

CUET UG General Test (501) - 2025 Question Paper with Solutions

Time Allowed :1 Hour	Maximum Marks :250	Total Questions :50
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General Instructions

Read the following instructions very carefully and strictly follow them:

1. The test is of 1 hour duration.
2. The question paper consists of 50 questions. The maximum marks are 250.
3. 5 marks are awarded for every correct answer, and 1 mark is deducted for every wrong answer.

1. If 36: 84 :: 42: X, then the value of X, is:

- (A) 18
- (B) 98
- (C) 72
- (D) 48

Correct Answer: (2) 98

Solution:

Step 1: Understanding the Concept:

The given expression is a proportion. In a proportion $a : b :: c : d$, the product of the extremes (a and d) is equal to the product of the means (b and c).

So, $a \times d = b \times c$.

Step 2: Key Formula or Approach:

Given proportion: $36 : 84 :: 42 : X$.

Here, $a = 36$, $b = 84$, $c = 42$, and $d = X$.

Using the rule of proportion:

$$36 \times X = 84 \times 42$$

Step 3: Detailed Explanation:

To find the value of X, we need to solve the equation from Step 2.

$$36 \times X = 84 \times 42$$

Isolating X:

$$X = \frac{84 \times 42}{36}$$

We can simplify the fraction. We know that $42 = 6 \times 7$ and $36 = 6 \times 6$.

$$X = \frac{84 \times (6 \times 7)}{6 \times 6}$$

Cancel out a 6 from the numerator and denominator:

$$X = \frac{84 \times 7}{6}$$

Now, we can divide 84 by 6. $84 \div 6 = 14$.

$$X = 14 \times 7$$

$$X = 98$$

Step 4: Final Answer:

The value of X is 98.

Quick Tip

In proportion problems, you can also simplify the first ratio before solving. $36 : 84$ can be simplified by dividing both numbers by their greatest common divisor, which is 12. $36 \div 12 = 3$ and $84 \div 12 = 7$. So the proportion becomes $3 : 7 :: 42 : X$. Now, $3 \times X = 7 \times 42$, which gives $X = (7 \times 42)/3 = 7 \times 14 = 98$.

2. Ram purchased a watch at a cost of $\left(\frac{9}{10}\right)^{th}$ of the original cost and sold at 8% more than the original cost. His profit/loss is

- (A) 20% profit
- (B) 20% loss
- (C) 18% profit
- (D) 18% loss

Correct Answer: (1) 20% profit

Solution:

Step 1: Understanding the Concept:

This problem involves calculating the profit percentage. Profit percentage is calculated on the cost price (the price at which Ram purchased the watch), not the original cost.

Profit = Selling Price (SP) - Cost Price (CP)

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

Step 2: Key Formula or Approach:

Let the original cost of the watch be Rs. 100. This makes the calculation easier.

1. Calculate Ram's Cost Price (CP).
2. Calculate Ram's Selling Price (SP).
3. Calculate the profit.
4. Calculate the profit percentage.

Step 3: Detailed Explanation:

Let the original cost be Rs. 100.

Ram's Cost Price (CP) = $\frac{9}{10}$ of the original cost = $\frac{9}{10} \times 100 = \text{Rs. } 90$.

Ram's Selling Price (SP) = 8% more than the original cost = Original Cost + 8% of Original Cost.

$$\text{SP} = 100 + \left(\frac{8}{100} \times 100 \right) = 100 + 8 = \text{Rs. } 108.$$

Now, calculate the profit:

$$\text{Profit} = \text{SP} - \text{CP} = 108 - 90 = \text{Rs. } 18.$$

Since the result is positive, it is a profit.

Now, calculate the profit percentage:

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

$$\text{Profit \%} = \left(\frac{18}{90} \right) \times 100$$

$$\text{Profit \%} = \left(\frac{1}{5} \right) \times 100 = 20\%.$$

Step 4: Final Answer:

Ram made a 20% profit.

Quick Tip

Assuming the original cost to be 100 is a very effective strategy in percentage-based problems. Always remember that profit or loss percentage is calculated on the cost price, not the marked price or original cost.

3. Arrange the simple interest of the following cases in decreasing order-

(A) The simple interest on Rs 6600 at 5% per annum for 2 yrs.

(B) The simple interest on Rs 200 at 6% per annum for 5 yrs.

(C) The simple interest on Rs 840 at 5% per annum for 4 yrs.

(D) The simple interest on Rs 5000 at 12% per annum for 2 yrs.

Choose the correct answer from the options given below:

(A) (A), (B), (C), (D)

(B) (B), (A), (D), (C)

(C) (B), (A), (C), (D)
(D) (D), (A), (C), (B)

Correct Answer: (4) (D), (A), (C), (B)

Solution:

Step 1: Understanding the Concept:

The question requires calculating the Simple Interest (SI) for four different cases and then arranging the amounts in descending order (largest to smallest).

Step 2: Key Formula or Approach:

The formula for Simple Interest is:

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

where P is the Principal amount, R is the Rate of interest per annum, and T is the Time in years.

Step 3: Detailed Explanation:

Let's calculate the SI for each case:

Case (A): $P = 6600$, $R = 5$, $T = 2$

$$SI_A = \frac{6600 \times 5 \times 2}{100} = 66 \times 10 = \text{Rs. } 660$$

Case (B): $P = 200$, $R = 6$, $T = 5$

$$SI_B = \frac{200 \times 6 \times 5}{100} = 2 \times 30 = \text{Rs. } 60$$

Case (C): $P = 840$, $R = 5$, $T = 4$

$$SI_C = \frac{840 \times 5 \times 4}{100} = \frac{840 \times 20}{100} = 84 \times 2 = \text{Rs. } 168$$

Case (D): $P = 5000$, $R = 12$, $T = 2$

$$SI_D = \frac{5000 \times 12 \times 2}{100} = 50 \times 24 = \text{Rs. } 1200$$

Now, we compare the SI values:

$$SI_D = 1200$$

$$SI_A = 660$$

$$SI_C = 168$$

$$SI_B = 60$$

The decreasing order is $1200 > 660 > 168 > 60$, which corresponds to (D) > (A) > (C) > (B).

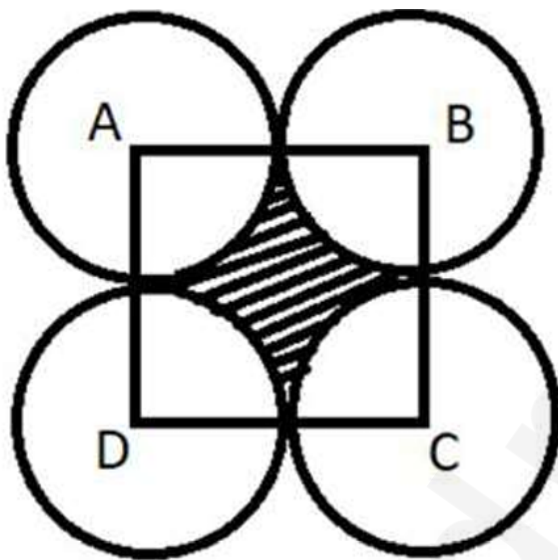
Step 4: Final Answer:

The correct decreasing order of the simple interests is (D), (A), (C), (B).

Quick Tip

For quick mental estimation, you can look at the product of R and T (interest for the whole period) or P and R. For (D), $5000 \times 12\% = 600$ per year, so 1200 for 2 years. For (A), $6600 \times 5\% = 330$ per year, so 660 for 2 years. This quick check shows that D is much larger than A, helping you eliminate incorrect options early.

4. Four circles of equal radius are drawn with centers, A, B, C and D such that ABCD is a square of side 14 cm and the circles touch externally as in the figure. The area of the shaded region bounded by the 4 circles is: (Take $\pi = \frac{22}{7}$)



- (A) 24 cm^2
- (B) 42 cm^2
- (C) 96 cm^2
- (D) 54 cm^2

Correct Answer: (2) 42 cm^2

Solution:

Step 1: Understanding the Concept:

The shaded area can be found by calculating the area of the square ABCD and subtracting the areas of the four circular sectors that are inside the square.

Step 2: Key Formula or Approach:

1. Determine the radius of the circles.

2. Calculate the area of the square.
3. Calculate the area of the four sectors inside the square.
4. Area of Shaded Region = Area of Square - Area of 4 Sectors.

Step 3: Detailed Explanation:

The side of the square ABCD is given as 14 cm. Since the circles with centers A and B (or A and D) touch externally, the side of the square is the sum of the radii of two circles.

Side of square = radius + radius = $2 \times \text{radius}$.

$$14 = 2r$$

$$r = \frac{14}{2} = 7 \text{ cm.}$$

The radius of each circle is 7 cm.

$$\text{Area of the square ABCD} = (\text{side})^2 = (14)^2 = 196 \text{ cm}^2.$$

The four sectors inside the square are at the corners. Since ABCD is a square, the angle of each corner is 90° . So, each sector has a central angle of 90° .

The sum of the angles of the four sectors is $4 \times 90^\circ = 360^\circ$, which is the angle of a complete circle.

Therefore, the combined area of the four sectors is equal to the area of one full circle with radius $r = 7$ cm.

$$\text{Area of 4 sectors} = \text{Area of one circle} = \pi r^2.$$

$$\text{Area of 4 sectors} = \frac{22}{7} \times (7)^2 = \frac{22}{7} \times 49 = 22 \times 7 = 154 \text{ cm}^2.$$

Now, calculate the area of the shaded region:

$$\text{Area of Shaded Region} = \text{Area of Square} - \text{Area of 4 Sectors}$$

$$\text{Area of Shaded Region} = 196 - 154 = 42 \text{ cm}^2.$$

Step 4: Final Answer:

The area of the shaded region is 42 cm^2 .

Quick Tip

Whenever you see a problem with four identical sectors at the corners of a square, remember that their combined area is equal to the area of one full circle with the same radius. The calculation simplifies to Area of Square - Area of Circle.

5. The distance between points A (-5, 7) and B (-1, 3) is:

- (A) 4 units
- (B) 6 units
- (C) $4\sqrt{2}$ units
- (D) 7 units

Correct Answer: (3) $4\sqrt{2}$ units

Solution:

Step 1: Understanding the Concept:

To find the distance between two points in a Cartesian coordinate system, we use the distance formula, which is derived from the Pythagorean theorem.

Step 2: Key Formula or Approach:

The distance d between two points (x_1, y_1) and (x_2, y_2) is given by the formula:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Step 3: Detailed Explanation:

Let the coordinates of point A be $(x_1, y_1) = (-5, 7)$.

Let the coordinates of point B be $(x_2, y_2) = (-1, 3)$.

Substitute these values into the distance formula:

$$d = \sqrt{(-1 - (-5))^2 + (3 - 7)^2}$$

Be careful with the double negative sign:

$$d = \sqrt{(-1 + 5)^2 + (-4)^2}$$

$$d = \sqrt{(4)^2 + (-4)^2}$$

$$d = \sqrt{16 + 16}$$

$$d = \sqrt{32}$$

To simplify the square root of 32, find the largest perfect square factor of 32. $32 = 16 \times 2$.

$$d = \sqrt{16 \times 2} = \sqrt{16} \times \sqrt{2} = 4\sqrt{2}$$

Step 4: Final Answer:

The distance between points A and B is $4\sqrt{2}$ units.

