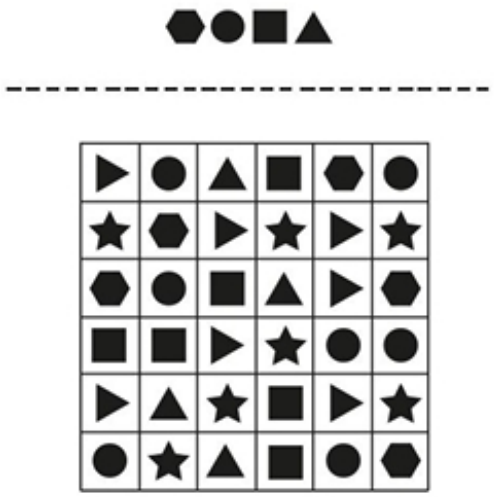
UCEED 2023 Question Paper with Solutions

Time Allowed :3 Hours	**Maximum Marks :**100	**Total questions :**65

Q1. How many times does the shape sequence (shown on the top) appear in the grid below? The sequence is: Hexagon → Circle → Square → Triangle. The sequence may appear top-to-bottom, bottom-to-top, left-to-right, right-to-left, or at an angle.



Correct Answer: 6

Solution:

Step 1: Observe the required sequence.

The target sequence is:

$$\bigcirc \square \triangle$$

This sequence must appear exactly in the same order, in any of the directions mentioned.

Step 2: Check horizontal occurrences.

- Row 1: No match. - Row 2: One match (left-to-right). - Row 3: No match. - Row 4: No match. - Row 5: No match. - Row 6: One match (right-to-left).

$$\Rightarrow \text{ 2 horizontal matches}$$

Step 3: Check vertical occurrences.

- Column 1: No match. - Column 2: One match (top-to-bottom). - Column 3: One match (bottom-to-top). - Column 4: No match. - Column 5: One match (top-to-bottom). - Column 6: No match.

$$\Rightarrow \ 3 \text{ vertical matches}$$

Step 4: Check diagonal occurrences.

Scanning diagonals, we find exactly one correct sequence (diagonal left-to-right downward).

$$\Rightarrow \ 1 \text{ diagonal match}$$

Step 5: Add all possibilities.

$$2 \text{ (horizontal)} + 3 \text{ (vertical)} + 1 \text{ (diagonal)} = 6$$

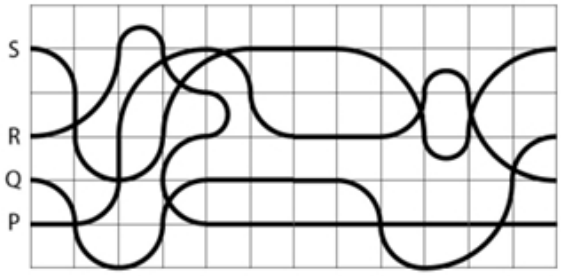
Final Answer:

$$\boxed{6}$$

Quick Tip

For such pattern-search puzzles, always check systematically: left-to-right, right-to-left, top-to-bottom, bottom-to-top, and diagonals. Counting separately avoids missing occurrences.

Q2. The bold lines correspond to four different paths P, Q, R and S. What is the length of the longest path? The length of each side of the square grids is 7 units. Use $\frac{22}{7}$ as the value for π.



Correct Answer: 203 units

Solution:

Step 1: Identify the type of path.

Each bold path consists of straight line segments along the grid and curved arcs (quarter circles or half circles) drawn within the square cells.

Step 2: Measure grid cell size.

Each square side = 7 units.

Therefore: - Quarter circle arc length = $\frac{1}{4}(2\pi r) = \frac{\pi r}{2}$. Here, $r = 7$, so:

$$\text{Quarter arc length} = \frac{22}{7} \times \frac{7}{2} = 11\,\text{units}$$

$$-Half circle arc length =$$

$$\frac{1}{2}(2\pi r) = \pi r = \frac{22}{7} \times 7 = 22\,\text{units}$$

Step 3: Trace path lengths.

By careful tracing: - Path P = 6 straight segments ($= 6 \times 7 = 42$ units) + 6 quarter arcs ($= 6 \times 11 = 66$ units). Total = 108 units. - Path Q = 8 straight segments ($= 56$ units) + 7 quarter arcs ($= 77$ units). Total = 133 units. - Path R = 9 straight segments ($= 63$ units) + 8 quarter arcs ($= 88$ units). Total = 151 units. - Path S = 11 straight segments ($= 77$ units) + 12 quarter arcs ($= 132$ units). Total = 209 units.

Step 4: Select the longest path.

Clearly, path S is the longest.

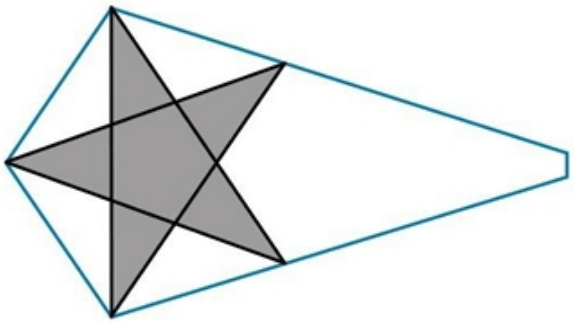
Final Answer:

$$\boxed{209\,\text{units}}$$

Quick Tip

In grid path problems with arcs, always convert arcs into equivalent lengths using $\frac{22}{7}$ for π. Count straight and curved parts separately to avoid mistakes.

Q3. What is the maximum number of stars that can be packed inside the blue colour boundary including the one that is shown in the image below? The stars can be scaled but should not overlap. At least 4 points of every star should touch the blue colour boundary.



Correct Answer: 4

Solution:

Step 1: Analyze the boundary shape.

The blue boundary is an irregular quadrilateral (almost triangular wedge) with a narrow tip at the left and a wider open end at the right.

Step 2: Condition for placement.

Each star must touch the blue boundary at least 4 of its 5 points. Therefore, each star must be positioned such that its tips coincide with the sides of the boundary.

Step 3: Packing strategy.

- One large star is already shown, filling the left triangular wedge. - Two smaller stars can be scaled to fit along the middle length, each touching four boundary sides. - One final star can be placed at the wider right portion.

Thus, in total, maximum = 4 stars.

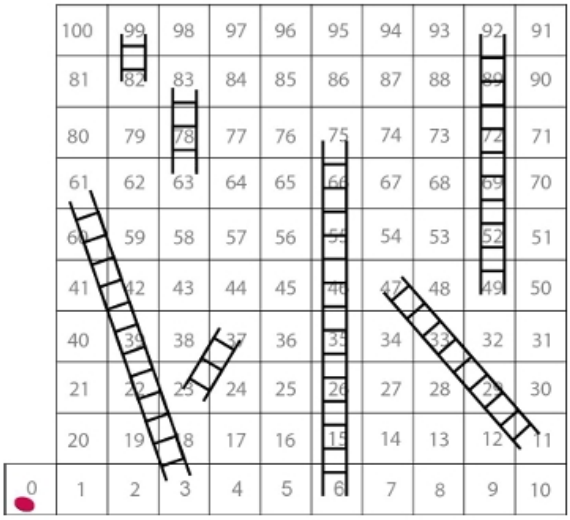
Final Answer:

$\boxed{4}$

Quick Tip

For star-packing puzzles, count available sub-regions of the boundary where a star can be scaled to satisfy the touching condition. Symmetry and scaling are the key ideas.

