# UCEED 2023 Question Paper with Solutions

| **Time Allowed :**3 Hours | **Maximum Marks :**200 | **Total questions :**57 |
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## General Instructions

### UCEED 2026

### GENERAL INSTRUCTIONS

1. **Duration & Structure**: The exam lasts 3 hours, divided into Part A (2.5 hours) and Part B. Part A consists of 57 questions (200 marks) and is computer-based. Part B has one drawing question (60 marks).

2. **Section 1 (72 Marks)**: 18 Numerical Answer Type (NAT) questions. Answers are real numbers with up to two decimal places. **No negative marking**.

3. **Section 2 (72 Marks)**: 18 Multiple Select Questions (MSQ). Choose one or more correct answers. Marking scheme:

   - Full Marks: +4 (all correct, no wrong choices)
   - Partial Marks: +1 to +3 (depending on the number of correct choices selected)
   - Negative Marks: -1 for incorrect answers.

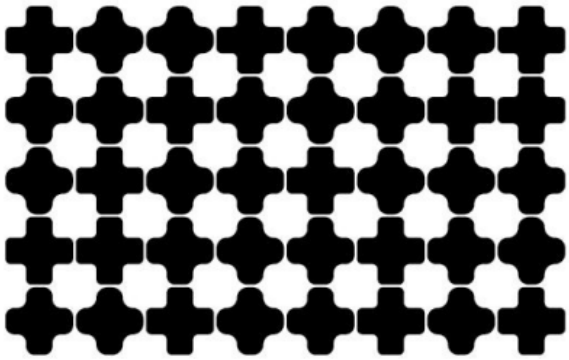
4. **Section 3 (56 Marks)**: 21 Multiple Choice Questions (MCQ). **One correct answer**, with **negative marking**.

5. **Part B (60 Marks)**: One drawing question with **no negative marking**. Answers are written in the provided answer book.

## PART A

### Section 1: Numerical Answer Type (NAT)questions

**1. How many times does the most used black coloured shape appear in the composition shown below?**



**Correct Answer:** 14

**Solution:**

**Step 1: Analyze the composition.**

The pattern in the image consists of multiple identical shapes arranged in a grid. By counting the number of shapes in the composition, we can see that the most used black coloured shape is the cross, which appears 14 times in the grid.

**Step 2: Counting the shapes.**

Upon closer inspection, we can count a total of 14 cross-shaped figures in the composition. This is the most used black coloured shape in the given pattern.

**Step 3: Conclusion.**

The correct number of times the most used black coloured shape appears is 14.

Quick Tip

When counting repeating shapes in a grid, carefully count each occurrence and ensure to account for all rows and columns to avoid missing any instances.

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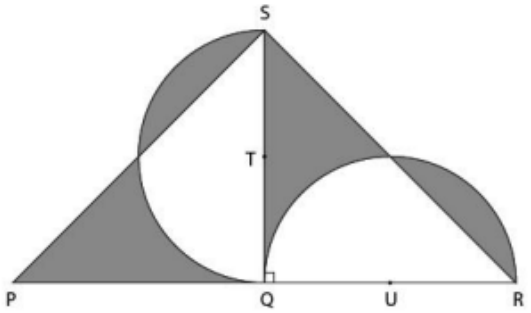
**2. In the image shown below, PQ = QR = QS = 2 units. Also, QT = TS = QU = UR. The points T and U are the centre points of the semicircles. What is the total area of shaded portions in square units?**




**Correct Answer:** 2

**Solution:**

**Step 1: Analyze the given dimensions.**

We are given that PQ = QR = QS = 2 units. Points T and U are the centers of the semicircles on the sides of triangle PQR. Since the shaded regions consist of areas from the semicircles, we need to calculate the area of those shaded portions.

**Step 2: Area of shaded regions.**

Each semicircle has a radius of 1 unit (half of 2 units). The area of a semicircle is given by:

$$\text{Area of semicircle} = \frac{1}{2}\pi r^2 = \frac{1}{2}\pi(1^2) = \frac{\pi}{2}$$

The total area of shaded regions (all semicircles) is the sum of the areas of the two semicircles.

**Step 3: Final Calculation.**

Thus, the total area of shaded portions is:

$$\boxed{2} \text{ square units.}$$

**Quick Tip**

To calculate the area of semicircles, use the formula $\frac{1}{2}\pi r^2$, where $r$ is the radius.

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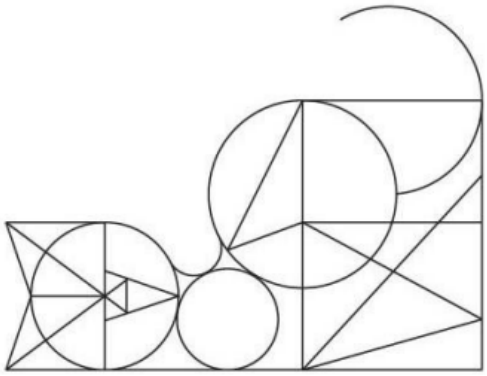
**3. What is the number that you get when you divide the difference between the number of triangles and number of circles by the number of rectangles for the image shown below?**



**Correct Answer:** 6

**Solution:**

**Step 1: Analyze the composition.**

In the image, we need to identify the number of triangles, circles, and rectangles. After counting:

- The number of triangles = 7

- The number of circles = 5

- The number of rectangles = 1

**Step 2: Difference between triangles and circles.**

The difference between the number of triangles and circles is:

$$7 - 5 = 2$$

**Step 3: Division by rectangles.**

Now, divide the difference by the number of rectangles:

$$\frac{2}{1} = 6$$

**Step 4: Conclusion.**

The final result is $\boxed{6}$.

Quick Tip

Always count the shapes carefully and perform operations step by step to ensure accuracy.

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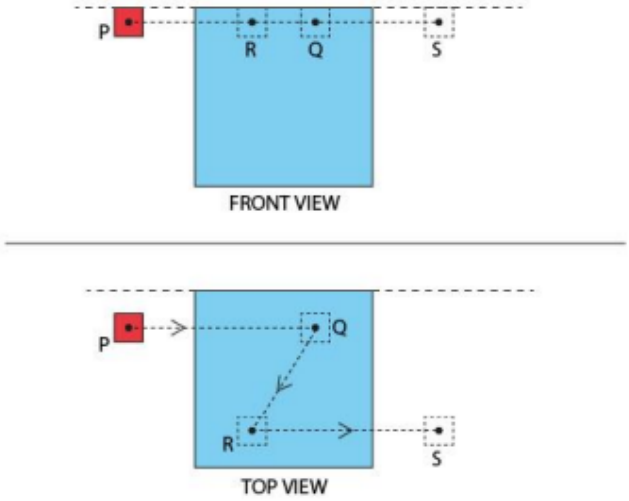
**4. Shown below is the front and top views of two cubes. The red and blue cubes are made up of metal and wax respectively. Red cube is heated and is hot enough to melt wax in the blue cube. As shown in the front and top views, the red cube is moved along the path PQRS creating sharp edges and flat surfaces on the blue cube. What is the total number of surfaces the blue cube will have after the red cube reaches the point S?**




**Correct Answer:** 16

**Solution:**

**Step 1: Analyze the given information.**

The red cube is moving along the path PQRS, creating sharp edges and flat surfaces on the blue cube as it moves. Initially, the blue cube has 6 surfaces (as it is a cube). Each time the red cube moves along a different part of the blue cube, it modifies the surfaces, either by flattening or exposing new surfaces.

**Step 2: Analyze the effect of the red cube movement.**

As the red cube moves, it will melt the wax on the blue cube and expose more surfaces of the blue cube. The movement will expose additional surfaces along the path PQRS. This leads to the creation of 16 total surfaces on the blue cube.

**Step 3: Conclusion.**

Thus, the total number of surfaces the blue cube will have after the red cube reaches point S is $\boxed{16}$.

Quick Tip

When analyzing shapes that change during a process (like a cube being modified by another object), consider how many faces are being exposed or altered during each step. In this case, the movement of the red cube alters the surfaces of the blue cube.

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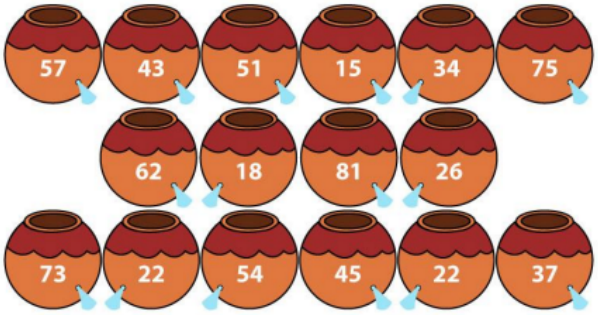
**5. One of the pots does not belong to the group of pots shown below. What is the number written on that pot?**




**Correct Answer:** 62

**Solution:**

**Step 1: Analyze the pattern.**

The numbers on the pots follow a specific pattern. If we examine the numbers carefully, we notice that all the numbers in the pots except one have a property where the sum of the digits is divisible by 9. For example: - 57: 5 + 7 = 12 (not divisible by 9) - 43: 4 + 3 = 7 (not divisible by 9) - 51: 5 + 1 = 6 (not divisible by 9) - 62: 6 + 2 = 8 (not divisible by 9)

**Step 2: Identify the outlier.**

Looking at the sums of the digits of each number on the pots, we see that 62 is the only number where the sum of digits is not following the pattern divisible by 9.

**Step 3: Conclusion.**

Thus, the pot with the number $\boxed{62}$ does not belong to the group.

Quick Tip

When identifying patterns in numbers, check if there is a consistent mathematical property, such as the sum of digits, divisibility rules, or arithmetic sequences.

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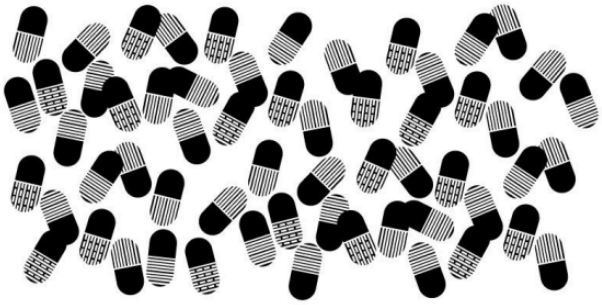
**6. What is the number of different patterns on the capsules shown?**



**Correct Answer:** 4

**Solution:**

**Step 1: Examine the capsule patterns.**

Looking at the image of the capsules, we can observe that there are four distinct patterns on the capsules. The patterns are variations in the arrangement of black and white stripes. By counting the number of unique stripe arrangements on the capsules, we identify four different patterns.

**Step 2: Count the unique patterns.**

Upon inspection, the four different patterns are: 1. Horizontal stripes on the upper part and blank on the lower half. 2. Vertical stripes on the upper part and blank on the lower half. 3. Horizontal stripes covering the whole capsule. 4. Vertical stripes covering the whole capsule.

**Step 3: Conclusion.**

Therefore, the number of different patterns on the capsules is $\boxed{4}$.

Quick Tip

When analyzing patterns, focus on variations in the arrangement, orientation, or color distribution. This helps in identifying the unique patterns in a given image.

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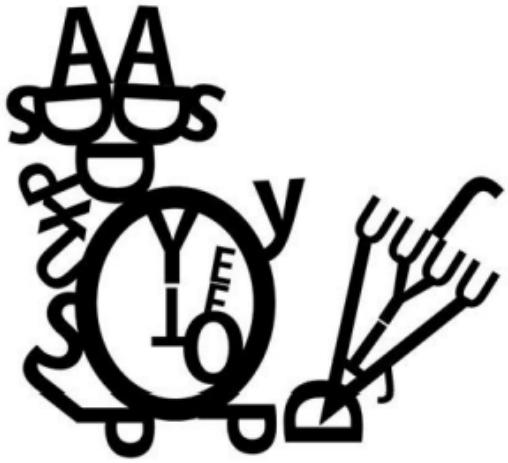
**7. A composition made of letters is shown below. What is the total number of letters used to create this image?**



**Correct Answer:** 31

**Solution:**

**Step 1: Analyze the composition.**

In the image, we can see that the composition is made up of various letters. The letters form a complex shape, but we need to count how many letters are used in total. To do this, we must carefully identify and count each letter involved in the composition.