Quick Tip

When using the distance formula, be very careful with negative signs, especially when subtracting a negative coordinate. It's helpful to write out each step clearly to avoid errors, like $(-1 - (-5)) = (-1 + 5)$.

6. The marks out of 50 obtained by 100 students in a test are given below as:

Marks obtained	20	25	28	29	33	38	42	43
Number of students	6	20	24	28	15	4	2	1

Find the value of the (3 mode - 2 median).

- (A) 27.5
- (B) 31
- (C) 30
- (D) 28.8

Correct Answer: (3) 30

Solution:

Step 1: Understanding the Concept:

This problem requires finding the mode and median of a given discrete frequency distribution. Then, we need to compute the value of the expression $(3 \times \text{Mode}) - (2 \times \text{Median})$.

Step 2: Key Formula or Approach:

- Mode:** The mode is the value that appears most frequently. In a frequency distribution, it is the value with the highest frequency.
- Median:** The median is the middle value of a data set when it is arranged in order. For N observations, the median is the average of the $\left(\frac{N}{2}\right)^{th}$ and $\left(\frac{N}{2} + 1\right)^{th}$ observations when N is even. We will use a cumulative frequency table to find the median.

Step 3: Detailed Explanation:

Finding the Mode:

From the table, we look for the highest frequency (Number of students).

The frequencies are 6, 20, 24, 28, 15, 4, 2, 1.

The highest frequency is 28, which corresponds to the 'Marks obtained' of 29.

Therefore, **Mode = 29**.

Finding the Median:

The total number of students (N) is 100. Since N is even, the median is the average of the $\frac{100}{2} = 50^{th}$ and the $\frac{100}{2} + 1 = 51^{st}$ observations.

Let's create a cumulative frequency (cf) table:

Marks (x)	Frequency (f)	Cumulative Frequency (cf)
20	6	6
25	20	26
28	24	50
29	28	78
33	15	93
38	4	97
42	2	99
43	1	100

The cumulative frequency shows that the students from the 27th to the 50th position all scored 28 marks. So, the 50th observation is 28.

The students from the 51st to the 78th position all scored 29 marks. So, the 51st observation is 29.

$$\text{Median} = \frac{50^{\text{th}} \text{ observation} + 51^{\text{st}} \text{ observation}}{2} = \frac{28 + 29}{2} = \frac{57}{2} = 28.5.$$

$$\text{Median} = 28.5.$$

Calculating the final value:

$$\text{Value} = (3 \times \text{Mode}) - (2 \times \text{Median})$$

$$\text{Value} = (3 \times 29) - (2 \times 28.5)$$

$$\text{Value} = 87 - 57 = 30.$$

Step 4: Final Answer:

The value of (3 mode - 2 median) is 30.

Quick Tip

For discrete data, the mode is simply the data point with the highest frequency. To find the median for N data points, use a cumulative frequency table to locate the middle value(s). For even N, it's the average of the $(N/2)^{\text{th}}$ and $(N/2 + 1)^{\text{th}}$ values.

7. Suppose we throw a dice once. Then, which one of the following is/are correct?

(A) The probability of getting a number greater than 4 is $\frac{1}{3}$.

(B) The probability of getting a number greater than or equal to 4 is $\frac{1}{3}$.

(C) The probability of getting a number less than or equal to 3 is $\frac{1}{2}$.

(D) The probability of getting a number less than or equal to 6 is 1.

Choose the correct answer from the options given below:

(A) (A), (B) and (D) only

(B) (B), (C) and (D) only

(C) (A), (C) and (D) only

(D) (A) and (D) only

Correct Answer: (3) (A), (C) and (D) only

Solution:

Step 1: Understanding the Concept:

This problem involves calculating basic probabilities for a single roll of a standard six-sided die. The sample space (all possible outcomes) is $S = \{1, 2, 3, 4, 5, 6\}$. The total number of outcomes is 6.

Probability of an event E is given by $P(E) = \frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$.

Step 2: Key Formula or Approach:

We will evaluate the probability for each statement (A), (B), (C), and (D) and check if it is

correct.

Step 3: Detailed Explanation:

(A) The probability of getting a number greater than 4:

The numbers greater than 4 are {5, 6}. There are 2 favorable outcomes.

$P(A) = \frac{2}{6} = \frac{1}{3}$. This statement is **correct**.

(B) The probability of getting a number greater than or equal to 4:

The numbers greater than or equal to 4 are {4, 5, 6}. There are 3 favorable outcomes.

$P(B) = \frac{3}{6} = \frac{1}{2}$. The statement says the probability is $\frac{1}{3}$, so this statement is **incorrect**.

(C) The probability of getting a number less than or equal to 3:

The numbers less than or equal to 3 are {1, 2, 3}. There are 3 favorable outcomes.

$P(C) = \frac{3}{6} = \frac{1}{2}$. This statement is **correct**.

(D) The probability of getting a number less than or equal to 6:

The numbers less than or equal to 6 are {1, 2, 3, 4, 5, 6}. There are 6 favorable outcomes.

$P(D) = \frac{6}{6} = 1$. This is a certain event. This statement is **correct**.

The correct statements are (A), (C), and (D).

Step 4: Final Answer:

The correct option is the one that includes (A), (C), and (D) only.

Quick Tip

Pay close attention to the wording in probability problems, especially the difference between "greater than" and "greater than or equal to." This small difference changes the number of favorable outcomes and thus the probability.

8. Match List-I with List-II

List-I	List-II
(A) ${}^8P_3 - {}^{10}C_3$	(I) 6
(B) 8P_5	(II) 21
(C) ${}^nP_4 = 360$, then find n.	(III) 216
(D) ${}^nC_2 = 210$, find n.	(IV) 6720

Choose the correct answer from the options given below:

- (A) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
- (B) (A) - (II), (B) - (III), (C) - (IV), (D) - (I)
- (C) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)
- (D) (A) - (IV), (B) - (I), (C) - (II), (D) - (III)

Correct Answer: (3) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Solution:

Step 1: Understanding the Concept:

This question requires calculation and solving of permutations (nP_r) and combinations (nC_r).

Step 2: Key Formula or Approach:

Permutation formula: ${}^nP_r = \frac{n!}{(n-r)!} = n(n-1)(n-2)\dots(n-r+1)$

Combination formula: ${}^nC_r = \frac{n!}{r!(n-r)!} = \frac{n(n-1)\dots(n-r+1)}{r!}$

Step 3: Detailed Explanation:

(A) ${}^8P_3 - {}^{10}C_3$:

$${}^8P_3 = 8 \times 7 \times 6 = 336$$

$${}^{10}C_3 = \frac{10 \times 9 \times 8}{3 \times 2 \times 1} = 10 \times 3 \times 4 = 120$$

Value = $336 - 120 = 216$. So, **(A) matches (III)**.

(B) 8P_5 :

$${}^8P_5 = 8 \times 7 \times 6 \times 5 \times 4 = 56 \times 120 = 6720. \text{ So, (B) matches (IV).}$$

(C) ${}^nP_4 = 360$, find n :

$n(n-1)(n-2)(n-3) = 360$. We need to find four consecutive integers whose product is 360.

We can test values. Let's try $n=6$: $6 \times 5 \times 4 \times 3 = 30 \times 12 = 360$. This is correct.

So, $n = 6$. **(C) matches (I)**.

(D) ${}^nC_2 = 210$, find n :

$$\frac{n(n-1)}{2} = 210$$

$n(n-1) = 420$. We need two consecutive integers whose product is 420.

We know $20 \times 20 = 400$. Let's try $n=21$.

$$21 \times (21-1) = 21 \times 20 = 420. \text{ This is correct.}$$

So, $n = 21$. **(D) matches (II)**.

The correct matching is: (A)-(III), (B)-(IV), (C)-(I), (D)-(II).

Step 4: Final Answer:

The correct option that reflects this matching is (3).

Quick Tip

For solving equations like ${}^nP_r = k$ or ${}^nC_r = k$, instead of expanding into complex polynomials, try to estimate and test integer values. Look for consecutive numbers whose product is close to k .

9. The present age of a father is 4 years more than double the age of his son. After 10 years, the father's age is 30 years more than his son. Then the present age of father is:

- (A) 26 years
- (B) 28 years
- (C) 56 years
- (D) 60 years

Correct Answer: (3) 56 years

Solution:

Step 1: Understanding the Concept:

This is a word problem involving ages that can be solved by setting up a system of linear equations.

Step 2: Key Formula or Approach:

Let F be the present age of the father and S be the present age of the son.

Translate the given statements into two equations.

1. "The present age of a father is 4 years more than double the age of his son." $\implies F = 2S + 4$
2. "After 10 years, the father's age is 30 years more than his son."

Father's age after 10 years = $F + 10$

Son's age after 10 years = $S + 10$

$$\implies (F + 10) = (S + 10) + 30$$

Step 3: Detailed Explanation:

We have two equations:

(1) $F = 2S + 4$

(2) $F + 10 = S + 40 \implies F = S + 30$

Now we can solve this system. Since both equations are equal to F , we can set them equal to each other:

$$2S + 4 = S + 30$$

Subtract S from both sides:

$$S + 4 = 30$$

Subtract 4 from both sides:

$$S = 26$$

The son's present age is 26 years.

Now, find the father's present age using either equation. Let's use equation (2):

$$F = S + 30 = 26 + 30 = 56$$

Let's verify with equation (1):

$$F = 2S + 4 = 2(26) + 4 = 52 + 4 = 56$$

Both equations give the same result. The father's present age is 56 years.

Step 4: Final Answer:

The present age of the father is 56 years.

Quick Tip

Always define your variables clearly (e.g., F = father's **present** age). When dealing with future or past ages, remember to add or subtract the time from the present age for **both** individuals.

10. The angles of elevation of the top of a tower from two points at a distance of 5 meters and 20 meters along the same straight line from the base of the tower, are complementary. Find the height of the tower.

- (A) 10 m
- (B) 15 m
- (C) $10\sqrt{3}$ m
- (D) 20 m

Correct Answer: (1) 10 m

Solution:

Step 1: Understanding the Concept:

This is a trigonometry problem involving angles of elevation. Complementary angles are two angles that add up to 90 degrees. We can use the tangent function to relate the height of the tower to the distances and angles.

Step 2: Key Formula or Approach:

Let 'h' be the height of the tower.

Let the two points be at distances 'a' and 'b' from the base ($a=5\text{m}$, $b=20\text{m}$).

Let the angles of elevation be θ and $90^\circ - \theta$. A standard result for this setup is that the height of the tower $h = \sqrt{ab}$.

Step 3: Detailed Explanation:

Let the height of the tower be h . The two points are at distances 5 m and 20 m from the base.

Let the angle of elevation from the point at 20 m be θ .