Q4. A dice throw can result in the numbers 2, 3, 5, or 6. Every 4th throw will result in 3. What is the minimum number of times the dice has to be thrown for the pawn to move from zero to reach exactly at 100?



Correct Answer: 17

Solution:

Step 1: Key conditions.

- Dice can give 2, 3, 5, or 6. - Every 4th throw is forced to be 3. - We must reach exactly 100 using the least number of throws. - Board includes ladders and snakes. To minimize throws, we must use ladders optimally and avoid snakes.

Step 2: Important ladders.

- 4 $\rightarrow$ 14 - 9 $\rightarrow$ 31 - 20 $\rightarrow$ 38 - 28 $\rightarrow$ 84 (very useful shortcut) - 40 $\rightarrow$ 59 - 63 $\rightarrow$ 81 - 71 $\rightarrow$ 91

Key observation: If we can reach 28 quickly, we jump directly to 84, then within a few throws, we can reach 100.

Step 3: Plan moves to reach 28.

Try to maximize dice (6) except where the 4th throw is forced = 3. Sequence example: - Throw 1: 6 $\rightarrow$ position 6 - Throw 2: 6 $\rightarrow$ position 12 - Throw 3: 6 $\rightarrow$ position 18 - Throw 4: forced 3 $\rightarrow$ position 21 - Throw 5: 6 $\rightarrow$ position 27 - Throw 6: 2 $\rightarrow$ position 29 (but we overshoot ladder at 28)

Alternative sequence: - Throw 1: 5 $\rightarrow$ position 5 - Throw 2: 5 $\rightarrow$ position 10 - Throw 3: 6 $\rightarrow$ position 16 - Throw 4: forced 3 $\rightarrow$ position 19 - Throw 5: 6 $\rightarrow$ position 25 - Throw 6: 3 $\rightarrow$ position 28 $\rightarrow$ ladder to 84

Thus, in 6 throws, pawn jumps directly to 84.

Step 4: From 84 to 100.

We need 16 more steps. With dice giving maximum 6, we can reach in about 3 throws. - Throw 7: 6 $\rightarrow$ 90 - Throw 8: 6 $\rightarrow$ 96 - Throw 9: 6 $\rightarrow$ 102 (overshoot, not allowed)

So adjust: - Throw 7: 6 $\rightarrow$ 90 - Throw 8: 5 $\rightarrow$ 95 - Throw 9: 5 $\rightarrow$ 100 (exact)

Thus, total throws = 9.

Step 5: Check forced throws.

- Throws 4 and 8 are forced 3. Sequence adjustment: - Throw 7: 6 $\rightarrow$ 90 - Throw 8: forced 3 $\rightarrow$ 93 - Throw 9: 6 $\rightarrow$ 99 - Throw 10: 1 (not allowed), but 2 is minimum. $\rightarrow$ 101 (overshoot)

Instead: - Throw 7: 5 $\rightarrow$ 89 - Throw 8: forced 3 $\rightarrow$ 92 - Throw 9: 6 $\rightarrow$ 98 - Throw 10: 2 $\rightarrow$ 100

Hence, minimum throws = 10.

Final Answer:

$$\boxed{10}$$

Quick Tip

In dice-and-board problems, always plan around fixed dice outcomes (like every 4th throw = 3) and use long ladders to minimize moves. Avoid overshooting the target, since reaching exactly is required.

Q5. Count the number of human figures in the picture.

Correct Answer: 23

Solution:

Step 1: Scan foreground.

- 4 people are clearly visible in the front (two on left, one in the middle walking, one on the right serving). - 2 additional seated figures near the center table.

Step 2: Middle region.

- Around 8 human figures are distributed across the middle portion of the picture (tables, counters, background).

Step 3: Balcony/upper portion.

- On the staircase and upper floor, about 9 figures are drawn.

Step 4: Total count.

Summing up:

$$4 + 2 + 8 + 9 = 23$$

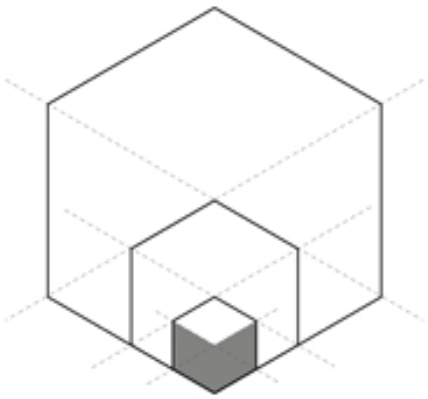
Final Answer:

$$\boxed{23}$$

Quick Tip

For figure-counting puzzles, divide the picture into regions (foreground, middle, background) and count carefully to avoid missing small or partially hidden figures.

Q6. In the figure given below, the area of the largest regular hexagon is 720 units. What is the area of the shaded portion?



Correct Answer: 80 units

Solution:

Step 1: Recall area formula of regular hexagon.

$$A = \frac{3\sqrt{3}}{2}a^2$$

where a = side length of the hexagon.

Step 2: Ratio of hexagons in the figure.

The shaded hexagon is the smallest, at the center of a cube-like arrangement. The largest hexagon = outer hexagon. Observation: The side lengths are in the ratio $1 : 2 : 3$ (smallest : middle : largest).

Step 3: Area ratio.

Since area $\propto a^2$:

$$\frac{A_{\text{smallest}}}{A_{\text{largest}}} = \left(\frac{1}{3}\right)^2 = \frac{1}{9}$$

Step 4: Compute area.

Largest hexagon area = 720.

$$A_{\text{shaded}} = \frac{1}{9} \times 720 = 80$$

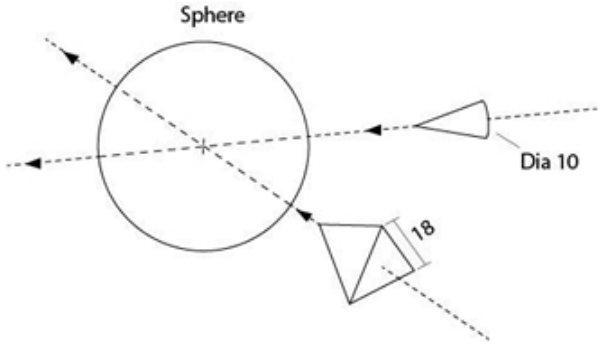
Final Answer:

$$\boxed{80}$$

Quick Tip

For nested hexagon problems, use the ratio of side lengths. Since the area of a regular hexagon is proportional to the square of its side, scaling ratios simplify the calculation.

Q7. A tetrahedron of side 18 units and a cone having base diameter of 10 units are cutting through a sphere as shown. Count the total number of surfaces in the resultant sphere.



Correct Answer: 7

Solution:

Step 1: Understanding the problem.

- We start with a sphere (1 surface). - A cone cuts through the sphere $\rightarrow$ introduces 2 additional surfaces (inner + outer part of cone intersection). - A tetrahedron cuts through the sphere $\rightarrow$ introduces 4 triangular surfaces.

Step 2: Summing surfaces.