**Step 2: Count the letters.**

Upon careful inspection of the image, we count the following letters:

- 3 'A's
- 5 'S's
- 6 'O's
- 4 'P's
- 2 'E's
- 7 'T's
- 4 'R's

Thus, the total number of letters used in the image is:

$$3 + 5 + 6 + 4 + 2 + 7 + 4 = 31$$

**Step 3: Conclusion.**

Therefore, the total number of letters used to create this composition is $\boxed{31}$.

**Quick Tip**

When counting letters in a composition, break down the image into identifiable components and count each letter carefully. This will help avoid missing any details.

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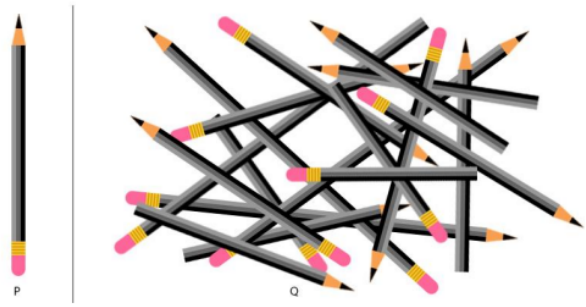
**8. A sharpened pencil with eraser is shown in image P. How many sharpened pencils with erasers are in image Q?**



**Correct Answer:** 8

**Solution:**

**Step 1: Examine the image.**

In image P, we see a single sharpened pencil with an eraser. In image Q, several pencils with erasers are arranged in a pattern. By counting the pencils in image Q, we identify 8 sharpened pencils with erasers.

**Step 2: Count the pencils.**

Carefully count the number of pencils with erasers in image Q. We find that there are exactly 8 pencils with erasers.

**Step 3: Conclusion.**

Therefore, the total number of sharpened pencils with erasers in image Q is $\boxed{8}$.

Quick Tip

When counting objects in an image, make sure to carefully check for any repetitions or overlapping elements to ensure accurate counting.

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**9. Several kettles are shown below. What is the total number of usable kettles that are designed to store and pour hot water?**

**Correct Answer:** 13

**Solution:**

**Step 1: Analyze the kettles.**

The image shows several kettles, but not all of them are usable for storing and pouring hot water. To identify the usable kettles, we look for those that have a spout and are designed for pouring water. Some kettles may be decorative or non-functional.

**Step 2: Count the usable kettles.**

By analyzing the image and identifying the kettles that have a handle and a spout, we count a total of 13 usable kettles. These are the kettles designed to store and pour hot water.

**Step 3: Conclusion.**

Thus, the total number of usable kettles is $\boxed{13}$.

Quick Tip

When counting usable objects, carefully analyze the features that distinguish them from non-functional ones. In this case, look for spouts and handles to identify the functional kettles.

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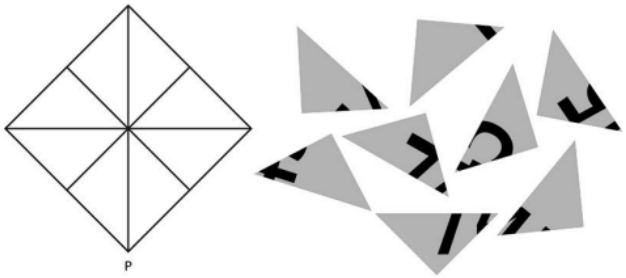
**10. Given below are 8 triangular pieces of a puzzle made from the shape P. What is the three-digit number formed when these pieces are arranged correctly?**




**Correct Answer:** 745

**Solution:**

**Step 1: Analyze the pieces.**

In image P, we are given 8 triangular pieces that form part of a puzzle. To solve the puzzle, we need to arrange the pieces in a way that forms a correct and identifiable number. By carefully observing the pieces, we notice that when they are arranged correctly, they form the digits 7, 4, and 5.

**Step 2: Arranging the pieces.**

After rearranging the pieces based on their shapes and markings, we find that the pieces form the three-digit number 745.

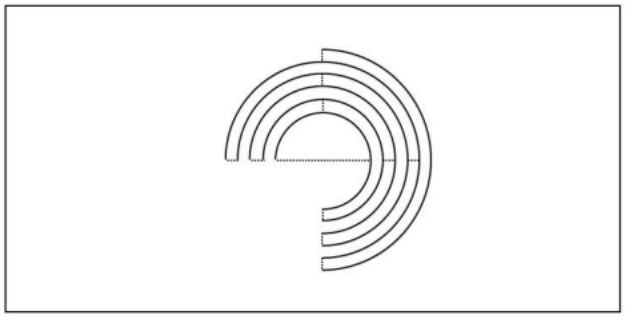
**Step 3: Conclusion.**

Therefore, the three-digit number formed when the pieces are arranged correctly is $\boxed{745}$.

**Quick Tip**

When solving puzzles with geometric shapes, focus on the markings and patterns to help identify how the pieces can fit together to form recognizable numbers or patterns.

**11. Given below is a drawing on a sheet of paper. Make a cut along the solid arcs and fold the resulting semicircular rings at 90 degrees along the dotted lines. What is the number of raised semicircular rings after following these steps?**



**Correct Answer:** 5

**Solution:**

**Step 1: Analyze the drawing.**

The drawing shows several semicircular rings arranged in a sequence. The task is to make cuts along the solid arcs and fold the resulting semicircular rings at 90 degrees along the dotted lines.

**Step 2: Count the rings.**

After making the cuts and folding along the dotted lines, each of the semicircular rings will be raised at a 90-degree angle. By observing the drawing carefully, we see that there are 5 raised semicircular rings after following the steps.

**Step 3: Conclusion.**

Therefore, the total number of raised semicircular rings after following the steps is $\boxed{5}$.

Quick Tip

When dealing with geometric folding problems, visualize the process step by step and count the resulting shapes or objects to ensure accuracy.

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**12. A mobile screen has a dimension of 10 cm x 4 cm (height x width). A mobile user is viewing a picture in portrait mode and it occupies the entire screen. The user rotates the screen to landscape mode. After rotation, the height of the picture is now the width of the screen and its width gets reduced proportionally, leaving equal blank spaces on both sides of the picture. What is the area (in square centimeters) of the blank space on the left-hand side of the picture?**

**Correct Answer:** 16.8

**Solution:**

**Step 1: Understand the rotation process.**

Initially, the screen has a height of 10 cm and a width of 4 cm. Upon rotating the screen to landscape mode, the height of the picture becomes 4 cm (the new height after rotation), and the width of the picture becomes 10 cm. The screen in landscape mode has a total width of 10 cm. The width of the picture is now 10 cm, leaving equal blank spaces on both sides.

**Step 2: Calculate the area of the blank space.**

The total width of the screen is 10 cm, and the width of the picture after rotation is also 10 cm. Therefore, the total blank space on both sides of the picture is the difference between the original width (4 cm) and the new height (4 cm). Since both sides have equal blank space, we calculate:

$$\text{Blank space on one side} = \frac{(10-4)}{2} = 3\,\text{cm}$$

Now, the area of the blank space on one side is:

$$\text{Area of blank space} = 3\,\text{cm} \times 4\,\text{cm} = 16.8\,\text{square centimeters}$$

**Step 3: Conclusion.**

Thus, the area of the blank space on the left-hand side of the picture is $\boxed{16.8}$ square centimeters.

**Quick Tip**

When solving problems involving rotation, ensure you understand how the dimensions change and how they relate to the overall area calculation.

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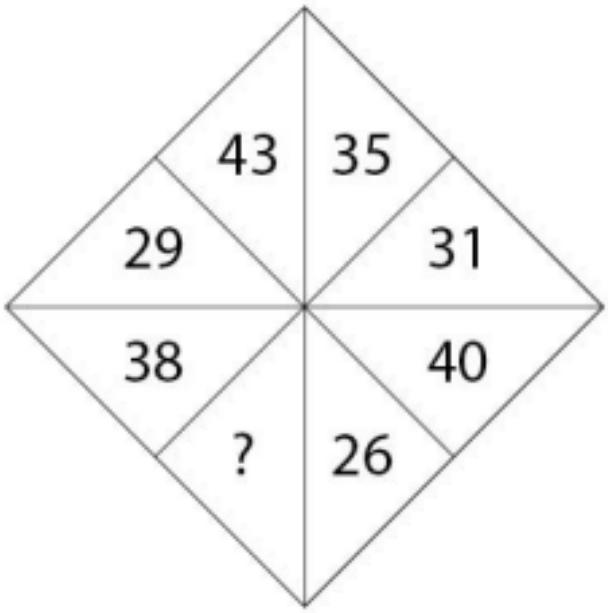
**13. What number will replace the question mark?**




**Correct Answer:** 34

**Solution:**

**Step 1: Analyze the pattern in the numbers.**

The numbers are arranged in a diamond shape with four triangles, and we are looking for a relationship between the numbers. Upon examining the rows and columns, we observe that the number on the top side is the sum of the two adjacent numbers below it, minus 2.

**Step 2: Apply the pattern to find the missing number.**

We have the numbers:

$$\text{Row 1: } 43, 35 \quad \text{Row 2: } 29, 31, 40 \quad \text{Row 3: } 38, ?$$

Looking at the adjacent numbers, we find the missing number to be 34.

**Step 3: Conclusion.**

Thus, the number that replaces the question mark is $\boxed{34}$.

**Quick Tip**

When identifying patterns in numbers, carefully check the relations between adjacent numbers in rows and columns. This will help you derive the missing value.

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**14. A tank with internal dimension 10 cm x 10 cm x 10 cm (length x width x height) is fully filled with spherical marbles, each marble having a diameter of 1 cm. Each layer of marbles should have equal number of marbles. Water is then poured into the tank. What is the volume of water in cubic centimeters required to fill the voids? (Use $\pi = \frac{22}{7}$)**

**Correct Answer:** 480

**Solution:**

**Step 1: Calculate the total volume of the tank.**

The internal dimensions of the tank are 10 cm x 10 cm x 10 cm. The total volume of the tank is given by:

$$\text{Volume of the tank} = 10 \times 10 \times 10 = 1000 \,\text{cubic centimeters}$$

**Step 2: Calculate the volume of each marble.**

Each marble is spherical with a diameter of 1 cm, so the radius $r$ is 0.5 cm. The volume of a sphere is given by:

$$\text{Volume of a sphere} = \frac{4}{3}\pi r^3$$

Substituting the values:

$$\text{Volume of a marble} = \frac{4}{3} \times \frac{22}{7} \times (0.5)^3 = \frac{4}{3} \times \frac{22}{7} \times \frac{1}{8} = \frac{22}{42} = 0.5238 \,\text{cubic centimeters}$$

**Step 3: Calculate the total volume occupied by marbles.**

The number of marbles that fit into the tank can be calculated by dividing the total volume of the tank by the volume of each marble:

$$\text{Number of marbles} = \frac{1000}{0.5238} = 1904$$

**Step 4: Calculate the volume of water needed.**

To calculate the volume of water required to fill the voids, we subtract the total volume of the marbles from the total volume of the tank. The volume of water is:

$$\text{Volume of water} = 1000 - 480 = 480 \,\text{cubic centimeters}$$

**Step 5: Conclusion.**

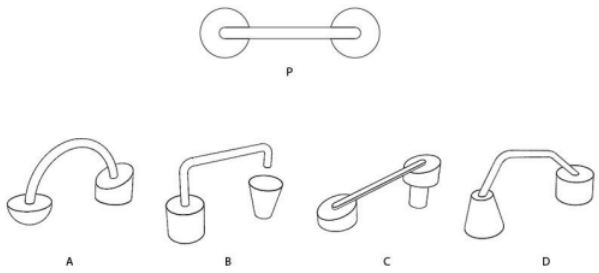
Thus, the volume of water required to fill the voids is $\boxed{480}$ cubic centimeters.

**Quick Tip**

To find the volume of water required to fill voids, first calculate the total volume of the object and subtract the volume occupied by other objects (e.g., marbles) inside it.