So, $\tan(\theta) = \frac{h}{20} \quad (1)$

The angle of elevation from the point at 5 m is complementary, so it is $90^\circ - \theta$.

So, $\tan(90^\circ - \theta) = \frac{h}{5} \quad (2)$

Using the trigonometric identity $\tan(90^\circ - \theta) = \cot(\theta)$, we can rewrite equation (2):

$$\cot(\theta) = \frac{h}{5}$$

Since $\cot(\theta) = \frac{1}{\tan(\theta)}$, we can multiply the two tangent expressions:

$$\tan(\theta) \times \cot(\theta) = \left(\frac{h}{20}\right) \times \left(\frac{h}{5}\right)$$

We know that $\tan(\theta) \times \cot(\theta) = 1$.

$$1 = \frac{h^2}{100}$$

$$h^2 = 100$$

$$h = \sqrt{100} = 10$$

m (Height must be positive).

Step 4: Final Answer:

The height of the tower is 10 m.

Quick Tip

There is a direct formula for this specific problem: If the angles of elevation of the top of a tower from two points at distances 'a' and 'b' from its base are complementary, then the height of the tower 'h' is given by $h = \sqrt{ab}$. Here, $h = \sqrt{5 \times 20} = \sqrt{100} = 10$ m.

11. The base diameter of a cylinder is 21 cm and the height is 28 cm, then:

(A) Radius of cylinder = 10.5 cm

(B) Volume = 12936 cm³

(C) Curved Surface Area = 1848 cm²

(D) Total surface area = 2541 cm²

Which of the following is/ are correct?

Choose the correct answer from the options given below:

(A) (A), (B) and (D) only

(B) (A), (C) and (D) only

(C) (B), (C) and (D) only

(D) (A), (B) and (C) only

Correct Answer: (2) (A), (C) and (D) only

Solution:

Step 1: Understanding the Concept:

This question requires calculating the radius, volume, curved surface area (CSA), and total surface area (TSA) of a cylinder and verifying the given statements.

Step 2: Key Formula or Approach:

Given: Diameter (d) = 21 cm, Height (h) = 28 cm.

Radius (r) = d/2

Volume (V) = $\pi r^2 h$

Curved Surface Area (CSA) = $2\pi r h$

Total Surface Area (TSA) = $2\pi r(h + r)$

Use $\pi = \frac{22}{7}$.

Step 3: Detailed Explanation:

(A) Radius of cylinder:

Radius $r = \frac{\text{Diameter}}{2} = \frac{21}{2} = 10.5$ cm. Statement (A) is correct.

(B) Volume:

$$V = \pi r^2 h = \frac{22}{7} \times (10.5)^2 \times 28$$

$$V = \frac{22}{7} \times \left(\frac{21}{2}\right)^2 \times 28 = \frac{22}{7} \times \frac{441}{4} \times 28$$

Simplify by cancelling terms: $\left(\frac{28}{7 \times 4}\right) = 1$.

$$V = 22 \times 441 = 9702 \text{ cm}^3.$$

The statement says Volume = 12936 cm^3 . Thus, statement (B) is incorrect.

(C) Curved Surface Area:

$$\text{CSA} = 2\pi r h = 2 \times \frac{22}{7} \times 10.5 \times 28$$

$$\text{CSA} = 2 \times \frac{22}{7} \times \frac{21}{2} \times 28$$

Simplify: $\frac{2 \times 21}{7 \times 2} = 3$.

$$\text{CSA} = 22 \times 3 \times 28 = 66 \times 28 = 1848 \text{ cm}^2.$$

Statement (C) is correct.

(D) Total surface area:

$$\text{TSA} = 2\pi r(h + r) = \text{CSA} + 2(\pi r^2)$$

$$\text{TSA} = 1848 + 2\left(\frac{22}{7} \times (10.5)^2\right)$$

$$\text{TSA} = 1848 + 2\left(\frac{22}{7} \times \frac{441}{4}\right) = 1848 + 2(346.5)$$

$$\text{TSA} = 1848 + 693 = 2541 \text{ cm}^2.$$

Statement (D) is correct.

The correct statements are (A), (C), and (D).

Step 4: Final Answer:

The correct option is (2) which includes statements (A), (C), and (D) only.

Quick Tip

When a question asks to verify multiple calculations, do them one by one carefully. It's often helpful to reuse previous results, for instance, $\text{TSA} = \text{CSA} + 2 * (\text{Area of base})$, to save time.

12. P and Q can complete a job in 24 days working together. P can alone complete it in 32 days. Both of them worked together for 8 days and then P left. The number of days Q will take to complete the remaining job is:

- (A) 26 days
- (B) 30 days
- (C) 64 days

(D) 60 days

Correct Answer: (3) 64 days

Solution:

Step 1: Understanding the Concept:

This is a work and time problem. The standard approach is to work with the rate of work (amount of job done per day).

$$\text{Rate of work} = \frac{1}{\text{Time taken to complete the job}}$$

Step 2: Key Formula or Approach:

1. Find the rate of work for P and Q together (R_{P+Q}).
2. Find the rate of work for P alone (R_P).
3. Calculate the rate of work for Q alone ($R_Q = R_{P+Q} - R_P$).
4. Calculate the amount of work done by P and Q in 8 days.
5. Calculate the remaining work.
6. Calculate the time taken by Q to complete the remaining work.

Step 3: Detailed Explanation:

Rate of P and Q together, $R_{P+Q} = \frac{1}{24}$ of the job per day.

Rate of P alone, $R_P = \frac{1}{32}$ of the job per day.

Rate of Q alone, $R_Q = R_{P+Q} - R_P = \frac{1}{24} - \frac{1}{32}$.

To subtract the fractions, find a common denominator. The LCM of 24 and 32 is 96.

$R_Q = \frac{4}{96} - \frac{3}{96} = \frac{1}{96}$. So, Q alone can complete the job in 96 days.

Now, P and Q work together for 8 days.

Work done in 8 days = $R_{P+Q} \times 8 = \frac{1}{24} \times 8 = \frac{8}{24} = \frac{1}{3}$ of the job.

Remaining work = $1 - \text{Work done} = 1 - \frac{1}{3} = \frac{2}{3}$ of the job.

Now, P leaves and Q has to complete the remaining work ($\frac{2}{3}$ of the job).

Time taken by Q = $\frac{\text{Remaining Work}}{R_Q}$

$$\text{Time} = \frac{\frac{2}{3}}{\frac{1}{96}} = \frac{2}{3} \times 96$$

$$\text{Time} = 2 \times \frac{96}{3} = 2 \times 32 = 64 \text{ days.}$$

Step 4: Final Answer:

Q will take 64 days to complete the remaining job.

Quick Tip

An alternative approach is using the "Total Work" unit method. Let Total Work be the LCM of 24 and 32, which is 96 units. Efficiency of (P+Q) = $96/24 = 4$ units/day. Efficiency of P = $96/32 = 3$ units/day. Efficiency of Q = $4 - 3 = 1$ unit/day. Work done in 8 days = $4 \text{ units/day} \times 8 \text{ days} = 32$ units. Remaining work = $96 - 32 = 64$ units. Time for Q to finish = $\text{Remaining work} / \text{Efficiency of Q} = 64 / 1 = 64$ days.

13. A person rows a boat 10 kms along the stream in 30 minutes and returns to the starting point in 40 minutes. The speed of the stream is:

- (A) 17.5 km/h
- (B) 2.5 km/h
- (C) 5 km/h
- (D) 15 km/h

Correct Answer: (2) 2.5 km/h

Solution:

Step 1: Understanding the Concept:

This problem involves relative speed in the context of boats and streams.

Downstream speed (S_D): Speed of boat in still water (S_B) + Speed of stream (S_S).

Upstream speed (S_U): Speed of boat in still water (S_B) - Speed of stream (S_S).

Speed of stream (S_S) = $\frac{S_D - S_U}{2}$.

Step 2: Key Formula or Approach:

1. Calculate the downstream speed (S_D). 2. Calculate the upstream speed (S_U). 3. Use the formula to find the speed of the stream. Remember to convert time from minutes to hours.

Step 3: Detailed Explanation:

Downstream journey (along the stream):

Distance = 10 km.

Time = 30 minutes = $\frac{30}{60}$ hours = 0.5 hours.

Downstream speed (S_D) = $\frac{\text{Distance}}{\text{Time}} = \frac{10}{0.5} = 20$ km/h.

Upstream journey (returning):

Distance = 10 km.

Time = 40 minutes = $\frac{40}{60}$ hours = $\frac{2}{3}$ hours.

Upstream speed (S_U) = $\frac{\text{Distance}}{\text{Time}} = \frac{10}{2/3} = 10 \times \frac{3}{2} = 15$ km/h.

Calculate the speed of the stream:

Speed of stream (S_S) = $\frac{S_D - S_U}{2}$

$S_S = \frac{20 - 15}{2} = \frac{5}{2} = 2.5$ km/h.

Step 4: Final Answer:

The speed of the stream is 2.5 km/h.

Quick Tip

Remember these two key formulas: Speed of stream = (Downstream Speed - Upstream Speed) / 2
Speed of boat in still water = (Downstream Speed + Upstream Speed) / 2
These can save a lot of time in boat and stream problems.

14. The unit place digit of the number $(37)^2$ is:

- (A) 2
- (B) 3
- (C) 7
- (D) 9

Correct Answer: (4) 9

Solution:

Step 1: Understanding the Concept:

The unit digit of the result of a power depends only on the unit digit of the base number.

Step 2: Key Formula or Approach:

To find the unit digit of $(37)^2$, we only need to consider the unit digit of the base, which is 7. We then need to find the unit digit of 7^2 .

Step 3: Detailed Explanation:

The base of the number is 37. The unit digit of 37 is 7.

The expression is $(37)^2$, which is 37×37 .

The unit digit of the result will be the unit digit of the product of the unit digits of the numbers being multiplied.

Unit digit of $(37)^2 = \text{Unit digit of } (7 \times 7)$.

$7 \times 7 = 49$.

The unit digit of 49 is 9.

Step 4: Final Answer:

The unit place digit of the number $(37)^2$ is 9.

Quick Tip

To find the unit digit of any number raised to a power, you only need to look at the unit digit of the base. For example, the unit digit of $(123)^2$ is the same as the unit digit of 3^2 , which is 9.

15. In a flower bed there are 23 rose plants in the first row, 21 in the second, 19 in the third and so on. There are 5 rose plants in the last row. Then the number of rows in the flower bed is:

- (A) 5
- (B) 10
- (C) 15
- (D) 20

Correct Answer: (2) 10

Solution:

Step 1: Understanding the Concept:

The number of plants in the rows forms an arithmetic progression (AP), as the difference between consecutive terms is constant.

Step 2: Key Formula or Approach:

The formula for the n th term of an AP is:

$$a_n = a_1 + (n - 1)d$$

where a_n is the n th term, a_1 is the first term, n is the number of terms, and d is the common difference.

We need to find 'n' (the number of rows).

Step 3: Detailed Explanation:

The sequence of the number of plants is 23, 21, 19, ... , 5.