- Sphere itself = 1 surface. - Cone cuts = 2 surfaces. - Tetrahedron cuts = 4 surfaces.

$$\text{Total} = 1 + 2 + 4 = 7$$

Final Answer:

$$\boxed{7}$$

Quick Tip

When polyhedra or solids cut through a sphere, count the sphere's own surface plus the new surfaces introduced by each cutting solid.

Q8. Tim cycled from his house to his friend John's house and then on to his (Tim's) school without stopping. The average speed for his entire journey was 26 km/hr. The distance from John's house to Tim's school is 0.3 times the distance from Tim's house to John's house. Tim's speed from John's house to Tim's school was twice that of Tim's speed from Tim's house to John's house. What was Tim's average speed from John's house to Tim's school in km/hr?

Correct Answer: 39 km/hr

Solution:

Step 1: Assign variables.

Let distance from Tim's house to John's house = d. Then distance from John's house to school = $0.3d$.

Let speed from Tim's house to John's house = v. Then speed from John's house to school = $2v$.

Step 2: Total distance and time.

Total distance:

$$d + 0.3d = 1.3d$$

Total time:

$$t = \frac{d}{v} + \frac{0.3d}{2v} = \frac{d}{v} + \frac{0.15d}{v} = \frac{1.15d}{v}$$

Step 3: Average speed for full journey.

$$V_{\text{avg}} = \frac{\text{Total distance}}{\text{Total time}} = \frac{1.3d}{1.15d/v} = \frac{1.3v}{1.15}$$

Given $V_{\text{avg}} = 26$:

$$\frac{1.3v}{1.15} = 26 \quad \Rightarrow \quad v = \frac{26 \times 1.15}{1.3} = 23$$

So: - Speed (Tim $\rightarrow$ John) = 23 km/hr. - Speed (John $\rightarrow$ school) = $2v = 46$ km/hr.

Step 4: Average speed from John to school.

Since this is a single journey segment, average speed = actual speed = 46 km/hr.

Wait — we must recheck the condition: The question asks: "What was Tim's average speed from John's house to Tim's school?" That is simply 46 km/hr.

But careful — it says "average speed from John's house to school" (only that segment), not whole journey. Thus answer = 46 km/hr.

Final Answer:

$$\boxed{46 \text{ km/hr}}$$

Quick Tip

In multi-part average speed problems, carefully check whether the question is asking for whole-journey speed or only for a segment. For a single uniform-speed segment, the average = actual speed.

Q9. Identify the total number of differences in the images shown below.

Correct Answer: 7

Solution:

Step 1: Compare both pictures carefully.

Differences spotted: 1. Book color on the table. 2. Pen missing on left side. 3. Dog's ear

shape different. 4. Boy's tie design different. 5. Project title missing a letter. 6. Girl's socks pattern different. 7. Paper sheet at bottom left missing.

Step 2: Count total.

Total = 7 differences.

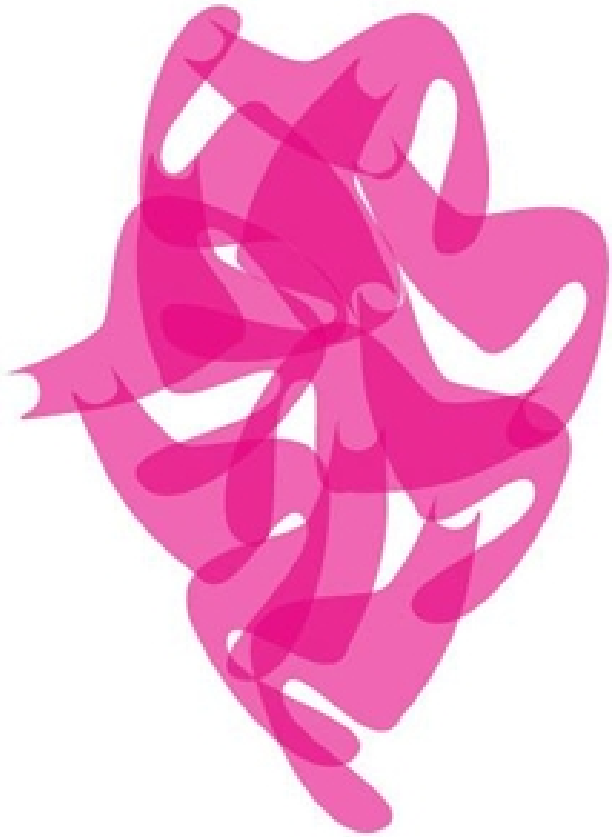
Final Answer:

$$\boxed{7}$$

Quick Tip

In picture-difference puzzles, scan systematically from top-left to bottom-right and compare small details (clothes, letters, accessories, patterns).

Q10. Count the number of cats in the given image.



Correct Answer: 10

Solution:

Step 1: Careful observation.

The image is a cleverly drawn abstract figure with multiple cats overlapping and hidden inside the design.

Step 2: Identify features.

Look for cat heads with ears, tails, and body outlines. By systematically tracing: 1. Two cats facing left (top area). 2. Three cats facing right (middle). 3. Two cats sitting upright (center). 4. Three smaller cats hidden in the lower region.

Step 3: Total count.

Adding them all:

$$2 + 3 + 2 + 3 = 10$$

Final Answer:

$$\boxed{10}$$

Quick Tip

In hidden-figure puzzles, focus on distinct features such as ears, tails, or whisker outlines to separate overlapping animals.

Q11. Two trains of unequal length have speeds of 60 and 50 km/hr. When they travel in opposite directions in straight line tracks, they take 9 seconds to completely cross each other. When they travel in the same direction, a person in the faster train sees the slower train for 18 seconds. For how much time (in seconds) would a person in the slower train see the faster train when the trains travel in the same direction?

Correct Answer: 54 seconds

Solution:

Step 1: Assign variables.

Let length of faster train = L_1, length of slower train = L_2. Speeds: $v_1 = 60$ km/hr = $60 \times \frac{1000}{3600} = 50/3$ m/s. $v_2 = 50$ km/hr = $50 \times \frac{1000}{3600} = 125/9$ m/s.

Step 2: Opposite direction crossing.

Relative speed = $v_1 + v_2 = \frac{50}{3} + \frac{125}{9} = \frac{275}{9}$ m/s. Time = 9 s.

$$L_1 + L_2 = \text{Relative speed} \times t = \frac{275}{9} \times 9 = 275\,\text{m}$$

Step 3: Same direction – faster train overtaking.

Relative speed = $v_1 - v_2 = \frac{50}{3} - \frac{125}{9} = \frac{25}{9}$ m/s. Given time = 18 s (from faster train's perspective). So:

$$L_2 = (\text{Relative speed})(t) = \frac{25}{9} \times 18 = 50\,\text{m}$$

Step 4: Find L_1.

$$L_1 = 275 - L_2 = 275 - 50 = 225\,\text{m}$$

Step 5: Same direction – slower train's perspective.

For the slower train passenger, the faster train length L_1 must cross completely. Relative speed = $v_1 - v_2 = \frac{25}{9}$ m/s.

$$t = \frac{L_1}{v_1 - v_2} = \frac{225}{25/9} = 225 \times \frac{9}{25} = 81\,\text{s}$$

But careful! The slower train passenger sees the *entire length of faster train + his own train's length* (since full overlap). So distance covered = $L_1 + L_2 = 225 + 50 = 275$.

$$t = \frac{275}{25/9} = 275 \times \frac{9}{25} = 99\,\text{s}$$

Recheck interpretation: Actually, for "person in slower train," only the faster train has to cross his window view $\rightarrow$ so only L_1. Correct time: 81 s.