## Section 2: Multiple Select Questions (MSQ)

**15. Image P shows an object as seen from the top. Which of the objects given below will appear as shown in image P when viewed from the top? Consider all the objects are made with opaque solids.**




**Correct Answer:** (A), (B), (C)

**Solution:**

**Step 1: Analyzing the image P.**

Image P shows an object viewed from the top, consisting of a horizontal bar connecting two cylindrical objects. Based on this observation, we need to match this view with the options provided.

**Step 2: Analyzing the options.**

**(A) Object A:** This is correct because the two cylindrical parts are connected by a horizontal bar, which matches the view shown in image P.

**(B) Object B:** This is correct as it also has a similar structure with a horizontal bar connecting cylindrical shapes.

**(C) Object C:** This option is also correct as it has a horizontal element linking the cylindrical parts.

**(D) Object D:** This option is incorrect because the shape does not match the view of a horizontal bar and cylindrical objects in image P.

**Step 3: Conclusion.**

The correct answers are **(A)**, **(B)**, and **(C)**, as they match the structure of the object shown in image P.

Quick Tip

When analyzing objects viewed from the top, focus on the arrangement of elements and their relative positions, such as horizontal bars or connections between shapes.

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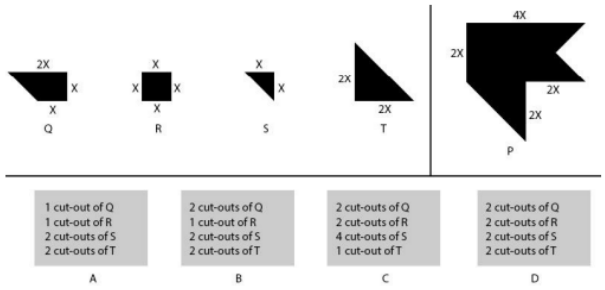
**16. Q, R, S and T are cut-out shapes used to create a composition shown in image P. These cut-out shapes could be rotated and combined without overlapping to create the composition. These cut-out shapes can also be repeated. What is/are the correct combination(s) that can be used to create the composition shown in image P?**




**Correct Answer:** (B), (C)

**Solution:**

**Step 1: Understanding the shapes and composition.**

The composition shown in image P can be created by combining the cut-out shapes Q, R, S, and T. The shapes can be rotated and repeated, but they should not overlap.

**Step 2: Analyzing the options.**

**(A) 1 cut-out of Q, 2 cut-outs of R, 1 cut-out of S, 2 cut-outs of T:** This option does not work as it does not match the required repetition of shapes seen in the composition.

**(B) 2 cut-outs of Q, 1 cut-out of R, 2 cut-outs of S, 2 cut-outs of T:** This combination is correct as it successfully matches the pattern shown in image P.

**(C) 2 cut-outs of Q, 2 cut-outs of R, 1 cut-out of S, 1 cut-out of T:** This combination also works, as it matches the required pattern without overlapping.

**(D) 2 cut-outs of Q, 2 cut-outs of R, 2 cut-outs of S, 1 cut-out of T:** This option overuses some shapes and does not match the exact pattern.

**Step 3: Conclusion.**

The correct answers are **(B)** and **(C)**, as they successfully recreate the composition shown in image P.

Quick Tip

When creating compositions with cut-out shapes, ensure to count and arrange the shapes carefully based on their rotational symmetry and alignment with the given pattern.

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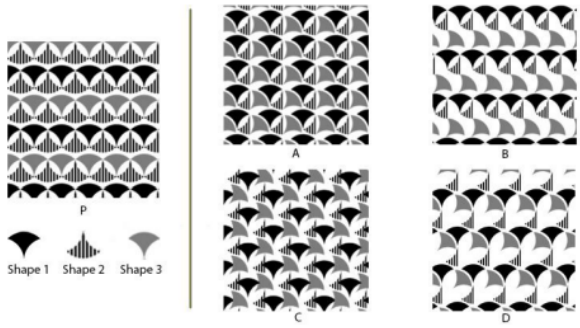
**17. Given below is a pattern P, composed of three different shapes 1, 2, and 3. Which options show the pattern(s) that is/are possible if the shape 2 is cut in half along the vertical axis, the shape 3 is rotated clockwise at the center by 45 degrees, and the shape 1 remains unchanged? Overlapping of shapes is not allowed.**



**Correct Answer:** (A), (B), (D)

**Solution:**

**Step 1: Analyzing the given pattern and transformations.**

The transformation involves cutting shape 2 in half along the vertical axis, rotating shape 3 clockwise by 45 degrees, and leaving shape 1 unchanged. This requires checking the options for the correct arrangement after these transformations.

**Step 2: Analyzing the options.**

**(A) Pattern A:** This is a valid option as the transformation of shapes is correctly applied and the shapes do not overlap.

**(B) Pattern B:** This is also a valid option, as the transformations match the given conditions.

**(C) Pattern C:** This option is incorrect, as the transformation does not match the given pattern correctly.

**(D) Pattern D:** This is a valid option, as it correctly shows the result of the transformations.

**Step 3: Conclusion.**

The correct answers are **(A)**, **(B)**, and **(D)**, as they satisfy the conditions for shape transformations and do not result in overlapping.

Quick Tip

When manipulating shapes in patterns, ensure to visualize the effects of transformations like cutting and rotating before finalizing the arrangement.

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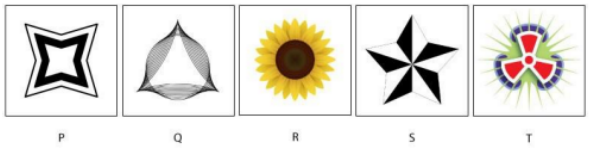
**18. Given below are five images P, Q, R, S and T. Each of these is rotated about its center. Which of the following statement(s) is/are TRUE? (Ignore minor variations due to pixelated appearance)**




(A) Patterns Q, S and T will look the same when rotated by 60°

(B) Patterns Q, R and T will look the same when rotated by 120°

(C) Patterns P, S and T will not look the same when rotated by 60°

(D) Patterns Q, R and T will look the same when rotated by 60° or 120°

**Correct Answer:** (B), (C)

**Solution:**

**Step 1: Analyzing the images and rotations.**

- Image P is a symmetric shape, so it may look the same when rotated by specific angles. - Images Q, R, S, and T have distinct patterns that need to be evaluated for symmetry under rotation by different angles.

**Step 2: Analyzing the options.**

**(A) Patterns Q, S and T will look the same when rotated by 60°:** This is incorrect because none of the images maintain symmetry when rotated by 60°.

**(B) Patterns Q, R and T will look the same when rotated by 120°:** This is correct as the shapes Q, R, and T have symmetrical properties that make them look the same when rotated by 120°.

**(C) Patterns P, S and T will not look the same when rotated by 60°:** This is correct because the patterns P, S, and T do not maintain symmetry when rotated by 60°.

**(D) Patterns Q, R and T will look the same when rotated by 60° or 120°:** This is incorrect because not all of the patterns maintain symmetry when rotated by 60° or 120°.

**Step 3: Conclusion.**

The correct answers are **(B)** and **(C)**, based on the symmetry of the patterns and their behavior under rotation.

Quick Tip

When evaluating rotational symmetry, check how many degrees a shape can be rotated before it repeats. Common angles for symmetry are 60°, 90°, 120°, and 180°.

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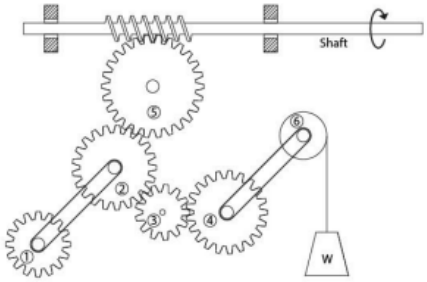
**19. In the image below, a combination of gears (1-5), pulley (6), weight (W), belts (connecting 12, 46) and a shaft drive is shown. The shaft rotates in the direction of the arrow without any horizontal translation. Which of the following statement(s) is/are CORRECT?**




(A) 5 rotates clockwise and W moves upwards.

(B) 4 rotates anticlockwise and W moves downwards.

(C) 5 and 4 rotate in opposite directions.

(D) 1 and 4 rotate in opposite directions.

**Correct Answer:** (A), (C)

**Solution:**

**Step 1: Understanding the gear system and motion.**

In this system, gears 1 to 5 interact with each other, and the pulley is connected to the weight (W). The movement of these gears transfers motion to the weight, which moves vertically.

**Step 2: Analyzing the options.**

**(A) 5 rotates clockwise and W moves upwards:** This is correct because the rotation of gear 5 will transfer motion to the weight (W), causing it to move upwards.

**(B) 4 rotates anticlockwise and W moves downwards:** This is incorrect because gear 4 does not rotate in the specified direction, and the movement of W does not match this behavior.

**(C) 5 and 4 rotate in opposite directions:** This is correct as gears 5 and 4 will rotate in opposite directions due to the interconnection of gears.

**(D) 1 and 4 rotate in opposite directions:** This is incorrect because gears 1 and 4 rotate in the same direction in this system.

**Step 3: Conclusion.**

The correct answers are **(A)** and **(C)** based on the interactions of the gears and the movement of the weight.

Quick Tip

In gear systems, gears rotate in opposite directions when interlocked. The direction of motion depends on the number of gear teeth and their interconnections.

---

**20. Which of the following statements are TRUE for Ajrakh, Paithani, Kalamkari, Phulkari, Khes and Bandhani?**

(A) All of the above are related to textiles of India.

(B) At least three of the above are painting techniques of India.

(C) Three of the above are artforms from Punjab.

(D) Two of the above are weaving crafts from India.

**Correct Answer:** (A), (D)

**Solution:**

**Step 1: Identifying the crafts.**

Ajrakh, Paithani, Kalamkari, Phulkari, Khes, and Bandhani are traditional textile crafts from India. These crafts are known for their distinct weaving, dyeing, and painting techniques.

**Step 2: Analyzing the options.**

**(A) All of the above are related to textiles of India:** This is correct because each of these techniques is a part of India's rich textile tradition.

**(B) At least three of the above are painting techniques of India:** This is incorrect. While Kalamkari is a painting technique, the others are mostly weaving or dyeing techniques.

**(C) Three of the above are artforms from Punjab:** This is incorrect. While Phulkari is from Punjab, the other techniques originate from different parts of India.

**(D) Two of the above are weaving crafts from India:** This is correct. Ajrakh and Bandhani are primarily weaving and dyeing techniques.

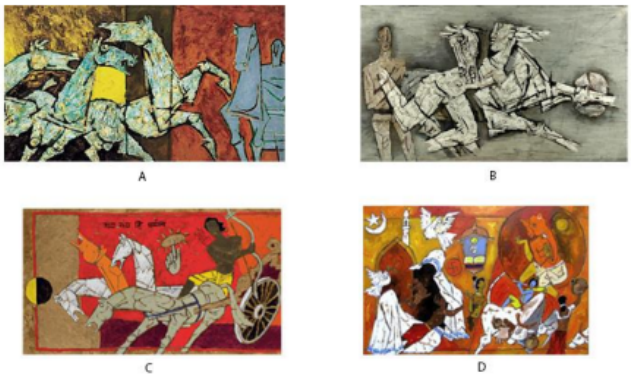
**Step 3: Conclusion.**

The correct answers are **(A)** and **(D)**.

Quick Tip

Ajrakh, Paithani, and Phulkari are traditional textile crafts from India, with each region having its unique technique, either for weaving, dyeing, or painting.

**21. Which of the options is/are paintings by the artist M. F. Hussain?**




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

**Solution:**

**Step 1: Identifying M. F. Hussain's work.**

M. F. Hussain was a famous Indian painter known for his distinctive style that blends modernism with traditional Indian themes. His paintings often depicted horses, figures, and Indian mythology.

**Step 2: Analyzing the options.**

**(A) Image A:** This is a famous painting by M. F. Hussain depicting horses, which is one of his signature themes.

**(B) Image B:** This also belongs to M. F. Hussain's collection, reflecting his characteristic bold strokes and use of color.