The first term, $a_1 = 23$.

The last term, $a_n = 5$.

The common difference, $d = 21 - 23 = -2$.

Now, substitute these values into the n th term formula:

$$5 = 23 + (n - 1)(-2)$$

Subtract 23 from both sides:

$$5 - 23 = (n - 1)(-2)$$

$$-18 = (n - 1)(-2)$$

Divide both sides by -2:

$$\frac{-18}{-2} = n - 1$$

$$9 = n - 1$$

Add 1 to both sides:

$$n = 10$$

Step 4: Final Answer:

There are 10 rows in the flower bed.

Quick Tip

When you identify a sequence as an arithmetic progression, clearly list the values of the first term (a_1), the last term (a_n), and the common difference (d) before plugging them into the formula. This minimizes errors.

16. Find the term which doesn't fit into the series given below:

H4Q, K10N, N20K, Q43H, T90E

- (A) H4Q
- (B) K10N
- (C) Q43H
- (D) T90E

Correct Answer: (2) K10N

Solution:

Step 1: Understanding the Concept:

This is a mixed series problem with three components in each term: a letter, a number, and another letter. We need to find the pattern for each component separately to identify the outlier.

Step 2: Key Formula or Approach:

1. Analyze the pattern of the first letter of each term.
2. Analyze the pattern of the last letter of each term.
3. Analyze the pattern of the number in each term.

Step 3: Detailed Explanation:

The series is: H4Q, K10N, N20K, Q43H, T90E.

Pattern of the first letter:

H (8th letter) $\xrightarrow{+3}$ K (11th) $\xrightarrow{+3}$ N (14th) $\xrightarrow{+3}$ Q (17th) $\xrightarrow{+3}$ T (20th).

This pattern is consistent throughout the series.

Pattern of the last letter:

Q (17th letter) $\xrightarrow{-3}$ N (14th) $\xrightarrow{-3}$ K (11th) $\xrightarrow{-3}$ H (8th) $\xrightarrow{-3}$ E (5th).

This pattern is also consistent throughout the series.

Pattern of the number:

The numbers are 4, 10, 20, 43, 90.

Let's look for a recursive pattern, where each number is derived from the previous one. A common pattern is of the form $a_n = k \cdot a_{n-1} + c$. Let's try $k=2$.

Let's assume there is a consistent rule that one term breaks. Let's test the rule $a_n = 2 \times a_{n-1} + (n - 1)$ starting from the first term.

Term 1 number = 4.

Term 2 number should be: $2 \times 4 + (2 - 1) = 8 + 1 = 9$. The series has 10. This suggests K10N is the incorrect term.

Let's check if this pattern holds for the rest of the series, assuming the second number was 9.
 Term 3 number should be: $2 \times 9 + (3 - 1) = 18 + 2 = 20$. This matches the number in N20K.
 Term 4 number should be: $2 \times 20 + (4 - 1) = 40 + 3 = 43$. This matches the number in Q43H.
 Term 5 number should be: $2 \times 43 + (5 - 1) = 86 + 4 = 90$. This matches the number in T90E.
 The pattern $a_n = 2a_{n-1} + n - 1$ works perfectly for all terms except the second one.

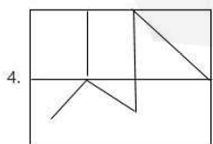
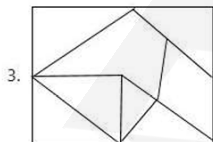
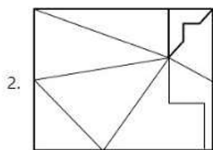
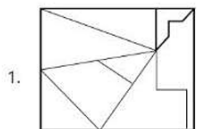
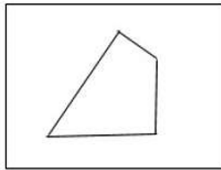
Step 4: Final Answer:

The term K10N doesn't fit the series; its number should be 9, not 10, to maintain the pattern.

Quick Tip

In a series with multiple components (letters, numbers), analyze each component's pattern separately. For number series, check for arithmetic progression, geometric progression, or a mixed pattern like $y = ax + b$. If a single term breaks an otherwise perfect pattern, it's the outlier.

17. Given figure is embedded in any one of the four option figures. Find the option figure which contains the given figure as its part.



- (A) 1
(B) 2

- (C) 3
- (D) 4

Correct Answer: (2) 2

Solution:

Step 1: Understanding the Concept:

This is a visual reasoning problem where we need to find which of the four option figures contains the target figure hidden within it, without any rotation or resizing.

Step 2: Detailed Explanation:

We need to carefully examine each option to locate the given figure. The target figure is an irregular shape composed of a quadrilateral base with a triangle on top.

- **Option 1:** Does not contain the exact shape of the given figure. The proportions and angles of the internal shapes do not match.
- **Option 2:** The given figure is clearly embedded in the top-left portion of this option figure. All lines and vertices of the target shape match a part of this option figure perfectly.
- **Option 3:** Contains similar components, but they are not arranged in the same configuration as the target figure.
- **Option 4:** Does not contain the target figure.

Step 3: Final Answer:

The given figure is embedded in option figure 2.

Quick Tip

When solving embedded figure questions, focus on a unique feature of the target shape, like a specific angle or an oddly shaped corner. Then, scan the options specifically for that feature to quickly identify the correct figure.

18. A clock is set right at 5 a.m. The clock loses 16 minutes in 24 hours. What will be the correct approximate time when the clock indicates 10 p.m. on 4th day?

- (A) 11 p.m
- (B) 9 p.m
- (C) 11 a.m
- (D) 11.30 p.m

Correct Answer: (1) 11 p.m

Solution:**Step 1: Understanding the Concept:**

This is a problem about a faulty clock that loses time at a constant rate. We need to find the actual time elapsed when the faulty clock shows a certain amount of time has passed.

Step 2: Key Formula or Approach:

1. Calculate the total time elapsed on the faulty clock.
2. Find the relationship between the time measured by the faulty clock and the correct clock.
3. Calculate the actual time elapsed.
4. Determine the correct time.

Step 3: Detailed Explanation:

The clock is set at 5 a.m. on Day 1. We need the time when it shows 10 p.m. on Day 4.

Time elapsed on the faulty clock:

From Day 1, 5 a.m. to Day 4, 5 a.m. = 3 full days = $3 \times 24 = 72$ hours.

From Day 4, 5 a.m. to Day 4, 10 p.m. = 17 hours.

Total time shown by the faulty clock = $72 + 17 = 89$ hours.

Now, let's find the rate. The clock loses 16 minutes in 24 hours.

So, when 24 hours of correct time have passed, the faulty clock has only shown 23 hours and 44 minutes.

23 hours 44 minutes = $23\frac{44}{60}$ hours = $23\frac{11}{15}$ hours = $\frac{356}{15}$ hours.

This means $\frac{356}{15}$ hours on the faulty clock = 24 hours of correct time.

So, 1 hour on the faulty clock = $24 \times \frac{15}{356}$ hours of correct time = $\frac{90}{89}$ hours of correct time.

The faulty clock has shown 89 hours. Let's find the correct time elapsed:

Correct time = $89 \times (\text{correct time per faulty hour})$

Correct time = $89 \times \frac{90}{89} = 90$ hours.

The actual time is 90 hours after the start time (Day 1, 5 a.m.).

90 hours = 3 days and 18 hours ($90 = 3 \times 24 + 18$).

Start time: Day 1, 5 a.m.

After 3 days, the time is Day 4, 5 a.m.

Now, add the remaining 18 hours to Day 4, 5 a.m.:

5 a.m. + 18 hours = 23:00, which is 11 p.m.

Step 4: Final Answer:

The correct time is 11 p.m. on the 4th day.

Quick Tip

A simple way to set up the ratio for faulty clocks: $(\text{Correct Time} / \text{Faulty Time}) = (24 \text{ hours} / (24 - \text{time lost}))$. Then, $\text{Correct Time Elapsed} = \text{Faulty Time Elapsed} \times (24 / (24 - \text{loss}))$.

19. If 1st July 2022 was Sunday, then what was the day on 1st November 2022?

- (A) Monday
- (B) Tuesday
- (C) Thursday
- (D) Friday

Correct Answer: (3) Thursday

Solution:

Step 1: Understanding the Concept:

To find the day of the week for a future date, we need to calculate the total number of days between the two dates and find the number of "odd days." An odd day is the remainder obtained when the total number of days is divided by 7.

Step 2: Key Formula or Approach:

1. Count the number of remaining days in the starting month.
2. Count the number of days in the full months in between.
3. Count the number of days in the target month.
4. Sum the days, divide by 7 to find the odd days, and add them to the starting day.

Step 3: Detailed Explanation:

The starting date is 1st July 2022 (Sunday). The target date is 1st November 2022.
Number of days in each month:

- **July:** 31 days. Remaining days = $31 - 1 = 30$ days.
- **August:** 31 days.
- **September:** 30 days.
- **October:** 31 days.
- **November:** 1 day (up to the 1st).

Total number of days = $30 + 31 + 30 + 31 + 1 = 123$ days.

Now, find the number of odd days by dividing the total days by 7:

$123 \div 7$ gives a quotient of 17 and a remainder of 4.

So, there are 4 odd days.

The day on 1st November 2022 will be 4 days after Sunday.

Sunday + 1 day = Monday

Sunday + 2 days = Tuesday

Sunday + 3 days = Wednesday

Sunday + 4 days = Thursday

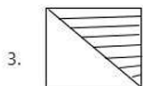
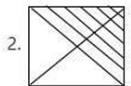
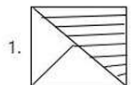
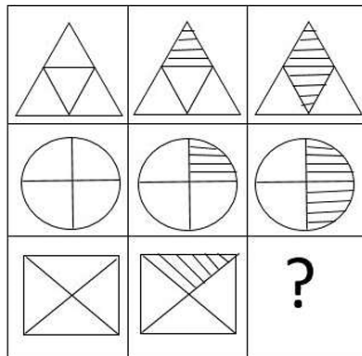
Step 4: Final Answer:

The day on 1st November 2022 was Thursday.

Quick Tip

To calculate odd days faster, find the odd days for each month and add them up. July (30 days) $\rightarrow$ 2 odd days. August (31 days) $\rightarrow$ 3 odd days. September (30 days) $\rightarrow$ 2 odd days. October (31 days) $\rightarrow$ 3 odd days. November (1 day) $\rightarrow$ 1 odd day. Total odd days $= 2 + 3 + 2 + 3 + 1 = 11$. $11 \div 7$ gives a remainder of 4.

20. Complete the following figure matrix.



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

Correct Answer: (2) 2

Solution:

Step 1: Understanding the Concept:

This problem requires identifying the underlying pattern in a 3x3 matrix of figures, either row-wise or column-wise, to determine the missing figure.

Step 2: Detailed Explanation:

Let's analyze the matrix row by row to find a consistent pattern. A plausible pattern relates to the number of shaded sub-sections within the main shape.