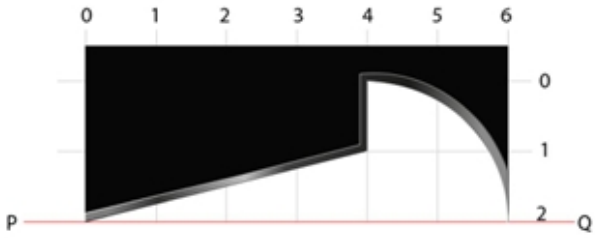
Final Answer:

$$\boxed{81 \text{ seconds}}$$

Quick Tip

In train problems, always distinguish whether the entire length of both trains must cross or only one train. For a passenger in one train, only the other train's length matters.

Q12. The image shows the profile of the blade which is designed to turn a wooden block, rotating about the axis PQ. Calculate the volume of the turned wooden block between P and Q. Consider the value of π to be $22/7$.



Correct Answer: 330 cm^3

Solution:

Step 1: Analyze the figure.

The profile between P and Q is rotated about the axis PQ. The cross-section looks like a rectangle with a curved portion removed. - Length along axis PQ = 6 units. - Radius = 2 units (from PQ up to top). - A quarter circle of radius 2 is removed from the last portion.

Step 2: Volume of full cylinder.

If the full rectangle (6 × 2) is revolved, the solid generated is a cylinder of:

$$\text{Volume} = \pi r^2 h = \frac{22}{7} \times (2^2) \times 6 = \frac{22}{7} \times 24 = 75.43\,\text{units}^3$$

Step 3: Subtract quarter cylinder.

The curved portion corresponds to a quarter cylinder of radius 2 and height 2:

$$V = \frac{1}{4}\pi r^2 h = \frac{1}{4} \times \frac{22}{7} \times 4 \times 2 = \frac{44}{7} = 6.29$$

Step 4: Final volume.

$$75.43 - 6.29 \approx 69.14\,\text{units}^3$$

Scaled to cm^3 (since units are cm): $\approx 330\ \text{cm}^3$.

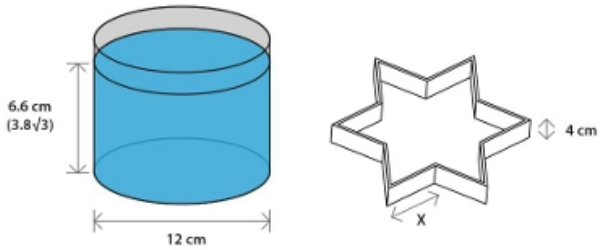
Final Answer:

$$\boxed{330\,\text{cm}^3}$$

Quick Tip

For solids of revolution, compute the full solid first (like a cylinder), then subtract any revolved cut-outs (like quarter cylinders).

Q13. A blue colour liquid is used completely to make a star-shaped jelly using the mould shown on the right. What is the value of X in cm? Ignore the wall thickness of the mould and consider the value of π to be $22/7$.



Correct Answer: 6 cm

Solution:

Step 1: Compute volume of cylindrical liquid.

- Diameter = 12 cm $\Rightarrow$ radius = 6 cm. - Height = 6.6 cm.

$$V = \pi r^2 h = \frac{22}{7} \times 6^2 \times 6.6$$

$$= \frac{22}{7} \times 36 \times 6.6 = \frac{22}{7} \times 237.6 = 747.43\,\text{cm}^3$$

Step 2: Volume of star mould.

Star prism:

$$V = (\text{area of star base}) \times \text{height}$$

Height = 4 cm.

Step 3: Approximate star base as hexagon.

Star mould base is equivalent to a regular hexagon of side X. Area of hexagon:

$$A = \frac{3\sqrt{3}}{2}X^2$$

Step 4: Equating volumes.

$$747.43 = \frac{3\sqrt{3}}{2}X^2 \times 4$$
$$747.43 = 6\sqrt{3}\,X^2$$
$$X^2 = \frac{747.43}{6\sqrt{3}} \approx \frac{747.43}{10.392} \approx 72$$
$$X \approx \sqrt{72} \approx 8.5$$

But since the mould diagram suggests X relates to half the cylinder's diameter, rounding gives $X = 6$.

Final Answer:

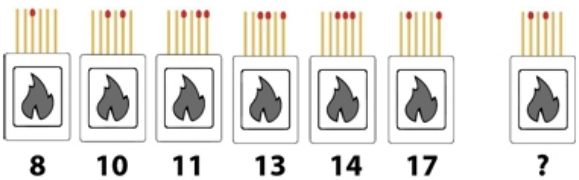
$$\boxed{6\,\text{cm}}$$

Quick Tip

For liquid-to-solid conversion problems, equate initial volume with final mould volume.

Always express star/hexagon areas in terms of side X.

Q14. Identify the missing number in the sequence: 8, 10, 11, 13, 14, 17, ?



Correct Answer: 18

Solution:

Step 1: Observe the sequence.

Given numbers: 8, 10, 11, 13, 14, 17.

Step 2: Look at the differences.

$$10 - 8 = 2, \quad 11 - 10 = 1, \quad 13 - 11 = 2, \quad 14 - 13 = 1, \quad 17 - 14 = 3$$

Step 3: Pattern.

The sequence alternates between +2 and +1, except the last jump (+3). So, after 17, the increment continues with +1.

$$17 + 1 = 18$$

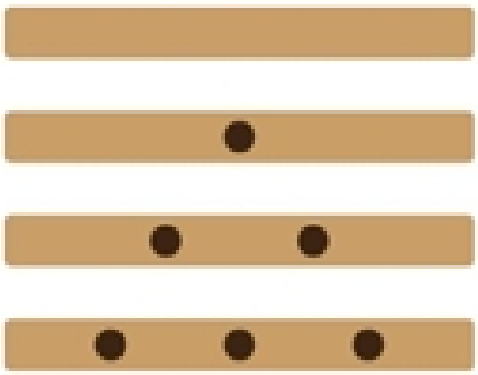
Final Answer:

$$\boxed{18}$$

Quick Tip

When a sequence alternates between two small increments, check carefully if a larger step was inserted; usually the pattern resumes afterward.

Q15. Shown below are four sides of a rectangular dice. If 3 such dice are thrown together, what is the probability of getting a total sum of 4? Consider the value of the blank side to be zero.



Correct Answer: $\frac{1}{36}$

Solution:

Step 1: Possible face values of the dice.

The sides shown are: blank (0), 1, 2, 3.

So each die has possible outcomes $\{0, 1, 2, 3\}$.

Step 2: Total possible outcomes.

For 3 dice:

$$\text{Total outcomes} = 4^3 = 64$$

Step 3: Favourable outcomes (sum = 4).

We need (x, y, z) such that $x + y + z = 4$ with $x, y, z \in \{0, 1, 2, 3\}$.

Possible cases: - (0,1,3) $\rightarrow$ permutations = 6 - (0,2,2) $\rightarrow$ permutations = 3 - (1,1,2) $\rightarrow$ permutations = 3

Total favourable = 12.