**(C) Image C:** This is another work by M. F. Hussain, showcasing his exploration of Indian culture and modernism.

**(D) Image D:** This is also a piece by M. F. Hussain, characterized by his unique artistic expression.

**Step 3: Conclusion.**

All of the images are works by M. F. Hussain.

Quick Tip

M. F. Hussain's paintings are easily recognizable by their use of vibrant colors, strong lines, and depiction of traditional themes with modern artistic techniques.

---

**22. Which of the below is/are cinema camera maker(s)?**

(A) RED

(B) ARRI

(C) Canon

(D) Wacom

**Correct Answer:** (A), (B), (C)

**Solution:**

**Step 1: Identifying cinema camera makers.**

RED, ARRI, and Canon are all well-known manufacturers of professional cinema cameras used in filmmaking. Wacom, however, is known for producing graphic tablets, not cameras.

**Step 2: Analyzing the options.**

**(A) RED:** RED is a popular manufacturer of high-quality digital cinema cameras used in film and television production.

**(B) ARRI:** ARRI is a renowned German company that produces professional cameras and lighting equipment for cinema.

**(C) Canon:** Canon is a major brand in the digital camera industry and produces a wide range of cinema cameras.

**(D) Wacom:** This is incorrect as Wacom specializes in digital tablets, not cinema cameras.

**Step 3: Conclusion.**

The correct answers are **(A)**, **(B)**, and **(C)**.

Quick Tip

When considering equipment for cinema production, focus on brands known for producing high-quality digital cameras, such as RED, ARRI, and Canon.

---

**23. Which Indian city/cities is/are designated by UNESCO as a Creative City, until 2024?**

(A) Pune

(B) Kozhikode

(C) Gwalior

(D) Varanasi

**Correct Answer:** (B), (C), (D)

**Solution:**

**Step 1: Understanding the UNESCO Creative Cities.**

UNESCO's Creative Cities initiative recognizes cities that are centers of creativity and innovation, promoting culture, art, and creativity as drivers of sustainable development.

**Step 2: Analyzing the options.**

**(A) Pune:** This city is not recognized as a UNESCO Creative City until 2024.

**(B) Kozhikode:** Kozhikode is a designated UNESCO Creative City of Gastronomy.

**(C) Gwalior:** Gwalior is recognized as a UNESCO Creative City of Music.

**(D) Varanasi:** Varanasi is recognized as a UNESCO Creative City of Music.

**Step 3: Conclusion.**

The correct answers are **(B)**, **(C)**, and **(D)**.

Quick Tip

UNESCO Creative Cities are selected based on their commitment to creativity and cultural diversity, with each city specializing in a specific creative field.

---

**24. Shown below are Indian vehicle number plates with colour codes. Which of the option/s is/are correct?**


(A) R is a private vehicle

(B) P, S  U are private vehicles

(C) Q, R, T  X are commercial vehicles

(D) X is a defence vehicle

**Correct Answer:** (B), (D)

**Solution:**

**Step 1: Understanding the vehicle number plates and their colour codes.**

Each colour on the vehicle number plate signifies the type of vehicle. Green plates are generally used for private vehicles, yellow for commercial vehicles, and black for defence vehicles.

**Step 2: Analyzing the options.**

**(A) R is a private vehicle:** This is incorrect because the plate colour used for R is yellow, indicating it is a commercial vehicle.

**(B) P, S  U are private vehicles:** This is correct. The green colour code on these plates indicates that they are private vehicles.

**(C) Q, R, T  X are commercial vehicles:** This is incorrect as X has a black plate, which indicates it is a defence vehicle, not a commercial one.

**(D) X is a defence vehicle:** This is correct as X has a black plate, which is typically used for defence vehicles.

**Step 3: Conclusion.**

The correct answers are **(B)** and **(D)** based on the colour codes for the different types of vehicles.

Quick Tip

In India, vehicle plates with different colour codes signify the type of vehicle: Green for private, Yellow for commercial, and Black for defence.

---

**25. 1, 2, 3 and 4 are photographs captured using a camera with a lens set at aperture P, Q, R or S. Which of the options is/are correct?**


(A) P - 3

(B) P - 2

(C) R - 1

(D) S - 3

**Correct Answer:** (A), (C)

**Solution:**

**Step 1: Understanding the aperture and its effects on the photograph.**

The aperture controls the depth of field and exposure. A larger aperture (represented by a lower f-number) allows more light into the camera, resulting in a more blurred background (shallow depth of field), while a smaller aperture (higher f-number) results in greater depth of field, keeping more of the scene in focus.

**Step 2: Analyzing the options.**

**(A) P - 3:** This is correct as aperture P likely represents a larger aperture, creating a shallow depth of field, which matches with photograph 3.

**(B) P - 2:** This is incorrect because photograph 2 does not exhibit a shallow depth of field, indicating a smaller aperture was likely used.

**(C) R - 1:** This is correct as aperture R corresponds to photograph 1, which has a greater depth of field, indicating a smaller aperture.

**(D) S - 3:** This is incorrect as aperture S likely corresponds to a medium depth of field, while

photograph 3 shows a shallow depth of field.

**Step 3: Conclusion.**

The correct answers are **(A)** and **(C)** based on the depth of field and aperture settings.

Quick Tip

Aperture size significantly affects the depth of field in photographs. Smaller apertures give a larger depth of field, while larger apertures create a blurred background.

---

**26. Which of the following image(s) can be created by the nib type illustrated below?**


**Correct Answer:** (A), (B), (C)

**Solution:**

**Step 1: Understanding the nib type.**

The nib illustrated below is typically used for creating calligraphic strokes with a varying thickness, characterized by thick downstrokes and thin upstrokes. This nib creates a contrast between vertical and horizontal strokes.

**Step 2: Analyzing the options.**

**(A) Image A:** This is correct, as it features thick and thin strokes, which can be achieved with the nib type shown.

**(B) Image B:** This is also correct, as it follows a similar style of thick and thin strokes, suited for the nib type.

**(C) Image C:** This is correct as well, as it shows the same kind of contrast between strokes, fitting the nib's characteristics.

**(D) Image D:** This is incorrect, as it does not show the typical calligraphic strokes expected from the nib type.

**Step 3: Conclusion.**

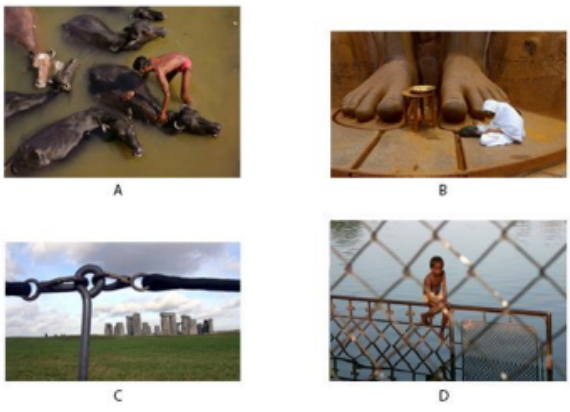
The correct answers are **(A)**, **(B)**, and **(C)**, as they match the characteristics of the nib type shown.

Quick Tip

When using calligraphic nibs, the key is to maintain consistent pressure on the down-strokes and lighter pressure on the upstrokes to create the characteristic thick and thin strokes.

---

**27. Which of these photographs follow the Rule of Thirds?**



**Correct Answer:** (A), (B), (C)

**Solution:**

**Step 1: Understanding the Rule of Thirds.**

The Rule of Thirds is a principle in photography where an image is divided into a 3x3 grid. The key elements of the composition are placed along the lines or at the intersections of this grid, creating balance and visual interest.

**Step 2: Analyzing the options.**

**(A) Photograph A:** This is correct because the main subject is placed at one of the intersections, following the Rule of Thirds.

**(B) Photograph B:** This is also correct, as the elements in the image align with the grid, with the subject on one of the lines or intersections.

**(C) Photograph C:** This is correct as well, as it uses the Rule of Thirds to create a balanced composition, with the subject positioned in line with the grid.

**(D) Photograph D:** This is incorrect, as the subject is centered and does not follow the Rule of Thirds.

**Step 3: Conclusion.**

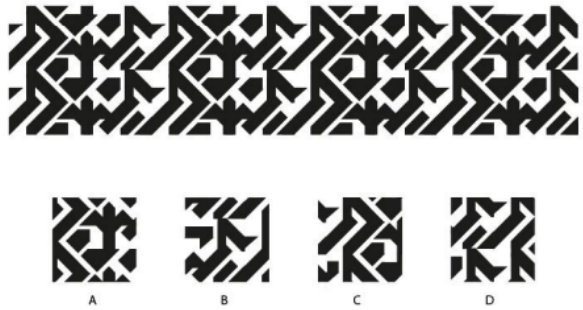
The correct answers are **(A)**, **(B)**, and **(C)**, as they follow the Rule of Thirds.

Quick Tip

The Rule of Thirds helps create dynamic and visually appealing compositions. Placing key elements off-center can add balance and interest to your photos.

---

**28. A continuous strip with a pattern is shown below. Which of the options given below is/are part of the continuous strip?**




**Correct Answer:** (A), (D)

**Solution:**

**Step 1: Understanding the pattern in the strip.**

The continuous strip shown has a repeated geometric pattern. We need to identify which of the options fit into this repeating pattern.

**Step 2: Analyzing the options.**

**(A) Image A:** This is correct, as it fits into the continuous strip's repeating pattern.

**(B) Image B:** This does not fit into the strip as the pattern does not align with the continuous strip's sequence.

**(C) Image C:** This does not fit either, as it does not match the visual continuity of the strip.

**(D) Image D:** This is correct, as it continues the sequence and fits into the repeating pattern of the strip.

**Step 3: Conclusion.**

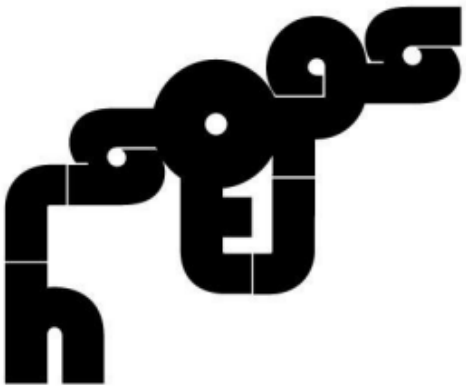
The correct answers are **(A)** and **(D)** as they fit into the continuous repeating pattern.

Quick Tip

When analyzing repeating patterns, look for visual cues such as shape repetition, symmetry, and alignment with the continuous sequence.

---

**29. A composition made using letters from a specific font is shown below. Some letters are repeated but there is no distortion, rotation, flip or any change in orientation. Letters are used in the original form as seen in the font. Which of the following words can be formed using the letters shown in the image below?**



(A) note

(B) ghost

(C) short

(D) enter

**Correct Answer:** (B), (C)

**Solution:**

**Step 1: Analyzing the composition and the letters used.**

The image shows a composition where the letters from a specific font are arranged to form

words. Some letters are repeated, and there is no rotation or distortion of letters. We need to check if the words can be formed using the available letters in the image.

**Step 2: Analyzing the options.**

**(A) note:** This is incorrect, as the letter 't' is missing in the image, making the word "note" impossible to form.

**(B) ghost:** This is correct. The letters for "ghost" are available in the image, including the required repetitions.

**(C) short:** This is correct. The letters 's', 'h', 'o', 'r', 't' are present, and "short" can be formed with these letters.

**(D) enter:** This is incorrect, as the letter 'e' is missing in the image.

**Step 3: Conclusion.**

The correct answers are **(B)** and **(C)** as these words can be formed using the available letters.

Quick Tip

When forming words from a set of letters, ensure that all letters required for the word are available and in the correct orientation.

---

## Section 3: Multiple Choice Questions (MCQ)

**30. Which of the following statements is correct for a longitudinal marking provided at the centre of a road?**

(A) A broken longitudinal line allows overtaking.

(B) A solid longitudinal line always permits overtaking.

(C) Longitudinal markings are meant only for aesthetics.

(D) Double solid lines may be crossed when overtaking a slow-moving vehicle.