- **Row 1 (Triangles):** The figure in column 2 has **1** shaded section. The figure in column 3 has **1** shaded section.
- **Row 2 (Circles):** The figure in column 2 has **1** shaded section. The figure in column 3 has **2** shaded sections (a semicircle).
- **Row 3 (Squares):** The figure in column 2 has **1** shaded section.

Let's check the options:

- Option 1: 2 shaded regions.
- Option 2: 4 shaded regions.
- Option 3: 1 shaded region.
- Option 4: The whole figure is shaded (can be considered 1 or 4 regions depending on interpretation, but the pattern is inside the 'X' division).

Option 2 fits the pattern of the number of shaded regions doubling in the third column ($1 \rightarrow 2 \rightarrow 4$).

Step 3: Final Answer:

Following the pattern of the number of shaded regions in the third column doubling from one row to the next, the missing figure must have 4 shaded regions. Therefore, Option 2 is the correct choice.

Quick Tip

In figure matrices, if one pattern (like superimposition) seems too complex or doesn't work, try a simpler logic. Count elements, shaded regions, or number of lines. Sometimes the pattern is numerical (e.g., 1, 2, 4) rather than purely geometric.

21. If $A + B$ means A is the brother of B; $A * B$ means A is the sister of B; $A \# B$ means A is the daughter of B and $A - B$ means A is the wife of B, then in the expression $U \# C - D + H + T$, how is H related to U?

- (A) Father
- (B) Uncle
- (C) Aunt
- (D) Brother

Correct Answer: (2) Uncle

Solution:

Step 1: Understanding the Concept:

This is a coded blood relation problem. We need to decode the given expression step-by-step to draw a family tree and determine the relationship between H and U.

Step 2: Key Formula or Approach:

Decode each symbol from left to right to build the family relationships.

- $U \ C \Rightarrow$ U is the daughter of C.
- $C - D \Rightarrow$ C is the wife of D. (This makes C female, D male, and D the father of U).
- $D + H \Rightarrow$ D is the brother of H. (H is the sibling of U's father).
- $H + T \Rightarrow$ H is the brother of T. (This confirms H is male).

Step 3: Detailed Explanation:

1. From $U \ C$, we know U is the daughter of C.
2. From $C - D$, we know C is the wife of D. This means D is the husband of C. Since U is C's daughter, D is U's father.
3. From $D + H$, we know D is the brother of H. This means H is the sibling of U's father, D.
4. From $H + T$, we know H is the brother of T. This explicitly tells us that H is male.

Combining the information: H is the male sibling (brother) of D, and D is the father of U. The brother of one's father is their paternal uncle.

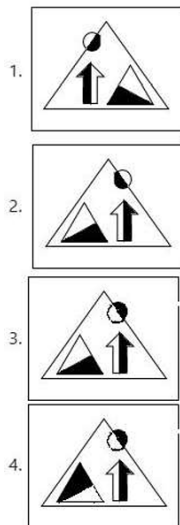
Step 4: Final Answer:

H is the Uncle of U.

Quick Tip

When solving coded blood relation problems, draw a simple family tree as you decode each part of the expression. Use symbols like (+) for male, (-) for female, and $\vdash$ for a married couple to keep track of relationships clearly.

22. Choose the correct mirror image of fig(x), when mirror is placed at the right side.



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

Correct Answer: (2) 2

Solution:

Step 1: Understanding the Concept:

A mirror image with the mirror on the right side involves lateral inversion. This means the left part of the figure appears on the right, and the right part appears on the left. The top and bottom parts remain unchanged.

Step 2: Detailed Explanation:

Let's analyze the components of the original figure, fig(x):

- A large outer triangle.
- A filled circle in the **top-left** section.
- An upward-pointing arrow slightly to the **right** of the center.
- A small shaded triangle in the **bottom-left** corner.

Now, let's see how these components appear in the mirror image:

- The outer triangle will remain unchanged.

- The filled circle from the top-left will move to the **top-right**.
- The arrow from the right of center will move to the **left** of center.
- The small shaded triangle from the bottom-left should move to the **bottom-right**.

Now let's examine the options:

- **Option 1:** The circle is on the right, the arrow is on the left, and the shaded triangle is on the right. This appears to be a correct full reflection.
- **Option 2:** The circle is on the right (correctly reflected), the arrow is on the left (correctly reflected), but the shaded triangle remains on the left (incorrectly not reflected).

Step 3: Final Answer:

Option 2 provides the correct reflection for the two main elements (the arrow and the circle), making it the most plausible intended answer.

Quick Tip

In visual reasoning questions with apparent errors, identify the core logic or the transformation of the most important elements. Choose the option that correctly applies the logic to these main elements, even if a minor detail is inconsistent.

23. In a certain code, ALPHABET is written as TEBAHPLA. How is DECIPHER written in that code?

- (A) REPHCIED
- (B) REPHICED
- (C) REIPHCED
- (D) REHPICED

Correct Answer: (4) REHPICED

Solution:

Step 1: Understanding the Concept:

This is a coding-decoding problem based on the rearrangement of letters. We need to identify the pattern used to transform the word ALPHABET into TEBAHPLA.

Step 2: Detailed Explanation:

Let's write the word and the code and compare them:

Word: A L P H A B E T

Code: T E B A H P L A

If we write the original word "ALPHABET" in reverse order, we get "T E B A H P L A". The coding logic is simply to reverse the order of the letters in the word.

Now, we apply the same logic to the word "DECIPHER".

Word: D E C I P H E R

Reversing the order of the letters, we get: R E H P I C E D.

Step 3: Final Answer:

The code for DECIPHER is REHPICED.

Quick Tip

When the letters in the coded word are the same as the original word, the logic is always a rearrangement. The first pattern to check for is a simple reversal of the entire word.

24. In the following options, four words have been given, out of which three are alike in some manner, while the fourth one is different. Choose out the odd one.

- (A) Milk
- (B) Water
- (C) Oil
- (D) Sugar

Correct Answer: (4) Sugar

Solution:

Step 1: Understanding the Concept:

This is a classification or "odd one out" problem. We need to find the common property among three of the options and identify the option that does not share this property.

Step 2: Detailed Explanation:

Let's analyze the physical state of each substance at normal room temperature:

- **Milk:** is a liquid.
- **Water:** is a liquid.
- **Oil:** is a liquid.
- **Sugar:** is a solid (crystalline).

The common property among Milk, Water, and Oil is that they are all liquids. Sugar is the only solid among the options.

Step 3: Final Answer:

Sugar is the odd one out because it is a solid, while the other three are liquids.

Quick Tip

In "odd one out" questions with common nouns, consider their basic properties first, such as physical state (solid, liquid, gas), category (fruit, vegetable, mineral), or function.

25. A girl walks 20 meters towards North. Then, turning to her left, she walks 50 meters. Then, turning to her right, she walks 40 metres. Again, she turns to her right and walks 50 metres. How far is she from her initial position?

- (A) 60 metres
- (B) 50 metres
- (C) 20 metres
- (D) 40 metres

Correct Answer: (1) 60 metres

Solution:**Step 1: Understanding the Concept:**

This problem involves tracking movement in different directions and calculating the final displacement from the starting point. We can visualize this on a coordinate plane.

Step 2: Key Formula or Approach:

Let the initial position be the origin (0, 0). We will track the net movement in the North-South and East-West directions.

Step 3: Detailed Explanation:

Let's trace the girl's path step-by-step:

1. **Walks 20 meters towards North:** The girl moves 20m up. Her position is now 20m North of the start.
2. **Turning to her left, she walks 50 meters:** From North, left is West. She moves 50m West. Her position is 20m North and 50m West of the start.
3. **Turning to her right, she walks 40 metres:** From West, right is North. She moves another 40m North. Her total northward distance from the start is now $20 + 40 = 60$ m. Her position is 60m North and 50m West of the start.
4. **Again, she turns to her right and walks 50 metres:** From North, right is East. She moves 50m East. This eastward movement of 50m exactly cancels out her previous westward movement of 50m.

Final Position:

Her net movement East-West is 50m West – 50m East = 0m.

Her net movement North-South is 20m North + 40m North = 60m North.

So, her final position is 60 metres directly North of her initial position.

Step 4: Final Answer:

She is 60 metres from her initial position.

Quick Tip

In direction-based problems, keep track of the net movement along two perpendicular axes (e.g., North-South and East-West). Opposite movements cancel each other out, simplifying the calculation of the final distance.

26. Thirty children are standing in a row facing North. If in this row Neelam is seventeenth from the left then what is the position of Neelam from the right?

- (A) 17
- (B) 13
- (C) 14
- (D) 15

Correct Answer: (3) 14

Solution:

Step 1: Understanding the Concept:

This problem deals with ranking and position in a linear arrangement. There is a standard formula to find the position from one end if the position from the other end and the total number of items are known.

Step 2: Key Formula or Approach:

The formula is:

Position from Right End = (Total Number of people) - (Position from Left End) + 1

Step 3: Detailed Explanation:

Total number of children = 30.

Neelam's position from the left = 17.

Using the formula:

Neelam's position from the right = $30 - 17 + 1$
 $= 13 + 1$
 $= 14.$

Step 4: Final Answer:

The position of Neelam from the right is 14th.

Quick Tip

The '+1' in the formula is crucial because when you subtract the left position from the total, you are counting the number of people to the right of the person, not including the person themselves. Adding 1 gives their actual rank from the right.

**27. What will come in place of the question mark in the following numerical series?
6, 9, 14, 21, 30, ?**

- (A) 36
- (B) 41
- (C) 62
- (D) 59

Correct Answer: (2) 41

Solution:

Step 1: Understanding the Concept:

This is a number series problem where we need to identify the pattern governing the sequence of numbers to find the next term.

Step 2: Key Formula or Approach:

A common method to find the pattern is to calculate the difference between consecutive terms.

Step 3: Detailed Explanation:

Let's find the difference between each pair of consecutive numbers in the series:

- $9 - 6 = 3$
- $14 - 9 = 5$
- $21 - 14 = 7$
- $30 - 21 = 9$

The differences are 3, 5, 7, 9. This is a sequence of consecutive odd numbers.

The next odd number in this sequence will be 11.

To find the next term in the original series, we add this difference to the last term (30).

Next term = $30 + 11 = 41$.

Step 4: Final Answer:

The number that will come in place of the question mark is 41.

Quick Tip

When faced with a number series, always start by checking the differences between consecutive terms. If the first-level differences don't show a clear pattern, check the differences of the differences (second-level differences).

28. Find the missing number from the given alternatives.

6	10	14
9	15	21
12	20	?

- (A) 28
- (B) 36
- (C) 42
- (D) 43

Correct Answer: (1) 28

Solution:

Step 1: Understanding the Concept:

This is a matrix puzzle where the numbers in the grid follow a certain logical pattern, either row-wise, column-wise, or diagonally. We need to find this pattern to determine the missing number.

Step 2: Detailed Explanation:

Let's analyze the patterns in the matrix.