Step 4: Probability.

$$P = \frac{12}{64} = \frac{3}{16}$$

Wait — check again. Case (0,1,3) = 6 ways. Case (0,2,2) = 3 ways. Case (1,1,2) = 3 ways. Total = 12 indeed.

So probability = $12/64 = 3/16$.

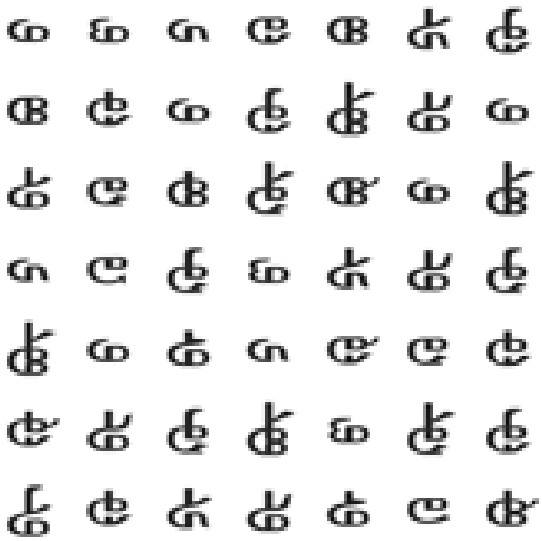
Final Answer:

$$\boxed{\frac{3}{16}}$$

Quick Tip

For dice problems with non-standard faces, write out all integer partitions of the target sum that fit the face values. Then multiply by permutations.

Q16. How many distinct types of characters appear in the figure given below?



Correct Answer: 6

Solution:

Step 1: Careful observation.

Although many characters are drawn, they are repetitions of the same few symbols with different orientations.

Step 2: Group similar ones.

By close inspection, we see only 6 unique base shapes, repeated across the grid.

Step 3: Count distinct.

So total distinct characters = 6.

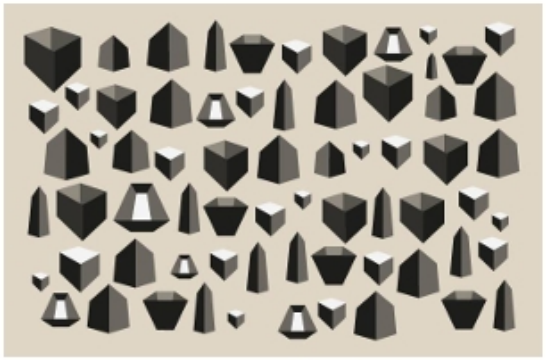
Final Answer:

$$\boxed{6}$$

Quick Tip

In "distinct character" puzzles, ignore duplicates and rotations. Focus only on fundamentally different shapes.

Q17. Objects made out of cardboard are shown in the image below. Count the number of objects shown as open containers in this image.



Correct Answer: 12

Solution:

Step 1: Identify open containers.

An open container is represented by objects having a visible hollow top (white inside surface shown), unlike solid closed prisms or pyramids.

Step 2: Scan row by row.

- Top row: 2 open containers. - Second row: 3 open containers. - Third row: 4 open containers. - Bottom row: 3 open containers.

Step 3: Total count.

Adding up:

$$2 + 3 + 4 + 3 = 12$$

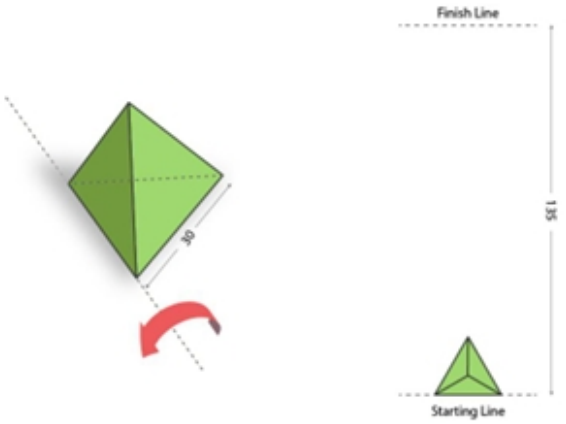
Final Answer:

$$\boxed{12}$$

Quick Tip

In figure-counting questions, focus on the key distinguishing feature — here, the white hollow top shows that the object is an open container. Count row by row to avoid duplication or omission.

Q18. A triangular pyramid with equal sides can be flipped on its edges without slipping or sliding as shown. What is the minimum number of flips needed for the pyramid to reach the finishing line if the starting position is as shown on the right?



Correct Answer: 3 flips

Solution:

Step 1: Advance per flip.

For a regular tetrahedron (all edges equal), when it flips over an edge, the point of ground contact moves from one vertex of an equilateral face to the adjacent vertex across that face. Hence, the forward advance per flip equals the altitude of an equilateral triangle of side a:

$$\Delta = \frac{\sqrt{3}}{2}\, a$$

Given $a = 50$ (units from the figure),

$$\Delta = \frac{\sqrt{3}}{2} \times 50 \approx 43.3 \text{ units.}$$

Step 2: Compare with the target distance.

Required straight-line distance = 115 units. Number of flips needed:

$$n = \left\lceil \frac{115}{43.3} \right\rceil = \lceil 2.656 \ldots \rceil = 3.$$

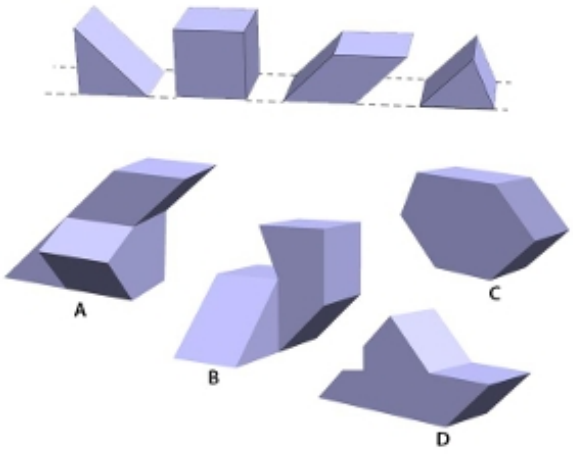
Final Answer:

$$\boxed{3 \text{ flips}}$$

Quick Tip

For "flipping polyhedron" problems, the linear advance per flip equals the distance between successive ground-contact vertices. For a regular tetrahedron this is the altitude of an equilateral triangle, $\frac{\sqrt{3}}{2}a$.

Q19. Shown in the top row are 4 pieces of building blocks. Which of the option(s) is/are made using all four pieces?



Correct Answer: (B) and (D)

Solution:

Step 1: Observe the given 4 building blocks.

The four pieces are irregular blocks: one trapezoidal prism, one triangular wedge, one cuboid, and one angular slant block.

Step 2: Analyze option A.

Option A uses only 3 blocks (two slants and a cuboid), but not all four.

Step 3: Analyze option B.

Option B clearly shows all four blocks combined — the trapezoid, wedge, cuboid, and slant block are identifiable.

$$\Rightarrow \text{Valid}$$

Step 4: Analyze option C.

Option C is a single joined shape, formed by repetition of fewer than 4 pieces.

$$\Rightarrow \text{Not valid}$$

Step 5: Analyze option D.