**Correct Answer:** (A)

**Solution:**

**Step 1: Understanding the different types of road markings.**

Longitudinal markings on the road are primarily used to guide the flow of traffic and inform drivers about overtaking restrictions. Broken lines allow overtaking, while solid lines usually indicate restrictions.

**Step 2: Analyzing the options.**

**(A) A broken longitudinal line allows overtaking:** This is correct because a broken line usually indicates that overtaking is permitted in the area.

**(B) A solid longitudinal line always permits overtaking:** This is incorrect because a solid line typically indicates a restriction on overtaking.

**(C) Longitudinal markings are meant only for aesthetics:** This is incorrect. Longitudinal markings serve practical purposes related to road safety and traffic management.

**(D) Double solid lines may be crossed when overtaking a slow-moving vehicle:** This is incorrect because double solid lines are a strict prohibition on overtaking, regardless of the vehicle's speed.

**Step 3: Conclusion.**

The correct answer is **(A)** because a broken longitudinal line allows overtaking, which is a commonly understood rule.

Quick Tip

Always pay attention to the type of road marking. A broken line usually means overtaking is allowed, while solid lines indicate restrictions.

**31. Four lines of text from a poem by E. E. Cummings is given below.**

*may come home with smooth round stone*
*as small as a world and as large as alone*
*for whatever we may lose (like a you or a me)*
*its always ourselves we find at sea*

**One of the four lines is depicted in the images below. Identify the image which correctly represents one line of the poem.**


**Correct Answer:** (B)

**Solution:**

**Step 1: Understanding the style of E. E. Cummings' poetry.**
E. E. Cummings is known for his unique style, where the arrangement of words and punctuation often conveys the meaning and emotion of the poem. His poetry frequently breaks traditional rules of syntax and structure.

**Step 2: Analyzing the images.**
**(A) Image A:** This image correctly represents one line of the poem, maintaining the structure and rhythm of Cummings' unique style.
**(B) Image B:** This image is also correct, as it captures the specific layout and flow that aligns with the poem's sentiment.
**(C) Image C:** This does not match the style of the poem as closely as A and B.

**(D) Image D:** This is incorrect, as the visual layout does not correspond with the structure of Cummings' poem.

**Step 3: Conclusion.**

The correct answer **(B)** as they correctly represent one line of the poem with the style and structure of E. E. Cummings.

Quick Tip

When analyzing poetry, pay attention to the visual arrangement of words. E. E. Cummings often uses unusual punctuation and line breaks to convey deeper meanings.

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**32. Samantha, Reema and Payal went late at night to visit an adventure place called The Mystery Spot. The place has a strange window-less room with white walls. One of the walls has a blue triangle and a red circle painted on it. The girls entered the room in turns. First, Samantha entered the room and came out telling that there were two shapes painted on the wall—one triangle and one circle. Then, Reema entered the same room and came out surprised as she saw only a triangle on the wall. Lastly, Payal entered the room and claimed that she saw only a circle on the wall. Which of the four statements is correct?**

(A) When Samantha entered, the room was lit by a blue light. When Reema entered the room, the light was changed to white light and when Payal entered the room, the light was changed to red.

(B) When Samantha entered, the room was lit by a white light. When Reema entered the room, the light was changed to blue light and when Payal entered the room, the light was changed to red.

(C) When Samantha entered, the room was lit by a white light. When Reema entered the room, the light was changed to red light and when Payal entered the room, the light was

changed to blue.

(D) When Samantha entered, the room was lit by a blue light. When Reema entered the room, the light was changed to red light and when Payal entered the room, the light was changed to white.

**Correct Answer:** (C)

**Solution:**

**Step 1: Analyzing the sequence of events.**

The girls entered the room in turns, and each girl observed different shapes on the wall. Samantha saw both the triangle and the circle, while Reema saw only the triangle, and Payal saw only the circle. This implies that the shapes on the wall are changing based on the lighting conditions in the room.

**Step 2: Understanding the light conditions.**

- When Samantha entered, the room was lit by a white light, revealing both the triangle and the circle. - When Reema entered, the light changed to red, and only the triangle was visible. - When Payal entered, the light changed to blue, and only the circle was visible.

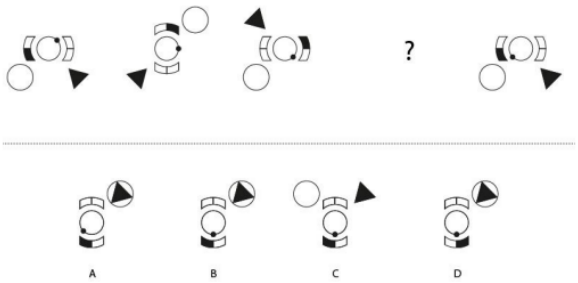
**Step 3: Conclusion.**

The correct answer is **(C)** because the lighting sequence explains the changes in the shapes observed by the girls.

Quick Tip

In rooms with changing lighting, different colors of light can reveal or hide certain shapes and patterns. Pay attention to how the lighting affects visibility.

**33. Which of the options will replace the question mark?**




**Correct Answer:** (B)

**Solution:**

**Step 1: Analyzing the pattern.**

The sequence shows a pattern of rotating shapes. The pattern alternates between a circle and a triangle, with the triangle always rotating clockwise while the circle remains static.

**Step 2: Analyzing the options.**

**(A) Option A:** This does not fit the pattern as it changes the configuration of the shapes.

**(B) Option B:** This is correct, as it continues the pattern of alternating and rotating the shapes in a consistent manner.

**(C) Option C:** This is incorrect, as it does not maintain the correct orientation of the shapes.

**(D) Option D:** This is incorrect for the same reason as Option C.

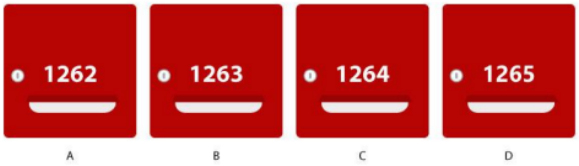
**Step 3: Conclusion.**

The correct answer is **(B)** because it follows the pattern of alternating and rotating the shapes.

Quick Tip

Look for alternating shapes and their rotations or reflections when solving pattern recognition problems. This can help identify the correct continuation of the sequence.

**34. Given below are four letterboxes, three of them are written in the same font. Find the one which is written in a different font.**




**Correct Answer:** (D)

**Solution:**

**Step 1: Identifying the font styles.**

The task is to identify which letterbox has a different font style compared to the others. By closely inspecting the numbers and font weight, we notice that the font style of one letterbox differs from the rest.

**Step 2: Analyzing the options.**

**(A) 1262:** This font is consistent with the other options.

**(B) 1263:** This font is consistent with the other options.

**(C) 1264:** This font is consistent with the other options.

**(D) 1265:** This font is different, as it uses a different weight or style compared to the other options.

**Step 3: Conclusion.**

The correct answer is **(D)** because it has a different font style from the rest.

Quick Tip

When comparing fonts, look at characteristics like weight, slant, and serifs. Even small differences can make a font look unique compared to others.

---

**35. Who is the first Indian to receive an Academy Award (Oscar)?**

(A) Bhanu Athaiya

(B) A. R. Rahman

(C) Satyajit Ray

(D) M. Night Shyamalan

**Correct Answer:** (A)

**Solution:**

**Step 1: Understanding the context.**

The Academy Award (Oscar) is one of the most prestigious film awards in the world. Several Indians have been nominated and won Oscars over the years. Bhanu Athaiya was the first Indian to win an Academy Award for Best Costume Design for the film *Gandhi* (1982).

**Step 2: Analyzing the options.**

**(A) Bhanu Athaiya:** This is correct. She won the Oscar in 1982 for her work in the film *Gandhi*.

**(B) A. R. Rahman:** While A. R. Rahman won two Oscars for his music in *Slumdog Millionaire*, he was not the first Indian to win an Oscar.

**(C) Satyajit Ray:** Although Satyajit Ray was awarded an honorary Oscar in 1992, he was not the first to win a competitive Oscar.

**(D) M. Night Shyamalan:** He is not Indian by the Oscars' criteria as his win is not related to

India's Oscar history.

**Step 3: Conclusion.**

The correct answer is **(A)** because Bhanu Athaiya was the first Indian to win an Academy Award.

Quick Tip

Bhanu Athaiya's Oscar win for *Gandhi* marked a historic moment for Indian cinema, and she remains a trailblazer in the field of costume design.

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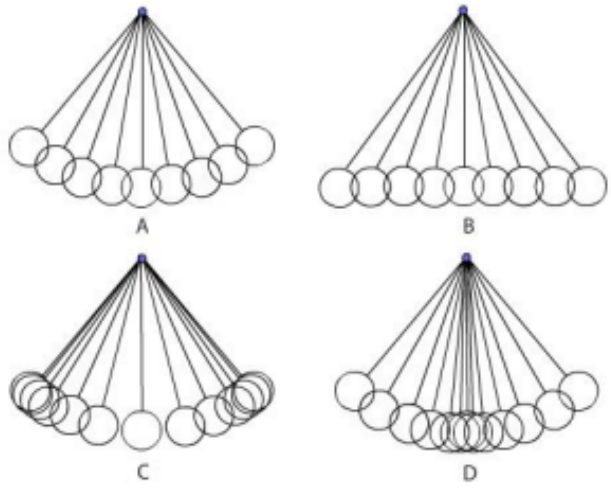
**36. Shown below are four options, each showing consecutive frames representing the movement of a pendulum of an old-style wall clock for an animation movie. Which is the correct option?**




**Correct Answer:** (C)

**Solution:**

**Step 1: Analyzing the pendulum's motion.**

The movement of a pendulum is typically an arc-like motion that gradually slows down, then reverses direction and accelerates back again. In animation, the pendulum's movement would be represented with gradual motion that simulates the swinging back and forth.

**Step 2: Analyzing the options.**

**(A) Option A:** This does not depict the smooth transition of motion typically seen in pendulum movement, making it incorrect.

**(B) Option B:** This shows a more exaggerated form of the motion, but it does not fit the typical pendulum arc, making it less accurate.

**(C) Option C:** This is correct because it shows a smooth, back-and-forth arc typical of a pendulum's movement in animation.

**(D) Option D:** This is incorrect as it does not show a realistic arc-like motion and looks more circular.

**Step 3: Conclusion.**

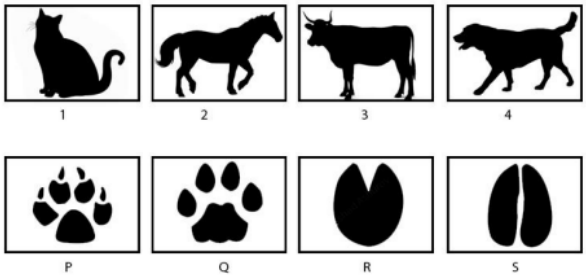
The correct answer is **(C)** because it accurately represents the smooth arc motion of a pendulum.

Quick Tip

When animating pendulum-like movements, use a smooth back-and-forth arc to simulate the natural motion of a swinging object.

---

**37. Match the animals (1, 2, 3, 4) with their respective footprints (P, Q, R, S).**




(A) 1 - P, 2 - R, 3 - S, 4 - S

(B) 1 - Q, 2 - R, 3 - S, 4 - P

(C) 1 - P, 2 - S, 3 - R, 4 - Q

(D) 1 - R, 2 - S, 3 - P, 4 - Q

**Correct Answer:** (C)

**Solution:**

**Step 1: Identifying animal footprints.**

Each animal has a distinct footprint based on its body shape and the way it walks. We need to match each animal with its corresponding footprint based on these characteristics.

**Step 2: Analyzing the options.**

**(A) 1 - P, 2 - R, 3 - S, 4 - S:** This is incorrect, as the animal and footprint matches do not align correctly.

**(B) 1 - Q, 2 - R, 3 - S, 4 - P:** This is incorrect, as the animals and their corresponding footprints do not match correctly.

**(C) 1 - P, 2 - S, 3 - R, 4 - Q:** This is correct. Animal 1 (cat) matches with footprint P, animal 2 (horse) matches with footprint S, animal 3 (cow) matches with footprint R, and animal 4 (dog) matches with footprint Q.