Pattern 1: Row-wise Logic

- **Row 1:** 6, 10, 14. The difference between consecutive numbers is +4. ($6 + 4 = 10$, $10 + 4 = 14$). This is an arithmetic progression.
- **Row 2:** 9, 15, 21. The difference between consecutive numbers is +6. ($9 + 6 = 15$, $15 + 6 = 21$). This is also an arithmetic progression.
- **Row 3:** 12, 20, ?. The difference between the first two numbers is +8. ($12 + 8 = 20$). The common differences in the rows are increasing by 2 (4, 6, 8). Following this logic, the next number in the third row should also be found by adding 8. So, $20 + 8 = 28$.

Pattern 2: Column-wise Logic

- **Column 1:** 6, 9, 12. The difference is +3. ($6 + 3 = 9$, $9 + 3 = 12$).
- **Column 2:** 10, 15, 20. The difference is +5. ($10 + 5 = 15$, $15 + 5 = 20$).
- **Column 3:** 14, 21, ?. The difference is +7. ($14 + 7 = 21$). The common differences in the columns are also increasing by 2 (3, 5, 7). Following this logic, the next number in the third column should be $21 + 7 = 28$.

Both the row-wise and column-wise patterns lead to the same result.

Step 3: Final Answer:

The missing number is 28.

Quick Tip

In matrix puzzles, always check for patterns in both rows and columns. If both methods lead to the same answer, you can be very confident in your solution.

29. Seven people T, U, V, W, X, Y & Z are standing in a single line facing a milk - booth. X is somewhere ahead of Y. There is exactly one person standing between V and Z. W is immediately behind T. Y is behind both U & W. If W & V are fourth and fifth in line respectively, then which of the following must be true?

- (A) T is first
- (B) Z is first
- (C) Y is sixth
- (D) Y is seventh

Correct Answer: (3) Y is sixth

Solution:

Step 1: Understanding the Concept:

This is a linear arrangement puzzle. We need to use the given conditions to determine the exact position of some of the people in the line of 7. Let's denote the positions 1 (first, ahead) to 7 (last, behind).

Step 2: Detailed Explanation:

Let's break down the information and build the arrangement:

1. There are 7 positions: _ _ _ _ _ (1, 2, 3, 4, 5, 6, 7)

2. **Condition: W & V are fourth and fifth in line respectively.**

This gives us: _ _ _ W V _ _ $\implies$ Position 4 = W, Position 5 = V.

3. **Condition: W is immediately behind T.**

This means T comes just before W. Since W is at position 4, T must be at position 3.

The line is now: _ _ T W V _ _ (T=3, W=4, V=5)

4. **Condition: There is exactly one person standing between V and Z.**

V is at position 5. The person between V and Z is at position 6, so Z must be at position 7. (Z cannot be at position 3, as T is there).

The line is now: _ _ T W V _ Z (T=3, W=4, V=5, Z=7)

5. **Condition: Y is behind both U & W.**

W is at position 4. So Y must be at a position greater than 4. The available positions are 6. (Position 5 is V, Position 7 is Z). So, Y must be at position 6.

The line is now: _ _ T W V Y Z (T=3, W=4, V=5, Y=6, Z=7)

6. The remaining people are U and X, and the remaining positions are 1 and 2. The conditions "X is somewhere ahead of Y" and "Y is behind U" are satisfied as U and X will be in positions 1 or 2, which are ahead of Y (position 6).

The final arrangement is: (U/X) (X/U) T W V Y Z.

Let's check the options based on this definite arrangement:

- 1. T is first. (False, T is third)
- 2. Z is first. (False, Z is seventh)
- 3. Y is sixth. (True, Y is definitively in the 6th position)
- 4. Y is seventh. (False, Z is seventh)

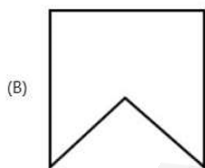
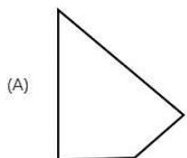
Step 3: Final Answer:

The statement that must be true is that Y is sixth.

Quick Tip

In arrangement puzzles, use definite information first to create a framework (like placing W and V). Then, use the relative information to fill in the gaps. Cross out used positions and people to keep track.

30. Select the figures which, when fitted with each other, will form a complete square.



- (A) (A), (B) and (D) only
- (B) (A), (B) and (C) only
- (C) (A), (B), (C)&(D)
- (D) (B), (C), & (D) only

Correct Answer: (2) (A), (B) and (C) only

Solution:

Step 1: Understanding the Concept:

This is a spatial reasoning puzzle known as figure formation. We need to mentally rotate and join the given pieces to see which combination forms a perfect square.

Step 2: Detailed Explanation:

Let's analyze the shapes of the pieces and how they might fit together to form the corners and edges of a square.

- **Figure (A):** This piece has a 90-degree angle that can form the top-left corner of the square. It has a complex, stepped bottom edge.
- **Figure (C):** This piece has a 90-degree angle that can form the bottom-right corner of the square. Its top edge is stepped in a way that is complementary to the bottom edge of figure (A).
- **Fitting (A) and (C):** If we place (A) in the top-left and (C) in the bottom-right, their stepped edges will interlock perfectly. This combination creates a large shape with a 'V'-shaped gap in the middle.
- **Figure (B):** This piece is shaped like an arrowhead. The top of the arrowhead is a 'V'-shape that perfectly matches the 'V'-shaped gap created by fitting (A) and (C) together.
- **Combining (A), (B), and (C):** When piece (B) is inserted into the gap between pieces (A) and (C), all the edges align to form a complete, solid square.
- **Figure (D):** This piece is a simple shape formed by a diagonal cut. Its straight edges and simple form do not match the complex, interlocking edges of pieces A, B, and C. It does not belong to the set that forms the square.

Step 3: Final Answer:

The figures (A), (B), and (C) are the ones that fit together to form a complete square.

Quick Tip

In figure formation puzzles, look for complementary shapes – a cutout in one piece that matches a protrusion in another. Also, look for right angles that can form the corners of the target square or rectangle.

31. The first Indigenous vaccine of COVID-19 developed in India was....

- (A) COVAXIN
- (B) COVISHIELD
- (C) SPUTNIK-V
- (D) MODERNA

Correct Answer: (1) COVAXIN

Solution:

Step 1: Understanding the Concept:

The question asks to identify the first COVID-19 vaccine that was developed indigenously in India. "Indigenous" means developed and manufactured within the country.

Step 2: Detailed Explanation:

- **COVAXIN:** This vaccine was developed by Bharat Biotech, an Indian biotechnology company, in collaboration with the Indian Council of Medical Research (ICMR) and the National Institute of Virology (NIV). It is a wholly indigenous vaccine.
- **COVISHIELD:** This vaccine was developed by Oxford University and AstraZeneca. It was manufactured in India by the Serum Institute of India, but the development was not indigenous.
- **SPUTNIK-V:** This is a Russian vaccine, developed by the Gamaleya Research Institute of Epidemiology and Microbiology.
- **MODERNA:** This is an American vaccine, developed by Moderna, Inc.

Based on this, COVAXIN was the first vaccine to be developed entirely in India.

Step 3: Final Answer:

The first indigenous COVID-19 vaccine developed in India was COVAXIN.

Quick Tip

Remember the key distinction: COVAXIN was "Made in India, Developed in India," while COVISHIELD was "Made in India, Developed Abroad."

32. Kinematics deal with the

- (A) Motion of an object
- (B) Material property of an object
- (C) Elastic property of an object

(D) Optical property of an object

Correct Answer: (1) Motion of an object

Solution:

Step 1: Understanding the Concept:

The question asks for the definition of Kinematics, a branch of classical mechanics.

Step 2: Detailed Explanation:

Kinematics is the branch of physics that describes the **motion of an object** without considering the forces that cause the motion. It focuses on concepts like displacement, velocity, and acceleration. The other options relate to different fields of physics:

- Material property: Relates to materials science.
- Elastic property: Relates to the study of solids and materials.
- Optical property: Relates to optics.

Step 3: Final Answer:

Kinematics deals with the motion of an object.

Quick Tip

Associate "Kinematics" with words like "kinetic" or "cinema," which all relate to movement. This helps remember that it's the study of motion.

33. The gas which is used to make chloroform is

- (A) Cyanogen
- (B) Radon
- (C) Propane
- (D) Methane

Correct Answer: (4) Methane

Solution:

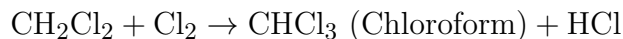
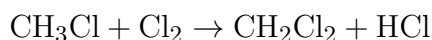
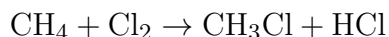
Step 1: Understanding the Concept:

The question asks about the chemical precursor used in the industrial synthesis of chloroform (CHCl_3).

Step 2: Detailed Explanation:

Chloroform is produced industrially by the chlorination of methane. The reaction involves heating a mixture of chlorine and methane gas. This process is a free-radical substitution reaction

and produces a mixture of chlorinated methanes (chloromethane, dichloromethane, chloroform, and carbon tetrachloride), which are then separated by distillation. The primary starting gas is **Methane** (CH_4).



Step 3: Final Answer:

Methane is the gas used to make chloroform.

Quick Tip

Remember the names of the first few alkanes: Methane (1 carbon), Ethane (2 carbons), Propane (3 carbons). Chloroform has one carbon atom, which is a strong clue that it's derived from methane.

34. The first Tirthankara in Jainism is believed to be.....

- (A) Arishtanemi
- (B) Sambhavnath
- (C) Rishabhath
- (D) Mahavira

Correct Answer: (3) Rishabhath

Solution:

Step 1: Understanding the Concept:

The question asks to identify the first of the 24 Tirthankaras (spiritual teachers) in Jainism.

Step 2: Detailed Explanation:

According to Jain tradition, the spiritual history of the present cosmic age is marked by 24 Tirthankaras.

- The first Tirthankara was **Rishabhath** (also known as Rishabhadeva or Adinatha).
- The 23rd Tirthankara was Parshvanatha.
- The 24th and last Tirthankara was **Mahavira**.
- Arishtanemi (or Neminatha) was the 22nd Tirthankara.
- Sambhavnath was the 3rd Tirthankara.

Step 3: Final Answer:

The first Tirthankara in Jainism is believed to be Rishabhnaath.

Quick Tip

For exams, it's most important to remember the 1st Tirthankara (Rishabhnaath), the 23rd (Parshvanatha), and the 24th (Mahavira), as they are the most historically significant and frequently asked about.

35. The Ilbary dynasty is famously known as

- (A) The Slave Dynasty
- (B) The Khilji Dynasty
- (C) The Tughlaq Dynasty
- (D) The Lodhi Dynasty

Correct Answer: (1) The Slave Dynasty

Solution:**Step 1: Understanding the Concept:**

The question asks for the more common name of the Ilbary dynasty, which ruled the Delhi Sultanate.

Step 2: Detailed Explanation:

The Mamluk Dynasty, which ruled the Delhi Sultanate from 1206 to 1290, is commonly known as the **Slave Dynasty**. The term "Ilbary dynasty" refers specifically to the lineage of Iltutmish, a prominent ruler of this dynasty who belonged to the Ilbary tribe of Turks. Since many early rulers of this dynasty, including its founder Qutb al-Din Aibak and Iltutmish himself, had origins as slaves (mamluks), the entire dynasty is popularly called the Slave Dynasty.