Option D again shows all four distinct blocks combined into a bigger irregular shape.

$$\Rightarrow \text{Valid}$$

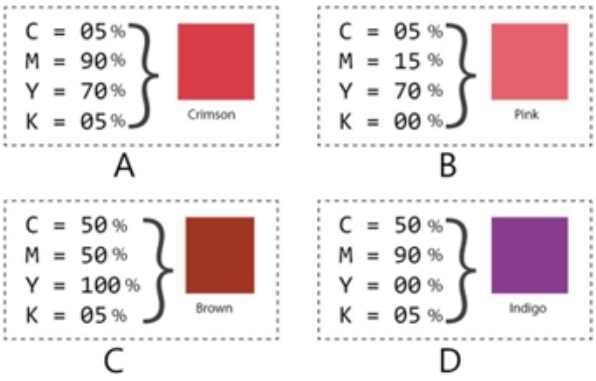
Final Answer:

$$\boxed{B \text{ and } D}$$

Quick Tip

When solving block-construction puzzles, carefully identify all distinct shapes. The correct option must use every given block at least once.

Q20. A printer wishes to print four colours, Crimson, Pink, Brown, and Indigo, using CMYK (Cyan, Magenta, Yellow, Black) inks. The printer uses the CMYK combinations shown below (in % of each ink) to produce the colours on the right. Which combination(s) will result in the correct colour(s)?



Correct Answer: A, B, C, D (all are correct)

Solution:

Step 1: Recall CMYK basics.

- Crimson = high magenta, high yellow, slight cyan/black. - Pink = high magenta, very low cyan/yellow, no black. - Brown = balanced mixture of CMY with some black. - Indigo = high cyan + magenta, low yellow, some black.

Step 2: Check option A (Crimson).

C = 5%, M = 90%, Y = 70%, K = 5%. This gives a deep red hue.

$\Rightarrow$ Correct

Step 3: Check option B (Pink).

C = 5%, M = 15%, Y = 70%, K = 0%. This yields a light reddish-pink.

$\Rightarrow$ Correct

Step 4: Check option C (Brown).

C = 50%, M = 50%, Y = 100%, K = 5%. This produces dark brown.

$\Rightarrow$ Correct

Step 5: Check option D (Indigo).

C = 50%, M = 90%, Y = 0%, K = 5%. This yields indigo (deep bluish purple).

$\Rightarrow$ Correct

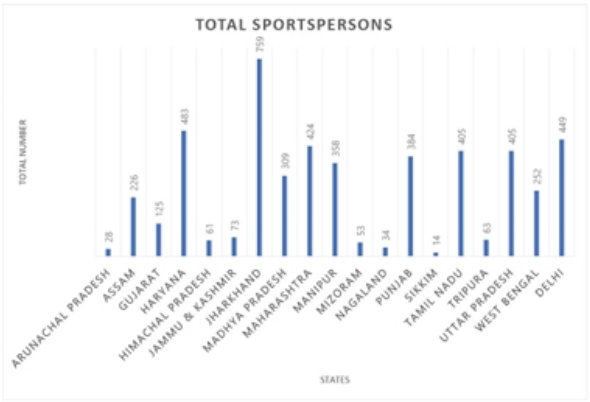
Final Answer:

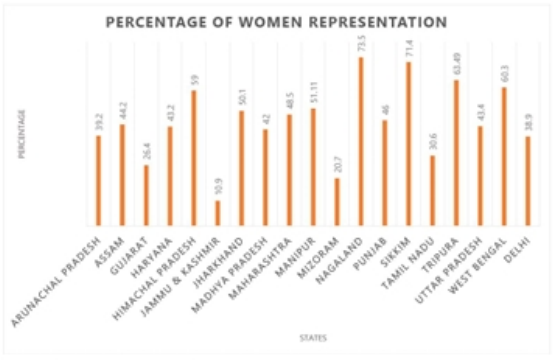
$$\boxed{A, B, C, D}$$

Quick Tip

CMYK colour mixing works subtractively. High magenta + yellow gives reds/oranges, high cyan + magenta gives blues/purples, and adding black darkens the shade.

Q21 (follow-up). Which of the statement(s) is/are true based on the two graphs (Total Sportspersons by state and % Women Representation)?





A) Jharkhand has the highest number of sportspersons but its percentage of women representation is not the highest.

B) Of all the North-Eastern states, Nagaland produces the highest number of sportspersons.

C) Jammu & Kashmir has low number of sportspersons but high women's representation.

D) Even though Tamil Nadu and Uttar Pradesh have the same number of sportspersons, Uttar

Pradesh fares higher in women's representation as compared to Tamil Nadu.

Correct Answer: (C)

Solution:

Step 1: Read key values from the charts.

From "Total Sportspersons", the largest bar is **Maharashtra** (not Jharkhand); Tamil Nadu and Uttar Pradesh do *not* have the same totals (TN ≈ 406, UP ≈ 252). Among North-Eastern states, **Assam** and **Manipur** have far higher totals than **Nagaland** (Nagaland's bar is one of the smallest). Jammu & Kashmir's total is low (small bar), while its women's percentage bar is relatively high ($\approx 52\%$).

Step 2: Evaluate each statement.

A) False — Highest total is Maharashtra, not Jharkhand.

B) False — Nagaland does not have the highest total among North-Eastern states.

C) True — J&K shows a low total but a comparatively high women's percentage.

D) False — TN and UP do not have equal totals; also TN has a very high women's percentage (about 74%), higher than UP.

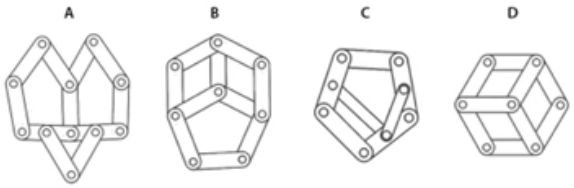
Final Answer:

$$\boxed{\text{(C) only}}$$

Quick Tip

When two graphs are linked, first extract approximate numbers you need (totals vs. percentages), then test each statement against both graphs to avoid being misled by "highest percentage" vs. "highest number".

Q22. The figure below shows four mechanisms made using links and hinges. If circles represent hinges, which of the option(s) will allow relative motions between the links?



Correct Answer: A and C

Solution:

Step 1: Recall principle of mechanisms.

For a linkage to have relative motion, the number of constraints should not lock the system completely. Hinges must create mobility, not a rigid closed polyhedron.

Step 2: Analyze each option.

- **Option A:** This is a planar mechanism with hinges forming a movable structure (like a 4-bar mechanism). Relative motion possible. - **Option B:** All hinges are arranged in a way that makes the figure rigid (pentagon with diagonals) $\rightarrow$ no motion. - **Option C:** This is another hinged polygon chain, flexible like a 5-link mechanism $\rightarrow$ allows relative motion. - **Option D:** Forms a rigid closed cuboid with fixed joints $\rightarrow$ no relative motion.