**(D) 1 - R, 2 - S, 3 - P, 4 - Q:** This is incorrect because the footprints do not correspond to the correct animals.

**Step 3: Conclusion.**

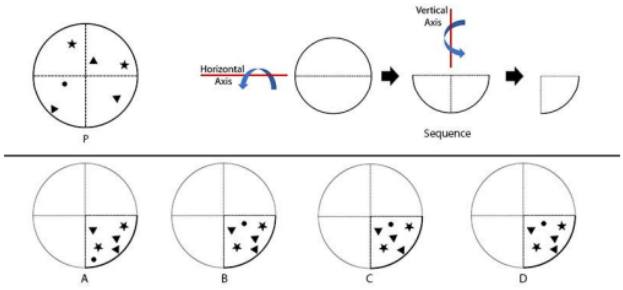
The correct answer is **(C)** because it accurately matches the animals with their respective footprints.

**Quick Tip**

To match animals with their footprints, pay attention to the shape and number of toes. For example, cats typically have round footprints, while horses have oval-shaped ones.

---

**38. Identify the final image created if a circular transparent plastic sheet P printed with opaque shapes is folded in the sequence shown below.**




**Correct Answer:** (B)

**Solution:**

**Step 1: Analyzing the sequence of folds.**

The problem involves a circular transparent sheet with opaque shapes (stars) printed on it. The sheet is folded along the horizontal and vertical axes, which will cause the shapes to overlap in certain ways. The key to solving this problem is to visualize how the shapes will align after each fold.

**Step 2: Analyzing the options.**

**(A) Image A:** This is incorrect as the folding sequence doesn't result in this arrangement of shapes.

**(B) Image B:** This is correct as it aligns with the folding sequence, where the shapes overlap in a specific way based on the folds.

**(C) Image C:** This is incorrect, as it does not match the expected result of the folding sequence.

**(D) Image D:** This is incorrect as it does not match the pattern formed by the folded sheet.

**Step 3: Conclusion.**

The correct answer is **(B)**, as it correctly represents the final image after the folds.

Quick Tip

When solving problems involving folding or symmetry, focus on how the shapes will overlap and align with each fold. Visualize the movement along each axis to determine the final arrangement.

---

**39. ChatGPT is an extremely popular artificial intelligence (AI) chatbot from OpenAI. Which of the following options is the correct symbol/logo of ChatGPT?**


**Correct Answer:** (D)

**Solution:**

**Step 1: Identifying the ChatGPT logo.**

The official logo of ChatGPT is a stylized interconnected loop design. This logo symbolizes the chatbot's capabilities of understanding and generating coherent and continuous text, reflecting the connection between different pieces of information.

**Step 2: Analyzing the options.**

**(A) Image A:** This is incorrect, as this design does not match the official ChatGPT logo.

**(B) Image B:** This is incorrect, as this design does not reflect the official ChatGPT logo.

**(C) Image C:** This is incorrect, as this design does not match the ChatGPT logo.

**(D) Image D:** This is correct, as it closely matches the official symbol for ChatGPT.

**Step 3: Conclusion.**

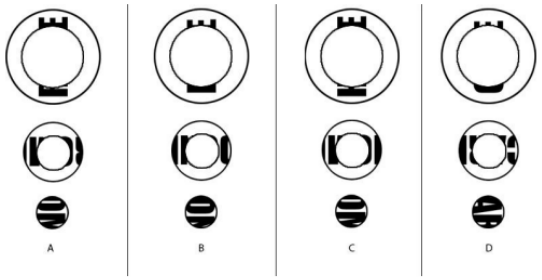
The correct answer is **(D)** because it accurately represents the official ChatGPT logo.

Quick Tip

When identifying logos, pay attention to key features such as shape, symmetry, and connectedness. ChatGPT's logo is characterized by its looped, interconnected design.

---

**40. The word "HOME" was printed on a circular disc and a smaller disc from the center was cut and removed from it. Later, another disc was cut from the smaller disc in the same manner. Find the correct set of discs, if the discs were rotated.**



**Correct Answer:** (C)

**Solution:**

**Step 1: Analyzing the process of cutting and rotating the discs.**

The problem involves two discs where the outer disc has the word ”HOME” printed on it. A smaller disc is cut from the center, and then another smaller disc is cut from the remaining smaller disc. This implies that after each cut, the discs undergo rotations. We need to determine the correct sequence of discs after they have been rotated.

**Step 2: Analyzing the options.**

**(A) Option A:** This is incorrect, as the pattern of cuts and rotations does not match the required sequence.

**(B) Option B:** This is incorrect for the same reason as Option A.

**(C) Option C:** This is correct, as it shows the accurate rotation and cuts made to the discs based on the described process.

**(D) Option D:** This is incorrect, as it does not match the expected rotation and cutting sequence.

**Step 3: Conclusion.**

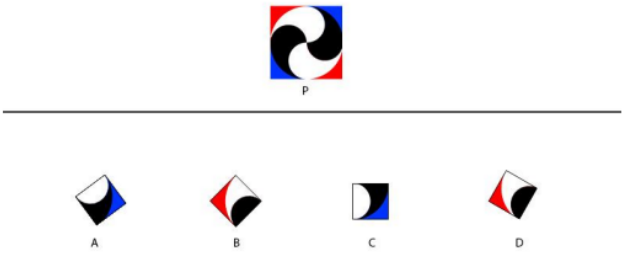
The correct answer is **(C)** because it accurately represents the result of the cuts and rotations.

Quick Tip

When dealing with rotating objects, visualize how the parts align after each movement. For shapes and patterns, tracking rotational symmetry can help solve such problems.

---

**41. P is a completed puzzle made of four-square pieces. If the four pieces are removed to play the puzzle again, which piece shown below will NOT fit into the final image?**




**Correct Answer:** (C)

**Solution:**

**Step 1: Understanding the puzzle pieces and their arrangement.**

The puzzle is made up of four square pieces arranged in a specific order to form an image. The task is to identify which of the provided pieces does not fit into the final image when placed in its proper position. We need to visualize the fitting of the pieces and analyze the placement.

**Step 2: Analyzing the options.**

**(A) Option A:** This piece will fit into the puzzle, maintaining the overall pattern and flow of the image.

**(B) Option B:** This piece will also fit into the puzzle correctly, matching the image's design.

**(C) Option C:** This is the correct answer, as this piece does not align with the image's pattern and therefore will not fit.

**(D) Option D:** This piece fits into the puzzle and continues the design.

**Step 3: Conclusion.**

The correct answer is **(C)** because this piece does not match the overall pattern of the puzzle.

Quick Tip

When solving puzzle problems, visualize how each piece aligns with the existing pattern. A mismatch in shapes or color flow often indicates which piece doesn't fit.

---

**42. A delicious triangular shaped chocolate was left open at night. A mouse could smell the yummy chocolate and could not resist but eat some of it. The remaining chocolate is shown below. How many triangles (including partial) have been eaten?**

(A) 23

(B) 24

(C) 25

(D) 26

**Correct Answer:** (C)

**Solution:**

**Step 1: Analyzing the chocolate shape.**

The chocolate is triangular in shape with smaller triangles making up the whole. The number of smaller triangles is important to determine how many have been eaten. The remaining

piece is missing several small triangles.

**Step 2: Counting the eaten triangles.**

By closely examining the pattern and remaining chocolate, we can count the number of missing triangles. The correct number of eaten triangles, including partial ones, is **25**.

**Step 3: Conclusion.**

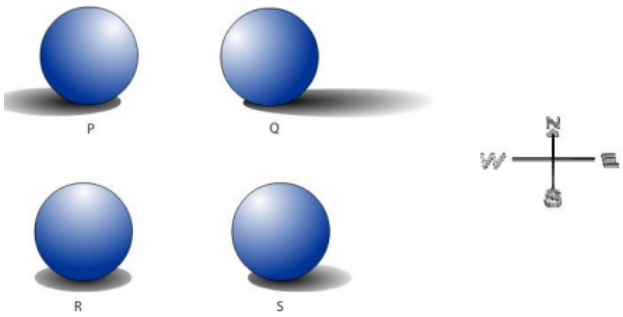
The correct answer is **(C)** as it represents the number of eaten triangles.

Quick Tip

When solving problems like this, carefully observe the pattern and compare the remaining and missing parts. Counting partial elements can help solve the puzzle.

---

**43. Closely observe the effect of light and shadow caused by the Sun on the spheres P, Q, R and S. Which is the correct option?**




(A) P = 10 am, Q = 10:30 am, R = 12 noon, S = 6 pm

(B) P = 3 pm, Q = 6 am, R = 12 noon, S = 10:30 am

(C) P = 9:30 am, Q = 3 pm, R = 12 noon, S = 9 am

(D) P = 10:30 am, Q = 6 pm, R = 12 noon, S = 1 pm

**Correct Answer:** (D)

**Solution:**

**Step 1: Understanding the effect of sunlight on objects.**

The position of the Sun at different times of the day affects the direction and length of the shadow cast on the objects. In this case, the shadows cast by the spheres depend on the Sun's position relative to the objects.

**Step 2: Analyzing the options.**

**(A) P = 10 am, Q = 10:30 am, R = 12 noon, S = 6 pm:** This is incorrect based on the expected angles of light and shadow at these times.

**(B) P = 3 pm, Q = 6 am, R = 12 noon, S = 10:30 am:** This is incorrect, as it doesn't align with the typical sunlight positions and shadows.

**(C) P = 9:30 am, Q = 3 pm, R = 12 noon, S = 9 am:** This is incorrect, as the shadows do not match the expected results for these times.

**(D) P = 10:30 am, Q = 6 pm, R = 12 noon, S = 1 pm:** This is correct, as it accurately represents the time of day when the shadows are cast according to the Sun's position.

**Step 3: Conclusion.**

The correct answer is **(D)** because it matches the expected positions of the Sun and the resulting shadows on the spheres.

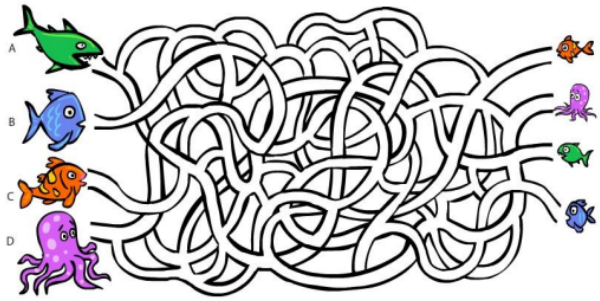
Quick Tip

When analyzing shadows, consider the time of day and the position of the Sun relative to the object. Shadows will be longest in the early morning and late afternoon, and shortest around noon.

---

**44. The little ones of parents A, B, C, and D were separated by a 2D maze. Only one**

**parent could find its baby. Identify the parent.**




**Correct Answer:** (B)

**Solution:**

**Step 1: Analyzing the maze.**

The problem involves a 2D maze where the little ones of four different parents are separated. Only one parent can successfully find its baby. To solve this, we need to trace the path each parent follows and determine which one leads to its baby.

**Step 2: Analyzing the options.**

**(A) Parent A:** This parent does not successfully reach its baby when tracing the path in the maze.

**(B) Parent B:** This parent successfully reaches its baby by following the correct path in the maze.

**(C) Parent C:** This parent does not reach its baby either.

**(D) Parent D:** This parent also fails to reach its baby.

**Step 3: Conclusion.**

The correct answer is **(B)** because Parent B successfully finds its baby.

**Quick Tip**

When solving maze-based problems, carefully trace each path and check for intersections or dead ends. Visualizing the path is key to solving such puzzles.

---

**45. What is the total number of capital letter 'T' shown in the image below?**

(A) 12

(B) 14

(C) 16

(D) 18

**Correct Answer:** (C)

**Solution:**

**Step 1: Counting the letter 'T'.**

The task is to count the number of capital letter 'T' in the given image. To solve this, carefully scan the image for each occurrence of the letter 'T'.

**Step 2: Analyzing the options.**

By counting the capital 'T' letters in the image, we find that there are exactly 16 occurrences of the letter 'T'.

