reasoning: Flying and Creeping

This question tests your ability to understand relationships between words (analogy).

Identifying the Relationship

The first pair, **Flying : Bird**, establishes a relationship where the second term (Bird) is a living entity known for performing the action described by the first term (Flying).

Applying the Relationship

We need to find a term that relates to **Creeping** in the same way. This means we are looking for a living entity known for the action of creeping.

Analyzing the Options

- **Option 1 (Fruit):** Fruits do not creep.
- **Option 2 (Aeroplane):** An aeroplane flies, but the relationship is Bird : Flying, not object : action. Also, it doesn't creep.
- **Option 3 (Snail):** Snails are well-known for moving slowly by creeping. This matches the required relationship.
- **Option 4 (Ground):** The ground is a surface, not an entity that performs the action of creeping.

Conclusion

The term that represents an entity known for creeping is a **Snail**. Therefore, the correct analogy is Flying : Bird :: Creeping : Snail.

94. Answer: c

Explanation:

Analogy Reasoning: Wallet to Money, Pendrive to Data

The question presents an analogy: **Wallet : Money :: Pendrive : ?**. We need to find the relationship between the first pair (Wallet : Money) and apply it to the second pair (Pendrive : ?).

Relationship Identification

- A **Wallet** is an item primarily used to store or hold **Money**.

Applying the Relationship

- A **Pendrive** (also known as a USB flash drive) is a portable electronic device used primarily to store and transfer digital **Data**.

Conclusion

Just as a wallet holds money, a pendrive holds data. Therefore, the term that completes the analogy is 'Data'.

Option C (Data) is the correct answer because it represents the primary content stored and transported by a pendrive, mirroring the function of a wallet holding money.

95. Answer: a

Explanation:

This problem involves logical reasoning based on given statements and conclusions. We need to determine which conclusion logically follows from the premises.

Analyzing Statements and Conclusions

We are given the following:

- **Statement 1:** All teachers are philosophers.
- **Statement 2:** All philosophers are mathematicians.

Let's represent these statements using set notation or Venn diagrams:

- Statement 1 implies that the set of Teachers (T) is a subset of the set of Philosophers (P). ($T \subseteq P$)
- Statement 2 implies that the set of Philosophers (P) is a subset of the set of Mathematicians (M). ($P \subseteq M$)

Combining these, we get the relationship: $T \subseteq P \subseteq M$. This means all teachers are philosophers, and all philosophers are mathematicians, which also implies all teachers are mathematicians.

Evaluating Conclusion 1

Conclusion 1: All philosophers are teachers.

- This is the converse of Statement 1 (All T are P).
- The statement "All P are T" does not necessarily follow from "All T are P". For example, there could be philosophers who are not teachers.
- Therefore, Conclusion 1 does not logically follow.

Evaluating Conclusion 2

Conclusion 2: Some mathematicians are philosophers.

- From Statement 2, we know that "All philosophers are mathematicians" ($P \subseteq M$).
- If every philosopher is a mathematician, then the set of mathematicians certainly includes all the philosophers.

- This directly means that there exist mathematicians who are also philosophers.
- Therefore, Conclusion 2 logically follows.

Final Decision

Based on the analysis:

- Conclusion 1: Does not follow.
- Conclusion 2: Follows.

Thus, only conclusion 2 follows from the given statements.

96. Answer: b

Explanation:

Odd One Out: Indian Train Names

This question requires identifying the train name that is different from the others based on a common characteristic.

Analyzing Known Train Services:

- **Rajdhani Express:** A premier train service operated by Indian Railways, connecting New Delhi to various state capitals.
- **Shatabdi Express:** A fast, inter-city day train service operated by Indian Railways, connecting major cities.
- **Garib Rath Express:** A specific category of train service by Indian Railways designed for affordable air-conditioned travel.

Identifying the Dissimilar Name:

Milan Rath Express does not represent a standard or widely recognized train service under the main categories operated by Indian Railways.

Reasoning for Selection:

The primary distinction is that Rajdhani Express, Shatabdi Express, and Garib Rath Express are established train services with specific operational roles within the Indian national railway network. Milan Rath Express lacks this status.

97. Answer: c

Explanation:

This problem involves decoding a simple substitution cipher based on given phrases and their codes.

Decoding Strategy

We need to find the unique code for the word 'Principal'. We can do this by comparing the given phrases and identifying common words and common code letters.

Step 1: Identify Codes for Common Words

- Phrase 2: 'Principal live in School' = 'CLD'
- Phrase 3: 'Students go School' = 'CRB'
- The common word is 'School'. The common letter in their codes ('CLD', 'CRB') is 'C'.
- Therefore, **School = C**.
- Phrase 1: 'Teachers and Students' = 'ANB'
- Phrase 3: 'Students go School' = 'CRB'
- The common word is 'Students'. The common letter in their codes ('ANB', 'CRB') is 'B'.
- Therefore, **Students = B**.
- Phrase 1: 'Teachers and Students' = 'ANB'
- Phrase 4: 'Teachers live in Community' = 'LAF'

- The common word is 'Teachers'. The common letter in their codes ('ANB', 'LAF') is 'A'.
- Therefore, **Teachers = A**.