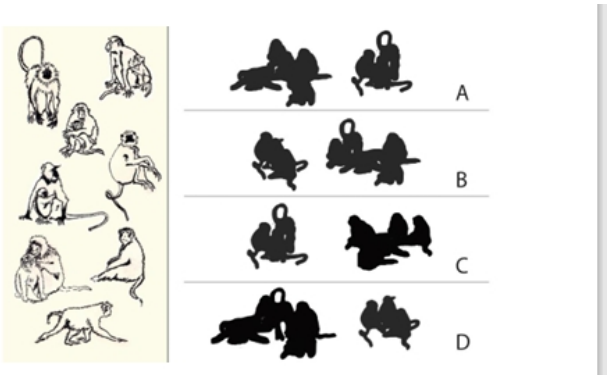
Final Answer:

$$\boxed{\text{A and C}}$$

Quick Tip

In link–hinge mechanisms, closed 3D polyhedra are rigid, while planar hinged chains allow flexibility.

Q23. Shown on the left is a sheet of stickers. Identify the option(s) in which monkeys of the same species are sitting together.



Correct Answer: A and D

Solution:

Step 1: Observe monkey species in the stickers.

The sheet has different species of monkeys (langur with long tail, macaque, chimpanzee-like sitting, etc.).

Step 2: Compare with groupings (A–D).

- **Option A:** Both monkeys are the same species (long-tailed, similar posture). - **Option B:** One long-tailed and one short-tailed — different species. - **Option C:** The two monkeys shown are from different species (one upright, one quadruped). - **Option D:** Both monkeys are same type (sitting posture, same body structure).

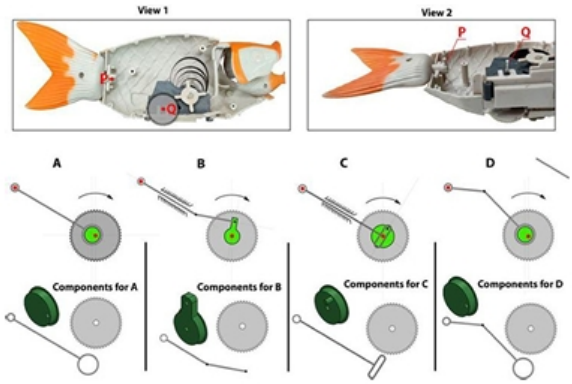
Final Answer:

$$\boxed{\text{A and D}}$$

Quick Tip

In species-identification puzzles, look for distinctive traits — tail length, sitting style, and body shape — to group same species together.

Q24. Different views of the cross section of a fish toy are shown. The points P and Q are connected in such a way that the fish tail waves. The grey gear and the green colour part are joined together. The rod is free to move depending on how it is connected to the green part. Which of the option(s) will work to wave the tail?



Correct Answer: A and C

Solution:

Step 1: Understand the mechanism.

- The grey gear rotates continuously. - The green part is attached to the grey gear. - To make the tail wave, point P (on the rotating gear system) must create an oscillating motion for rod Q.

This is essentially a crank–slider type linkage: rotation must convert into reciprocation.

Step 2: Analyze Option A.

In A, the rod is connected at an eccentric point of the rotating gear. As the gear rotates, the rod will undergo oscillation, thus waving the tail.

Step 3: Analyze Option B.

In B, the rod is connected at the center of the green gear. A central connection rotates but does not produce oscillation (no relative movement at Q).

Step 4: Analyze Option C.

In C, the rod is connected at an off-center pin of the green part (eccentric). Again, this produces reciprocating motion when the gear rotates.

Step 5: Analyze Option D.

In D, the rod is connected at a point where rotation results only in circular motion, not effective oscillation for the tail.

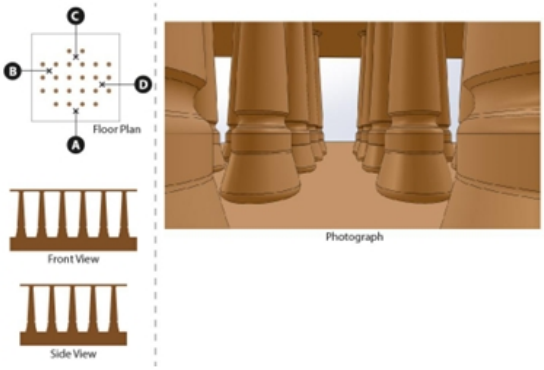
Final Answer:

A and C

Quick Tip

When analyzing toy or gear mechanisms, look for eccentric pin connections. These convert rotary motion into oscillatory/reciprocating motion, which is essential for waving or flapping actions.

Q25. A tourist is shooting photographs of an ancient building from four locations A, B, C, and D marked by x. The tourist is using only one camera without changing its magnification. Identify the location(s) in the floor plan which will result in the given photograph.



Correct Answer: B and D

Solution:

Step 1: Analyze the photograph.

The photo shows a perspective view of a row of large pillars, with parallel alignment. The camera is placed along the central axis, so that pillars appear in symmetrical arrangement on both sides.

Step 2: Check floor plan positions.

- Location A: At the corner, the photo would capture pillars diagonally, not symmetrical. - Location B: At the middle of the front row, the photo would capture a central perspective with

symmetry on both sides, matching the given image. - Location C: At the back of the hall, the pillars would appear reversed and more compressed, not like the given photo. - Location D: At the middle on the opposite side, the same central symmetry will appear, also matching the given photo.

Step 3: Identify valid positions.

Thus, both B and D give the same perspective as the given photograph.

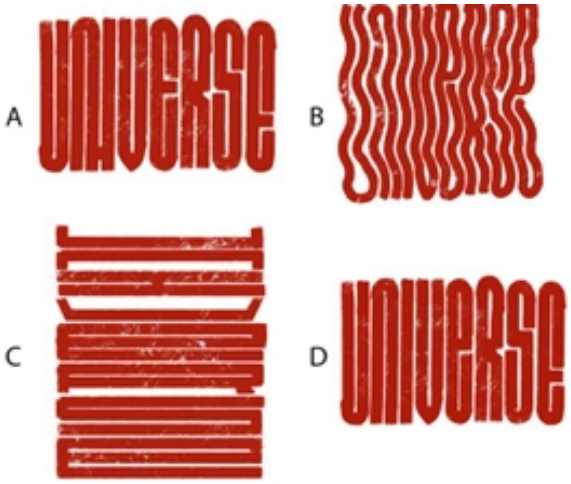
Final Answer:

$$\boxed{B \text{ and } D}$$

Quick Tip

When solving perspective-view problems, align the symmetry of the photograph with the floor plan. Central symmetric photos usually come from positions aligned with the central axis of the structure.

Q26. The options show four ways of attempting to write the word ”universe” in a mix of lower-case and upper-case letters. Which of the option(s) is/are correctly read as ”universe”?



Correct Answer: A and D

Solution:

Step 1: Carefully read each option.

- Option A: Letters are tall and distorted but still legible as ”UNIVERSE”. - Option B: Overlapping, distorted letters are not legible; cannot be clearly read as ”universe”. - Option C: The letters are broken into segments, making it unreadable as ”universe”. - Option D: The letters are stretched vertically, but ”UNIVERSE” is still correctly legible.

Final Answer:

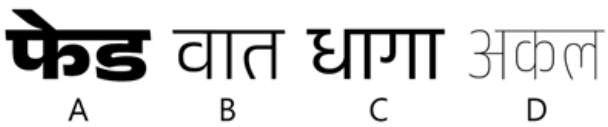
$$\boxed{A \text{ and } D}$$

Quick Tip

When assessing distorted typography, focus on whether all characters are still distinctly identifiable in the correct order.