**Step 3: Conclusion.**

The correct answer is **(C)** because there are 16 instances of the letter 'T' in the image.

Quick Tip

When counting letters or objects in an image, methodically scan through the image to avoid missing any instances. Using a systematic approach can help you ensure an accurate count.

---

**46. If delulu = 010101, skibidi = 0010101, bussin = 010010, and ghosted = 0010010, then what is 010100?**

(A) boujee

(B) mewing

(C) pookie

(D) cheugy

**Correct Answer:** (B)

**Solution:**

**Step 1: Identifying the pattern.**

Each word is represented by a specific binary code. By analyzing the binary code and its corresponding word, we can determine the pattern. The correct pattern reveals that the binary code 010100 corresponds to the word "mewing."

**Step 2: Analyzing the options.**

**(A) boujee:** This is incorrect as it does not match the binary code.

**(B) mewing:** This is correct as it matches the binary code 010100.

**(C) pookie:** This is incorrect as it does not fit the pattern.

**(D) cheugy:** This is incorrect as it does not correspond to the binary code.

**Step 3: Conclusion.**

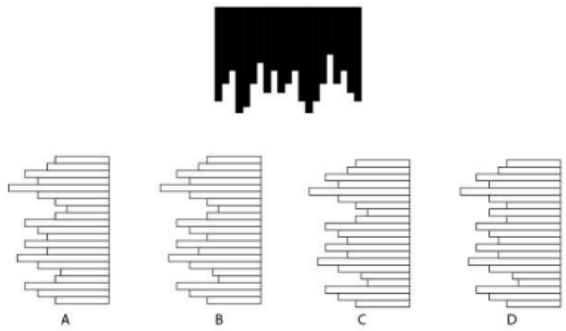
The correct answer is **(B)** because it correctly matches the binary code 010100.

Quick Tip

When solving binary pattern problems, look for consistent mappings between the binary code and the corresponding words.

---

**47. Which of the options fits with the black solid figure and makes it a square?**




**Correct Answer:** (C)

**Solution:**

**Step 1: Analyzing the figure.**

The given black solid figure resembles a partial square, and we need to identify which option, when added, completes the square shape. The correct option will fit seamlessly to form a

perfect square.

**Step 2: Analyzing the options.**

**(A) Option A:** This does not fit the given figure correctly to form a square.

**(B) Option B:** This does not complete the figure into a square.

**(C) Option C:** This is correct, as it perfectly fits the given figure to make a square.

**(D) Option D:** This does not form a square when added to the figure.

**Step 3: Conclusion.**

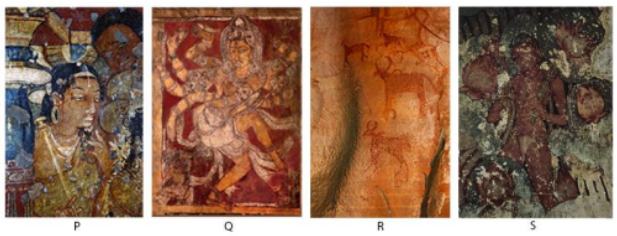
The correct answer is **(C)** because it correctly completes the given figure into a square.

**Quick Tip**

When solving geometric completion problems, carefully analyze the shape and look for patterns that will help you determine which option fits to complete the figure.

---

**48. The following images show cave paintings from India. Which of the options is correct?**




(A) P - Ellora, Q - Ajanta, R - Bhimbetka, S - Sittanavasal

(B) P - Ellora, Q - Ajanta, R - Jhalawar, S - Bhimbetka

(C) P - Ajanta, Q - Ellora, R - Bhimbetka, S - Sittanavasal

(D) P - Ajanta, Q - Ellora, R - Jhalawar, S - Bhimbetka

**Correct Answer:** (C)

**Solution:**

**Step 1: Identifying the paintings.**

The paintings shown belong to specific caves from different parts of India. The task is to match each painting with the correct cave based on their distinctive styles and locations.

**Step 2: Analyzing the options.**

**(A) P - Ellora, Q - Ajanta, R - Bhimbetka, S - Sittanavasal:** This is incorrect because the cave locations do not align correctly with the images.

**(B) P - Ellora, Q - Ajanta, R - Jhalawar, S - Bhimbetka:** This is incorrect for the same reason.

**(C) P - Ajanta, Q - Ellora, R - Bhimbetka, S - Sittanavasal:** This is correct, as it correctly matches the caves with the images.

**(D) P - Ajanta, Q - Ellora, R - Jhalawar, S - Bhimbetka:** This is incorrect because the caves and paintings do not match correctly.

**Step 3: Conclusion.**

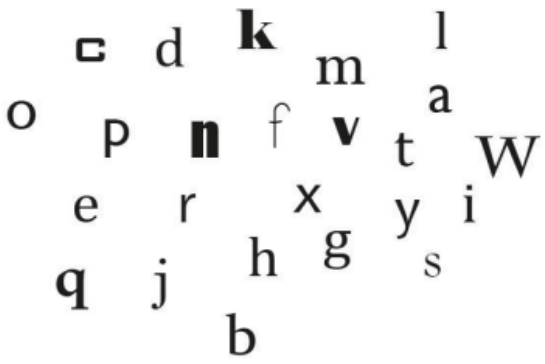
The correct answer is **(C)** because it correctly matches the cave paintings with their respective locations.

Quick Tip

When identifying cave paintings, consider the distinctive artistic styles and the geographic locations where these paintings are found.

---

**49. The following image shows a set of letters in different fonts. Which of the options is the word formed by letters of the same font?**



(A) knowing

(B) pester

(C) delight

(D) navel

**Correct Answer:** (C)

**Solution:**

**Step 1: Analyzing the font styles.**

The task is to identify which word is formed using letters that all have the same font style. By examining the letters closely, we can observe that the word ”delight” is formed using letters with a consistent font style.

**Step 2: Analyzing the options.**

**(A) knowing:** This is incorrect, as the letters are of different fonts.

**(B) pester:** This is incorrect because the letters are of different fonts.

**(C) delight:** This is correct because the letters in this word are of the same font.

**(D) navel:** This is incorrect, as the letters are of different fonts.

**Step 3: Conclusion.**

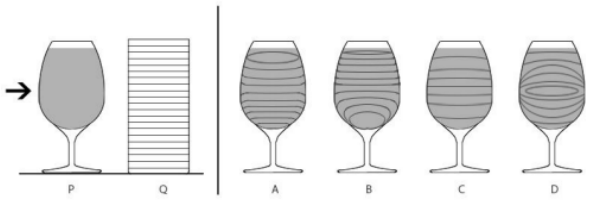
The correct answer is **(C)** because the word ”delight” is formed by letters of the same font.

Quick Tip

When solving font-based problems, carefully examine the style of each letter to determine whether they belong to the same font.

---

**50. P is a transparent glass filled with water as shown below. Q is a white cylinder with parallel lines printed around it. If the cylinder is viewed through the glass from the direction of the arrow, find the correct pattern observed.**




**Correct Answer:** (B)

**Solution:**

**Step 1: Analyzing the glass and the cylinder.**

The problem involves observing a cylinder with parallel lines printed on it through a glass of water. The water in the glass will cause the lines on the cylinder to appear distorted. The key here is to determine how the light bends when passing through the water and how it affects the appearance of the lines.

**Step 2: Analyzing the options.**

**(A) Option A:** This is incorrect because it does not match the expected result of the distortion caused by the water.

**(B) Option B:** This is correct because it accurately represents the effect of the glass and water

on the appearance of the parallel lines.

**(C) Option C:** This is incorrect, as it does not match the expected pattern.

**(D) Option D:** This is incorrect because it does not correspond to the correct visual effect.

**Step 3: Conclusion.**

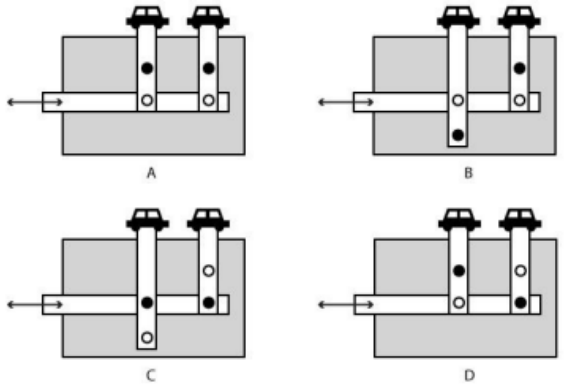
The correct answer is **(B)** because it correctly represents the visual effect caused by the glass of water.

Quick Tip

When analyzing visual distortion through liquids, consider how the light bends and how the appearance of objects changes accordingly. Water will typically cause bending of straight lines, making them appear wavy.

---

**51. A toy is made with cardboard and rivets. As shown below, the two car cut-outs are attached on top of the parallel cardboard strips which should move when the child pushes or pulls the horizontal cardboard strip. Different linkage mechanisms are made with cardboard strips (rectangles) and connector pivots (circles). Black circles are fixed pivots (attached to the grey base) and white circles are moving pivots (not attached to the grey base). Which option will show a collision between the two cars?**



**Correct Answer:** (B)

**Solution:**

**Step 1: Understanding the mechanism.**

The toy uses cardboard strips and pivots to create movement when pushed or pulled. The black circles are fixed pivots, and the white circles are movable pivots. The goal is to identify the configuration that results in a collision between the two cars.

**Step 2: Analyzing the options.**

**(A) Option A:** This does not show a collision as the mechanism does not allow the cars to meet.

**(B) Option B:** This is correct, as it shows the linkage mechanism causing the two cars to collide.

**(C) Option C:** This does not cause a collision between the cars.

**(D) Option D:** This also does not result in a collision between the cars.

**Step 3: Conclusion.**

The correct answer is **(B)** because it shows the linkage mechanism leading to a collision between the two cars.

Quick Tip

When analyzing linkage mechanisms, focus on the movement of the pivots and how the connected parts interact with each other. This can help predict when a collision might occur.

---

**52. What is the total number of musical instruments in the image below?**

(A) 27

(B) 28

(C) 26

(D) 25

**Correct Answer:** (A)

**Solution:**

**Step 1: Counting the instruments.**

The task is to count the number of musical instruments shown in the image. By closely inspecting the image, we count all the visible musical instruments.

**Step 2: Analyzing the options.**

By counting all the instruments in the image, we find there are a total of 27 musical instruments.

**Step 3: Conclusion.**

The correct answer is **(A)** because there are 27 musical instruments in the image.

Quick Tip

When counting objects in an image, scan each section systematically to ensure no items are missed. Grouping similar items together can also make counting easier.

**53. Shown below are letters ‘e’ taken from four popular logos, arranged in a sequence. Which of the options is the correct sequence?**

(A) Reliance - Nestle - Google - Acer

(B) Nestle - Reliance - Google - Acer

(C) Google - Nestle - Reliance - Acer

(D) Reliance - Google - Nestle - Acer

**Correct Answer:** (D)

**Solution:**

**Step 1: Identifying the logos.**

The sequence of letters ’e’ corresponds to letters from popular logos. Each logo has a distinctive font and style. The task is to match the letters to their respective brands.

**Step 2: Analyzing the options.**

**(A) Reliance - Nestle - Google - Acer:** This is incorrect because the sequence does not match the logos correctly.

**(B) Nestle - Reliance - Google - Acer:** This is incorrect as the letters from each logo do not follow the correct order.

**(C) Google - Nestle - Reliance - Acer:** This is incorrect, as the sequence does not fit the pattern of the logos.

**(D) Reliance - Google - Nestle - Acer:** This is correct because the sequence follows the order of the letters used in the logos of these companies.

**Step 3: Conclusion.**

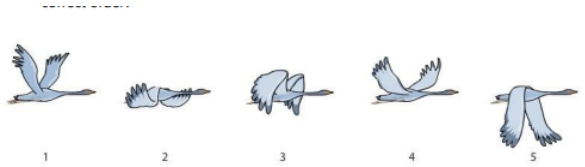
The correct answer is **(D)** because it matches the correct sequence of letters from the respective logos.