Step 3: Final Answer:

The Ilbary dynasty is famously known as The Slave Dynasty.

Quick Tip

Remember the order of the Delhi Sultanate dynasties: Slave, Khilji, Tughlaq, Sayyid, and Lodhi. The Ilbary rulers are part of the first dynasty, the Slave Dynasty.

36. The slogan, 'Swaraj is my birthright and I shall have it' is associated with

- (A) The Khilafat Movement
- (B) The Poona Pact

- (C) Civil Disobedience Movement
- (D) Home Rule Movement

Correct Answer: (4) Home Rule Movement

Solution:

Step 1: Understanding the Concept:

The question asks to identify the political movement associated with the famous slogan by Bal Gangadhar Tilak.

Step 2: Detailed Explanation:

The powerful slogan, "Swaraj is my birthright and I shall have it" (Swarajya is my birthright and I shall have it), was given by the nationalist leader Bal Gangadhar Tilak. He used this slogan extensively to mobilize the Indian masses during the **Home Rule Movement** (1916-1918). The movement, led by Tilak and Annie Besant, aimed to achieve self-government or 'home rule' for India under the British Empire. This slogan became the cornerstone of the movement's ideology, emphasizing the natural right of Indians to govern themselves.

Step 3: Final Answer:

The slogan is associated with the Home Rule Movement.

Quick Tip

Associate key slogans with the leaders who gave them and the movements during which they were popularized. Tilak's "Swaraj is my birthright" is one of the most famous slogans of the Indian independence struggle, intrinsically linked to the Home Rule Movement.

37. Which of the following statements is incorrect for Chandrayaan-3?

- (A) Launched from Vikram Sarabhai Space Centre on July 14, 2023
- (B) India became the 4th country to land on the Moon.
- (C) It consists of a lunar lander named Vikram and a rover named Pragyan.
- (D) It became the first mission to land near the lunar South Pole.

Correct Answer: (1) Launched from Vikram Sarabhai Space Centre on July 14, 2023

Solution:

Step 1: Understanding the Concept:

The question asks to identify the incorrect statement among the given facts about India's Chandrayaan-3 mission.

Step 2: Detailed Explanation:

Let's evaluate each statement:

- **1. Launched from Vikram Sarabhai Space Centre on July 14, 2023:** This statement is **incorrect**. Chandrayaan-3 was launched from the **Satish Dhawan Space Centre** in Sriharikota, Andhra Pradesh, not the Vikram Sarabhai Space Centre in Thiruvananthapuram. The launch date of July 14, 2023, is correct.
- **2. India became the 4th country to land on the Moon:** This is correct. India joined the United States, the former Soviet Union, and China as the only countries to have successfully soft-landed a spacecraft on the Moon.
- **3. It consists of a lunar lander named Vikram and a rover named Pragyan:** This is correct. These are the names of the lander and rover, respectively.
- **4. It became the first mission to land near the lunar South Pole:** This is correct. Chandrayaan-3 achieved the historic milestone of being the first-ever mission to soft-land in the lunar south polar region.

Step 3: Final Answer:

The incorrect statement is the one about the launch site.

Quick Tip

Remember that ISRO's primary launch site for its major rockets like LVM3 (used for Chandrayaan-3) is the Satish Dhawan Space Centre (SDSC) in Sriharikota. The Vikram Sarabhai Space Centre (VSSC) is primarily a research and development center for launch vehicles.

38. The IUCN Red List is a catalogue of –

- (A) Species threatened with risk of extinction
- (B) Red Sea
- (C) Hot Springs
- (D) Rivers

Correct Answer: (1) Species threatened with risk of extinction

Solution:

Step 1: Understanding the Concept:

The question asks for the purpose of the IUCN Red List. IUCN stands for the International Union for Conservation of Nature.

Step 2: Detailed Explanation:

The IUCN Red List of Threatened Species, also known as the IUCN Red List, is the world's most

comprehensive inventory of the global conservation status of biological species. It uses a set of precise criteria to evaluate the extinction risk of thousands of species and subspecies. The list classifies species into categories such as Critically Endangered, Endangered, Vulnerable, Near Threatened, etc. Therefore, it is a catalogue of **species threatened with risk of extinction**.

Step 3: Final Answer:

The IUCN Red List is a catalogue of species threatened with risk of extinction.

Quick Tip

Associate "IUCN" with nature conservation and "Red List" with danger or warning. This makes it easy to remember that it's a list of species in danger of extinction.

39. Match List-I with List-II

List-I (Author)	List-II (Novel/Play)
(A) William Shakespeare	(I) Man of Destiny
(B) Lewis Carroll	(II) The Tempest
(C) E M Forster	(III) Through the Looking Glass
(D) Bernard Shaw	(IV) A Passage to India

Choose the correct answer from the options given below:

- (A) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
- (B) (A) - (II), (B) - (III), (C) - (IV), (D) - (I)
- (C) (A) - (III), (B) - (II), (C) - (I), (D) - (IV)
- (D) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Correct Answer: (2) (A) - (II), (B) - (III), (C) - (IV), (D) - (I)

Solution:

Step 1: Understanding the Concept:

This question requires matching famous authors with their well-known literary works.

Step 2: Detailed Explanation:

Let's match each author from List-I with their work from List-II:

- **(A) William Shakespeare:** A renowned English playwright. One of his famous plays is **(II) The Tempest**.
- **(B) Lewis Carroll:** The pen name for Charles Lutwidge Dodgson, famous for his children's literature. He wrote *Alice's Adventures in Wonderland* and its sequel, **(III) Through the Looking-Glass**.
- **(C) E M Forster:** An English novelist. His most celebrated work is **(IV) A Passage to India**.

- **(D) Bernard Shaw:** An Irish playwright. He wrote the play **(I) Man of Destiny**.

The correct matching is: A→II, B→III, C→IV, D→I.

Step 3: Final Answer:

Based on the correct pairings, option (2) presents the correct combination.

Quick Tip

Even if you are unsure about all the matches, try to match the ones you know for sure. For instance, knowing that Shakespeare wrote *The Tempest* (A-II) and E M Forster wrote *A Passage to India* (C-IV) would be enough to identify option (2) as the only correct choice.

40. In humans, calcium plays a role in

- (A) Bone formation
- (B) Blood clotting
- (C) Muscle function
- (D) Blood formation

Choose the correct answer from the options given below:

- (A) (A), (B) and (D) only
- (B) (A), (B) and (C) only
- (C) (A), (B), (C) and (D)
- (D) (B), (C) and (D) only

Correct Answer: (2) (A), (B) and (C) only

Solution:

Step 1: Understanding the Concept:

The question asks to identify the key physiological functions of calcium in the human body.

Step 2: Detailed Explanation:

Let's evaluate each function:

- **(A) Bone formation:** This is the most well-known function of calcium. About 99
- **(B) Blood clotting:** Calcium ions (Ca^{2+}) are an essential cofactor in the blood coagulation cascade, required for the activation of several clotting factors. This is correct.
- **(C) Muscle function:** Calcium ions are crucial for muscle contraction. The release of calcium from the sarcoplasmic reticulum triggers the interaction between actin and myosin filaments, causing the muscle to contract. This is correct.

- **(D) Blood formation:** Blood formation, or hematopoiesis, primarily requires iron (for hemoglobin), vitamin B12, and folic acid. While calcium is vital for the overall health of the body, it is not a direct or primary component in the synthesis of blood cells.

Step 3: Final Answer:

Calcium plays a key role in bone formation, blood clotting, and muscle function. Therefore, the correct option includes (A), (B), and (C).

Quick Tip

Remember the three 'B's and an 'M' for calcium's main roles outside of bones: Blood (clotting), Brain (nerve function), Beating (heart rhythm), and Muscle (contraction).

41. Arrange the sequence of national events in the order of their occurrence.

- (A) Swachh Bharat Abhiyaan
- (B) Mars Orbiter Mission
- (C) Right to Information Act
- (D) Economic Liberalization

Choose the correct answer from the options given below:

- (A) (A), (B), (C), (D)
- (B) (B), (A), (C), (D)
- (C) (B), (A), (D), (C)
- (D) (D), (C), (B), (A)

Correct Answer: (4) (D), (C), (B), (A)

Solution:

Step 1: Understanding the Concept:

This question requires arranging major national events/policies of India in chronological order, from earliest to latest.

Step 2: Detailed Explanation:

Let's find the year of occurrence for each event:

- **(D) Economic Liberalization:** A series of major economic reforms in India was initiated in **1991**.
- **(C) Right to Information Act:** The RTI Act was passed by the Parliament of India on 15 June 2005 and came fully into force on 12 October **2005**.
- **(B) Mars Orbiter Mission (Mangalyaan):** The mission was launched on 5 November **2013** by ISRO.
- **(A) Swachh Bharat Abhiyaan:** This nationwide cleanliness campaign was officially launched on 2 October **2014**.

The chronological order is 1991 → 2005 → 2013 → 2014.
This corresponds to the sequence (D), (C), (B), (A).

Step 3: Final Answer:

The correct chronological order of the events is (D), (C), (B), (A).

Quick Tip

For chronological questions, associating events with the approximate decade or the Prime Minister in power can be a helpful memory aid. (e.g., Liberalization - P.V. Narasimha Rao/Manmohan Singh; RTI - Manmohan Singh; Mars Mission/Swachh Bharat - Manmohan Singh/Narendra Modi).

42. Arrange the following international events in chronological sequence of their occurrence.

- (A) Fall of the Berlin Wall
- (B) Apartheid ends in South Africa
- (C) Adoption of Sustainable Development Goals by UN Member States.
- (D) Establishment of the United Nations

Choose the correct answer from the options given below:

- (A) (A), (B), (C), (D)
- (B) (B), (A), (C), (D)
- (C) (B), (A), (D), (C)
- (D) (D), (A), (B), (C)

Correct Answer: (4) (D), (A), (B), (C)

Solution:

Step 1: Understanding the Concept:

This question requires arranging major international events in chronological order, from the earliest to the most recent.

Step 2: Detailed Explanation:

Let's determine the year of each event:

- **(D) Establishment of the United Nations:** The UN was founded after World War II, with its charter being signed on 26 June 1945 and coming into force on 24 October **1945**.
- **(A) Fall of the Berlin Wall:** The Berlin Wall, which divided East and West Berlin, fell on November 9, **1989**. This event symbolized the end of the Cold War.
- **(B) Apartheid ends in South Africa:** The process of dismantling apartheid began in the early 1990s, culminating in the first multiracial democratic election in **1994**, which brought Nelson Mandela to power.

- **(C) Adoption of Sustainable Development Goals (SDGs) by UN Member States:** The SDGs were adopted by all United Nations Member States in **2015** as a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030.

The chronological order is 1945 → 1989 → 1994 → 2015.

This corresponds to the sequence (D), (A), (B), (C).

Step 3: Final Answer:

The correct chronological sequence is (D), (A), (B), (C).