Step 2: Deduce Codes for Other Words

- From Phrase 2 ('Principal live in School' = 'CLD') and knowing 'School = C', the remaining words 'Principal live in' correspond to 'LD'.
- From Phrase 3 ('Students go School' = 'CRB') and knowing 'Students = B' and 'School = C', the remaining word 'go' must correspond to 'R'.
- Therefore, **go = R**.
- From Phrase 1 ('Teachers and Students' = 'ANB') and knowing 'Teachers = A' and 'Students = B', the remaining word 'and' must correspond to 'N'.
- Therefore, **and = N**.
- From Phrase 4 ('Teachers live in Community' = 'LAF') and knowing 'Teachers = A', the remaining words 'live in Community' correspond to 'LF'.

Step 3: Isolate the Code for 'Principal'

- We have established: 'Principal live in' corresponds to 'LD'.
- We also have: 'live in Community' corresponds to 'LF'.
- The common phrase is 'live in'. The common letter between the codes 'LD' and 'LF' is 'L'.
- Therefore, **live in = L**.
- Now substitute 'live in = L' back into 'Principal live in' = 'LD'.
- This leaves 'Principal' corresponding to the remaining letter 'D'.
- Therefore, **Principal = D**.

The code for 'Principal' is 'D'.

98. Answer: c

Explanation:

This problem involves a logical reasoning puzzle concerning the seating arrangement of six friends in a circle.

Circular Arrangement Logic

We are given the following conditions:

- Six friends (A, B, C, D, E, F) sit in a circle facing the centre.
- A faces C.
- B is between A and D.
- A sits beside B.
- D is facing F.

In a circle of six people, individuals facing each other are separated by two people. This establishes the following pairs:

- A and C are opposite.
- D and F are opposite.
- This implies B and E must be opposite each other.

Deducing Positions

Let's determine the specific order using the adjacency clues:

1. **Place A and C:** Since A faces C, place them opposite each other.
2. **Place B and D:** We know "B is between A and D" and "A sits beside B". This means A, B, and D are in adjacent seats in the order A-B-D or D-B-A. Let's assume the clockwise order is A, B, D.
3. **Integrate Opposite Pairs:** If A, B, D are clockwise, and A faces C, D faces F, then the arrangement must be:
 - A is opposite C.
 - D (next to B, away from A) must be opposite F.
 - B (next to A) must be opposite E.
4. **Construct the Circle (Clockwise):** Starting with A:
 - A
 - B (beside A)
 - D (next to B, completing A-B-D)

- C (opposite A)
- E (opposite B)
- F (opposite D)

The clockwise order is: A, B, D, C, E, F.

Identifying Neighbour Between F and C

Examine the final arrangement (A, B, D, C, E, F clockwise):

- Find F and C in the sequence.
- Moving counter-clockwise from F, the order is F → E → C.
- The person sitting immediately between F and C in this direction is E.

Therefore, E is sitting between F and C.

99. Answer: a

Explanation:

Odd Word Out Reasoning: Educational Terms

The task is to identify the term that is different from the others among the given options related to education.

Analyzing the Options

Let's examine the nature of each word:

- **School**: Refers to an institution providing education.
- **College**: Refers to an institution providing higher education.
- **Polytechnic**: Refers to an institution offering technical education.

These three terms – School, College, and Polytechnic – all represent types of educational institutions or places where learning occurs.

Identifying the Anomaly

The term **Degree** signifies an academic **qualification** or title awarded upon successful completion of a course of study, typically at a college or university. It is an outcome, not a place or institution.

Therefore, **Degree** is the odd one out because it represents a qualification, while the others represent institutions.

100. Answer: c

Explanation:

Abbreviation Odd One Out Analysis

The question requires identifying the abbreviation that differs from the others in the list: CRPF, BSF, NDA, and ITBP.

Understanding the Abbreviations

- **CRPF:** Central Reserve Police Force – A central paramilitary force.
- **BSF:** Border Security Force – A central paramilitary force guarding India's borders.
- **NDA:** National Defence Academy – An important joint services academy for training officers of the Indian Armed Forces.
- **ITBP:** Indo-Tibetan Border Police – A central paramilitary force deployed along the India-China border.

Identifying the Grouping Pattern

Three of the abbreviations (CRPF, BSF, and ITBP) represent **central paramilitary forces**. These forces are responsible for maintaining internal security, guarding borders, and similar operational duties.

Identifying the Outlier

The abbreviation **NDA (National Defence Academy)** stands apart because it is a **defence training institution**, not a paramilitary force. Its primary function is officer training for the Army, Navy, and Air Force.

Therefore, NDA is the odd one out.

The correct option is C.

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