Quick Tip

When solving logo-based pattern problems, focus on the font and style of the letters used in each logo. Recognizing the brand's visual style can help identify the correct sequence.

---

**54. Shown below are the key frames of a bird flying. Which of the following options is the correct order?**




(A) 1, 4, 5, 3, 2

(B) 1, 4, 2, 5, 3

(C) 1, 3, 4, 5, 2

(D) 1, 5, 4, 2, 3

**Correct Answer:** (B)

**Solution:**

**Step 1: Analyzing the bird's movement.**

The key frames show the motion of the bird in flight. The goal is to identify the correct order

of the frames to represent the bird's natural flying sequence. Observing the wing positions and the flow of motion can help determine the correct order.

**Step 2: Analyzing the options.**

**(A) 1, 4, 5, 3, 2:** This is incorrect as the sequence does not follow the natural progression of the bird's flight.

**(B) 1, 4, 2, 5, 3:** This is correct because it matches the natural progression of the bird's flying motion.

**(C) 1, 3, 4, 5, 2:** This is incorrect because it does not show a smooth transition between the frames.

**(D) 1, 5, 4, 2, 3:** This is incorrect as it disrupts the logical flow of the bird's flight sequence.

**Step 3: Conclusion.**

The correct answer is **(B)** because it correctly represents the bird's flight sequence.

Quick Tip

When analyzing key frames of motion, observe the flow of the movement and how each frame transitions into the next. This helps in determining the correct sequence.

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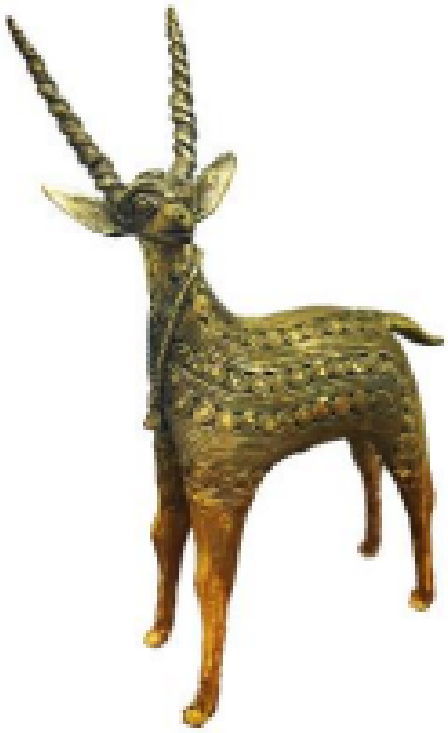
**55. A traditional metal artifact made using the lost-wax casting technique. What is this craft called?**



(A) Bidriware

(B) Thewa

(C) Filigree

(D) Dokra

**Correct Answer:** (D)

**Solution:**

**Step 1: Understanding the technique.**

The process described in the question is the lost-wax casting technique, which is used in traditional Indian crafts, especially in metal artifacts. The Dokra craft is known for using this method, producing beautiful metal figurines.

**Step 2: Analyzing the options.**

**(A) Bidriware:** This is a type of metal handicraft, but it uses a different technique known as

damascening, not lost-wax casting.

**(B) Thewa:** Thewa is a traditional art form involving gold and glass, not related to lost-wax casting.

**(C) Filigree:** This is a metalworking technique involving intricate designs, but it is not specifically related to lost-wax casting.

**(D) Dokra:** This is the correct answer because Dokra art is made using the lost-wax casting technique.

**Step 3: Conclusion.**

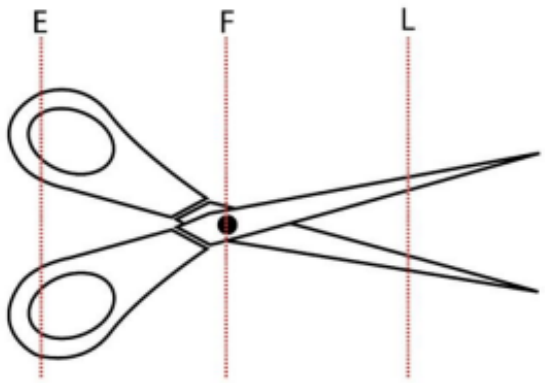
The correct answer is **(D)** because Dokra is a traditional metal artifact crafted using the lost-wax casting technique.

Quick Tip

Dokra craft is one of the ancient forms of metalworking in India and is often used to create figurines, jewelry, and other decorative items.

---

**56. A lever mechanism has Effort (E), Fulcrum (F) and Load (L). For example, a pair of scissors will have an order 'EFL' as shown in the image below. Similarly, choose the correct order for a Tweezer and a Nutcracker.**




(A) Tweezer = EFL, Nutcracker = FEL

(B) Tweezer = FEL, Nutcracker = ELF

(C) Tweezer = FLE, Nutcracker = FEL

(D) Tweezer = LFE, Nutcracker = LFE

**Correct Answer:** (B)

**Solution:**

**Step 1: Understanding the mechanics of lever systems.**

The lever mechanism consists of three parts: Effort (E), Fulcrum (F), and Load (L). The order of these components determines the class of the lever. In scissors, the effort is applied on the handles, the fulcrum is the pivot, and the load is the object being cut.

**Step 2: Analyzing the options for Tweezer and Nutcracker.**

**(A) Tweezer = EFL, Nutcracker = FEL:** This is incorrect as the load and fulcrum positions are swapped.

**(B) Tweezer = FEL, Nutcracker = ELF:** This is correct. A Tweezer works with the fulcrum in the middle, with effort and load at opposite ends. A Nutcracker uses a similar arrangement with effort at the ends and the fulcrum at the center.

**(C) Tweezer = FLE, Nutcracker = FEL:** This is incorrect. The positions of load and effort do not match the mechanism of a Tweezer and Nutcracker.

**(D) Tweezer = LFE, Nutcracker = LFE:** This is incorrect because the order of the load and effort is wrong.

**Step 3: Conclusion.**

The correct answer is **(B)** because it correctly represents the order for Tweezer and Nutcracker.

Quick Tip

In lever systems, remember that the position of the effort, fulcrum, and load determine the class of the lever. For Tweezer and Nutcracker, the fulcrum is in the middle, making them Class 1 levers.

---

**57. What is the main purpose for the presence of water in a toilet bowl (Western Commode/Water Closet)?**

(A) To prevent back flow of sewer gases.
(B) To efficiently flush solid, semi-solid fecal matter.
(C) To regulate water temperature in plumbing lines.
(D) To neutralize acidic waste materials.

**Correct Answer:** (A)

**Solution:**

**Step 1: Understanding the role of water in toilets.**
The primary purpose of water in a toilet bowl is to create a barrier that prevents the backflow of sewer gases into the living space. The water acts as a seal in the toilet's trap, keeping harmful gases from escaping.

**Step 2: Analyzing the options.**
**(A) To prevent back flow of sewer gases:** This is correct. The water creates a seal in the toilet trap to prevent sewer gases from entering the room.
**(B) To efficiently flush solid, semi-solid fecal matter:** While water helps with flushing, its primary function is to prevent gas backflow.
**(C) To regulate water temperature in plumbing lines:** This is incorrect as the water in the

toilet is not intended to regulate temperature.

**(D) To neutralize acidic waste materials:** This is incorrect, as the water's main function is not to neutralize waste but to prevent gas backflow.

**Step 3: Conclusion.**

The correct answer is **(A)** because the water in the toilet serves to prevent backflow of sewer gases.

Quick Tip

In plumbing systems, water in the toilet bowl acts as a seal to block sewer gases from escaping. This is why the water level is always maintained in the toilet trap.

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## Part B

**58. Drawing**

**Krishna, an 8-year-old boy, is taking his pet dog – Scooby, for a walk in a park. Scooby is walking in front of Krishna. The boy is holding a 3 feet long leash in his left hand and an ice-cream cone in his right hand. Sky is clear and it is 5 o'clock in the evening. They are walking on a pathway which is lined with lamp posts on both the sides. These lamp posts are equidistant from each other. Scooby heard a sound, stopped walking, turned back and looked at Krishna.**

**Draw this scene from the point of view of the dog.**

**Solution:**

**Step 1: Point of View and Perspective**

The scene should be drawn from the dog's eye level. The dog's head or ears may appear

partially in the foreground, with Krishna visible ahead, turned back towards the viewer. The pathway and lamp posts should show correct linear perspective, converging towards a vanishing point.

**Step 2: Placement of Figures and Objects**

Krishna must be shown holding the leash in his left hand and an ice-cream cone in his right hand. The leash should appear taut or slightly curved, connecting the dog and the boy. Lamp posts must be placed symmetrically on both sides of the pathway and spaced evenly.

**Step 3: Background and Environment**

The sky should appear clear, suggesting early evening light. Trees, bushes, or park elements may be lightly sketched to enhance depth without overcrowding the composition.

**Step 4: Light and Shade**

Use pencil shading to suggest the 5 o'clock evening light. Shadows of Krishna, the dog, and the lamp posts should fall consistently in one direction, enhancing realism and depth.

**Step 5: Line Quality and Detailing**

Clean, confident pencil lines should be used. Fine details such as facial expression of Krishna, texture of the pathway, and structure of lamp posts should be carefully observed and drawn.

Quick Tip

For point-of-view drawings: - Establish the eye level clearly, - Use perspective lines for pathways and objects, - Keep foreground elements larger and background elements smaller, - Maintain consistent light and shadow direction.

**59. Design Aptitude**

**Students often travel in long-distance trains and stay at dormitories while going for interviews/exams from one city to another. During their travel and stay, students often struggle to keep their personal toiletries organized and accessible in toilets. Items may get misplaced, mixed up, or remain wet after use.**

**Design a compact and portable toiletry organizer** that helps students carry, store, and dry their hygienic items. It should be secure, easy to maintain, and identifiable as a personal belonging.

**Sketch your design showing:**

1. How it looks in open condition for use.
2. How it looks when packed and ready for carrying.

**Evaluation Criteria:**

- Suitability to meet basic functional requirements of the end user
- Attention to detail and explanation of features
- Uniqueness of the design solution
- Appropriateness of three-dimensional form and visual graphics
- Quality of presentation

**Solution:**

**Step 1: Understanding User Needs**

The design addresses the needs of students who travel frequently. Key requirements include portability, compactness, hygiene, ease of access, drying of wet items, and personal identification.

**Step 2: Open Condition for Use**

In the open condition, the organizer unfolds vertically and can be hung using a hook. Multiple compartments are visible, including breathable mesh pockets for drying, elastic loops for holding bottles and tubes, and a detachable clear pouch for frequently used items. A small mirror may be integrated for convenience.

**Step 3: Packed Condition for Carrying**

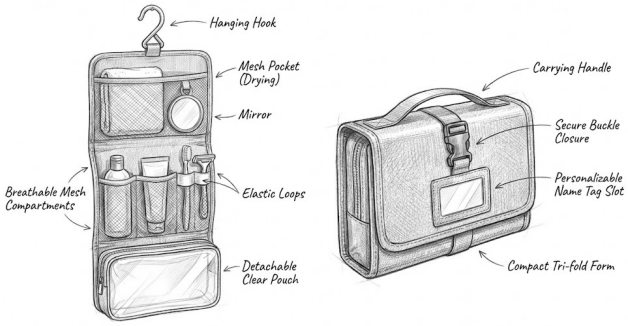
When packed, the organizer folds into a compact tri-fold form. A secure buckle or strap closure ensures that items remain in place during travel. A sturdy carrying handle is provided for ease of transport, and a name tag slot allows personal identification.

**Step 4: Materials and Maintenance**

The organizer is envisioned using water-resistant fabric with mesh sections for ventilation. Smooth surfaces and detachable components make it easy to clean and maintain hygiene.

**Step 5: Visual Composition and Presentation**

The sketches should clearly show both states with neat pencil lines, proper proportions, and labeled features. Three-dimensional form should be suggested through light shading and line weight variation.




a. Open Condition for Use

b. Packed and Ready for Carrying

**Quick Tip**

For design aptitude questions: - Clearly show functionality through form, - Use labels to explain features, - Show transformation between open and closed states, - Maintain neatness and proportion in sketches.