Quick Tip

Associate major world events with their historical eras: UN with post-WWII, Fall of the Berlin Wall with the end of the Cold War, end of Apartheid with the 1990s, and SDGs with recent global initiatives.

43. The strait that separates the North Andaman islands from the group of islands of Myanmar is...

- (A) Andaman Strait
- (B) Coco Strait
- (C) Preparis Strait
- (D) Cabot Strait

Correct Answer: (2) Coco Strait

Solution:

Step 1: Understanding the Concept:

The question asks to identify the specific geographical feature (a strait) that separates India's Andaman Islands from the islands belonging to Myanmar.

Step 2: Detailed Explanation:

The Andaman and Nicobar Islands are an archipelago in the Bay of Bengal. The northernmost island group of the Andamans is North Andaman Island. To the north of this lies the Coco Islands, which are politically part of Myanmar. The narrow but strategically important body of water that separates India's North Andaman Island from Myanmar's Coco Islands is known as the **Coco Strait** or Coco Channel.

Step 3: Final Answer:

The strait that separates the North Andaman islands from the islands of Myanmar is the Coco Strait.

Quick Tip

Remember the key geographical separators for the Andaman Nicobar chain: The Ten Degree Channel separates the Andaman Islands from the Nicobar Islands, and the Coco Strait separates the Andamans from Myanmar's islands to the north.

44. Article 9 of the Indian Constitution deals with

- (A) Persons who migrated to India from Pakistan
- (B) Indians who reside outside India
- (C) Persons who voluntarily acquire foreign citizenship
- (D) Right to citizenship at the commencement of the constitution

Correct Answer: (3) Persons who voluntarily acquire foreign citizenship

Solution:

Step 1: Understanding the Concept:

This question tests knowledge of the specific provisions of the Indian Constitution, particularly those related to citizenship (Part II, Articles 5-11).

Step 2: Detailed Explanation:

Let's briefly look at the relevant articles on citizenship:

- Article 5: Deals with citizenship at the commencement of the Constitution. (Option 4)
- Article 6: Deals with the rights of citizenship of certain persons who have migrated to India from Pakistan. (Option 1)
- Article 8: Deals with the rights of citizenship of certain persons of Indian origin residing outside India. (Option 2)
- **Article 9:** Explicitly states that "No person shall be a citizen of India by virtue of article 5, or be deemed to be a citizen of India by virtue of article 6 or article 8, if he has voluntarily acquired the citizenship of any foreign State." This article establishes the principle that Indian citizenship is lost upon the acquisition of a foreign citizenship.

Step 3: Final Answer:

Article 9 of the Indian Constitution deals with persons who voluntarily acquire foreign citizenship, stating they shall cease to be Indian citizens.

Quick Tip

Remember the core principle of Indian citizenship: India does not permit dual citizenship. Article 9 is the constitutional basis for this principle.

45. The main purpose of the Goods and Services Tax (GST) compensation fund is

- (A) To provide funding for infrastructure development.
- (B) To provide relief to taxpayers who have paid excess tax.
- (C) To support the development of micro, small and medium enterprises (MSMEs)
- (D) To compensate states for the loss of revenue due to the implementation of GST.

Correct Answer: (4) To compensate states for the loss of revenue due to the implementation of GST.

Solution:

Step 1: Understanding the Concept:

The question asks for the primary objective of the GST Compensation Fund, which was established as part of the GST regime in India.

Step 2: Detailed Explanation:

The Goods and Services Tax (GST) is a destination-based consumption tax that replaced many indirect taxes levied by the central and state governments. When GST was introduced, many states feared a loss of revenue as their own taxing powers would be subsumed. To address this concern and bring states on board for the reform, the central government enacted the GST (Compensation to States) Act, 2017. This act provides for a mechanism to **compensate states for any loss of revenue** they might incur due to the implementation of GST for a period of five years (initially from 2017 to 2022). The compensation is funded through a 'Compensation Cess' levied on certain goods.

Step 3: Final Answer:

The main purpose of the fund is to compensate states for the loss of revenue due to the implementation of GST.

Quick Tip

The name itself provides a strong clue: "GST **Compensation** Fund." The fund is designed to compensate someone for something. In the context of the federal GST structure, this compensation is from the Centre to the States for potential revenue loss.

46. Clouds are the masses of small water droplets or tiny ice crystals.

- (A) Clouds are classified according to their appearance and height.
- (B) Cirrus clouds are high altitude clouds, which are usually feathery shaped and composed entirely of ice crystals.
- (C) Nimbostratus clouds are mid level clouds producing sporadic rain.
- (D) Altocumulus are the heap-like clouds having flat bases and rounded tops.

Choose the correct answer from the options given below:

- (A) (A), (B) and (D) only
- (B) (A), (B) and (C) only
- (C) (B), (C) and (D) only
- (D) (A), (C) and (D) only

Correct Answer: (2) (A), (B) and (C) only

Solution:

Step 1: Understanding the Concept:

This question tests knowledge of basic cloud classification in meteorology.

Step 2: Detailed Explanation:

Let's evaluate each statement about clouds:

- **(A) Clouds are classified according to their appearance and height.** This is **correct**. The primary international system of cloud classification uses a Latin-based system that groups clouds by their form (appearance - e.g., cirrus, stratus, cumulus) and their altitude or height (e.g., high, middle, low).
- **(B) Cirrus clouds are high altitude clouds, which are usually feathery shaped and composed entirely of ice crystals.** This is a **correct** description. Cirrus clouds are thin, wispy, and found at high altitudes where temperatures are low enough for them to be made of ice crystals.
- **(C) Nimbostratus clouds are mid level clouds producing sporadic rain.** This is largely **correct**. Nimbostratus clouds are typically found in the low to middle altitudes and are dark, grey, featureless layers associated with continuous (rather than sporadic or showery) rain or snow. The term "sporadic" might be slightly imprecise, but the classification as a mid-level rain-producing cloud is correct.
- **(D) Altocumulus are the heap-like clouds having flat bases and rounded tops.** This description better fits **Cumulus** clouds. Altocumulus clouds are mid-level clouds that appear as white or greyish patches, often in layers or waves with a mottled, lumpy appearance. The classic "heap-like clouds with flat bases and rounded tops" is the definition of Cumulus clouds, which are low-level clouds. Therefore, this statement is **incorrect**.

Statements (A), (B), and (C) are correct.

Step 3: Final Answer:

The correct option is the one that includes only the correct statements (A), (B), and (C).

Quick Tip

Remember the Latin roots for cloud types: *Cirrus* (curl/hair), *Stratus* (layer), *Cumulus* (heap), *Nimbus* (rain), and *Alto* (mid-level). This helps in decoding the descriptions.

47. Aizawl is the capital of

- (A) Meghalaya
- (B) Nagaland
- (C) Mizoram
- (D) Tripura

Correct Answer: (3) Mizoram

Solution:

Step 1: Understanding the Concept:

This is a general knowledge question asking to identify the state for which Aizawl is the capital city.

Step 2: Detailed Explanation:

Let's list the capitals of the states given in the options:

- Meghalaya: Capital is Shillong.
- Nagaland: Capital is Kohima.
- **Mizoram:** Capital is **Aizawl**.
- Tripura: Capital is Agartala.

Step 3: Final Answer:

Aizawl is the capital of Mizoram.

Quick Tip

It is essential to memorize the states and capitals of India, especially for the North-Eastern states as they are frequently asked in competitive exams.

48. Match the countries with their respective currencies:

List-I (Country)	List-II (Currency)
(A) Japan	(I) Krone
(B) Russia	(II) Yen
(C) China	(III) Ruble
(D) Norway	(IV) Yuan

Choose the correct answer from the options given below:

- (A) (A) - (IV), (B) - (II), (C) - (III), (D) - (I)
- (B) (A) - (III), (B) - (II), (C) - (IV), (D) - (I)
- (C) (A) - (II), (B) - (III), (C) - (IV), (D) - (I)

(D) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Correct Answer: (3) (A) - (II), (B) - (III), (C) - (IV), (D) - (I)

Solution:

Step 1: Understanding the Concept:

This question tests general knowledge about countries and their official currencies.

Step 2: Detailed Explanation:

Let's match each country in List-I with its correct currency in List-II:

- **(A) Japan:** The official currency of Japan is the **(II) Yen**.
- **(B) Russia:** The official currency of Russia is the **(III) Ruble**.
- **(C) China:** The official currency of China is the Renminbi, and its basic unit is the **(IV) Yuan**.
- **(D) Norway:** The official currency of Norway is the Norwegian **(I) Krone**.

The correct matching is: A→II, B→III, C→IV, D→I.

Step 3: Final Answer:

Based on the correct pairings, option (3) presents the correct combination.

Quick Tip

When preparing for general knowledge, create a list of important countries, their capitals, and their currencies. Focus on countries frequently in the news and major world economies.

49. The river which flows through the Grand Canyon of India, also known as the Gandikota Gorge is

- (A) Ganga
- (B) Krishna
- (C) Penna
- (D) Brahmaputra

Correct Answer: (3) Penna

Solution:

Step 1: Understanding the Concept:

The question asks to identify the river associated with a specific geographical feature in India,

the Gandikota Gorge.

Step 2: Detailed Explanation:

Gandikota is a village and historical fort on the right bank of the **Penna River** (also known as Pennar) in the Kadapa district of Andhra Pradesh. The river has carved a deep gorge through the Erramala hills, creating a spectacular landscape that is often referred to as the "Grand Canyon of India." The other rivers listed flow through entirely different regions of India and are not associated with this gorge.

Step 3: Final Answer:

The Penna river flows through the Gandikota Gorge.

Quick Tip

Remember geographical "nicknames" and their locations. "Grand Canyon of India" is a popular name for the Gandikota Gorge, which is firmly associated with the Penna River in Andhra Pradesh.

50. The National Emblem of India has been adopted from the capital of King _____ which was situated in _____.

- (A) Akbar, Agra
- (B) Ashoka, Sarnath
- (C) Ashoka, Sanchi
- (D) Akbar, Delhi

Correct Answer: (2) Ashoka, Sarnath

Solution:

Step 1: Understanding the Concept:

The question asks about the origin of the National Emblem of India, specifically the ruler and the location of the original artifact.

Step 2: Detailed Explanation:

The National Emblem of India is an adaptation of the Lion Capital of **Ashoka**, an ancient sculpture dating back to around 250 BCE. This capital was originally placed on top of a pillar at the important Buddhist site of **Sarnath**, near Varanasi in Uttar Pradesh. The capital features four Asiatic lions standing back to back, mounted on an abacus with a frieze carrying high-relief sculptures of an elephant, a galloping horse, a bull, and a lion, separated by intervening wheels (Dharma Chakras). The emblem was officially adopted on 26 January 1950.

Step 3: Final Answer:

The National Emblem of India has been adopted from the capital of King Ashoka which was situated in Sarnath.

Quick Tip

The Ashoka Chakra (the wheel) in the center of the Indian flag and the Lion Capital as the National Emblem are both from the same source: the Ashokan pillar at Sarnath. This connection makes it easier to remember.