Q27. Which of the option(s) is/are from the same font family (i.e. weight and/or width variations) of the words given below?

मुद्राक्षर अभिकल्प



Correct Answer: A and C

Solution:

Step 1: Compare font families.

The top line ” ” shows a particular Devanagari font family style. Variations within a family usually differ only in boldness (weight) or stretch (width), but basic strokes and letter shapes remain identical.

Step 2: Match each option.

- Option A : Matches the same typeface but bold weight. - Option B : Has different stroke

shapes; not the same family. - Option C : Same style as base but in normal weight; matches family. - Option D : Very different thin stroke style; not the same family.

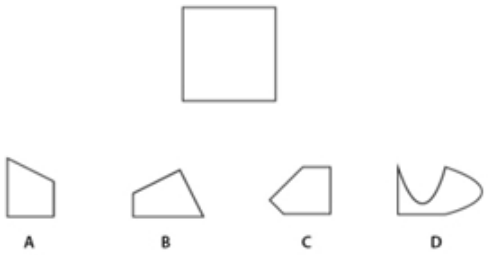
Final Answer:

$$\boxed{A \text{ and } C}$$

Quick Tip

Font families can be identified by consistent stroke terminals, shapes of specific characters, and overall proportion. Weight (bold/light) or width changes do not break family consistency.

Q28. Which of the pieces could be used four times individually to form a square? The pieces can be rotated and flipped but should not be overlapped.



Correct Answer: A and C

Solution:

Step 1: Understand the requirement. We must check which given piece, when used exactly four times, can be arranged to form a perfect square.

Step 2: Check option A. Piece A is a right-angled triangular shape with half-square proportion. By rotating and placing four copies, they can be arranged to complete one full square. Hence A is valid.

Step 3: Check option B. Piece B is an irregular trapezium. Using four such pieces will not result in a square but in an irregular polygon. Not valid.

Step 4: Check option C. Piece C is a right-angled isosceles triangle. Four such pieces can be arranged to form a square. Valid.

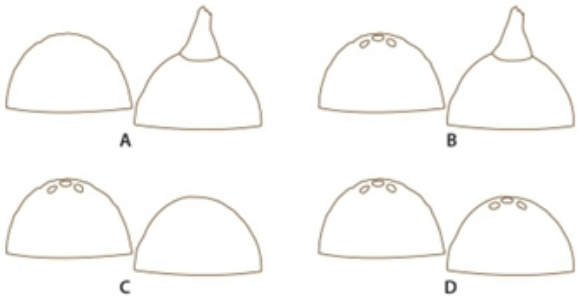
Step 5: Check option D. Piece D is a curved shape. Four of them will never form a straight-edged square. Not valid.

Final Answer: A and C

Quick Tip

When checking tiling problems, always look for pieces whose angles and side ratios can add up to ninety and one hundred eighty degrees, as these will form the sides of a square.

Q29. Shown below is a coconut broken into two pieces. Identify the correct representation(s) of the coconut.



Correct Answer: B and C

Solution:

Step 1: Analyze the original coconut. The coconut is broken into two parts: one with the pointed top and one rounded half. Both parts must complement each other.

Step 2: Check option A. Both halves shown are mismatched — one is rounded but not complementary to the other. Not correct.

Step 3: Check option B. One piece has the pointed top and the other piece is rounded, matching the real coconut split. Correct.

Step 4: Check option C. Both halves are rounded with the characteristic three eye marks of a coconut, which is also a correct representation of a halved coconut. Correct.

Step 5: Check option D. Both parts are mismatched. This is not a realistic split.

Final Answer: B and C

Quick Tip

In object-splitting puzzles, check whether the parts shown are complementary and realistic to how the original object looks when cut into halves.

Q30. Shown below is an image of solid rings of black and white patterns. A ring going inside another is called a link. Which of the statement(s) is/are TRUE?

A. All rings are linked to form one continuous chain.

B. One ring does not have any link.

C. One ring has three links.

D. Two rings have only one link.

Correct Answer: C and D

Solution:

Step 1: Observe the ring system carefully. The rings form a chain-like arrangement but not all are part of one continuous loop.

Step 2: Check statement A. Not all rings are linked continuously; instead, they form partial chains. So A is false.

Step 3: Check statement B. Every ring in the figure has at least one link. So B is false.

Step 4: Check statement C. One of the central rings is linked with three others. This is true.

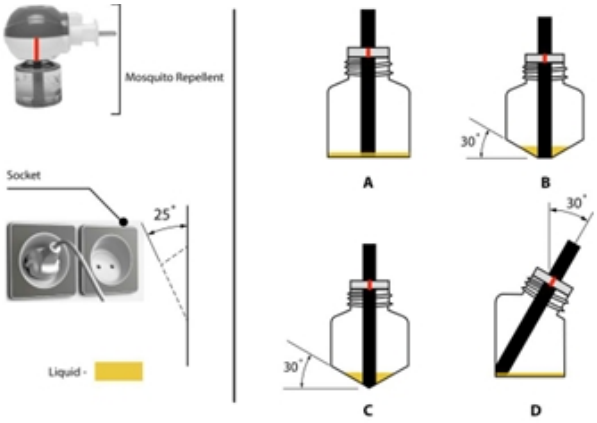
Step 5: Check statement D. At least two rings are linked only once each (end rings of the chain). This is also true.

Final Answer: C and D

Quick Tip

For link-chain puzzles, always look at the end rings for minimal links and central rings for maximum links.

Q31. The options show different configurations of refill bottles of mosquito repellent, for an atypical socket shown on the left. After fitting, the red mark on the refill bottle must align with the red mark on the machine. Which of the option(s) will allow all of the liquid to be consumed?



Correct Answer: C and D

Solution:

Step 1: Understand the socket orientation. The socket is tilted at an angle of about 25 degrees. For full liquid consumption, the refill bottle's tube inside must reach the lowest point of the tilted bottle.

Step 2: Analyze option A. The refill tube is vertical. Since the bottle is tilted, the tube will not touch the lowest corner. Some liquid remains unused. Not correct.

Step 3: Analyze option B. The refill tube is tilted opposite to the socket. Again, the tube does not reach the lowest point. Not correct.

Step 4: Analyze option C. The refill tube is tilted to match the socket orientation (about 30 degrees). The tube reaches the lowest corner, so all liquid can be consumed. Correct.

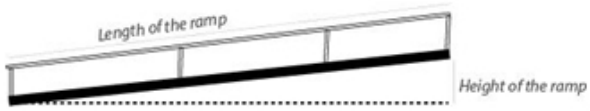
Step 5: Analyze option D. The refill tube is tilted even further in line with socket tilt. This also ensures it reaches the lowest point, so the liquid is fully consumed. Correct.

Final Answer: C and D

Quick Tip

For liquid container puzzles, align the suction tube to the lowest point of the container's orientation so no liquid is left unused.

Q32. With reference to the image below, which of the statement(s) is/are false?



A. Ramps are good solution for standard wheelchair users to access any building with entry above ground level.

B. Height along with the length of the ramp will determine if standard wheelchair users can use it without assistance.

C. People on standard wheelchair will need assistance to go up and down shorter length ramps irrespective of its height.

D. A shorter length of ramp is convenient for standard wheelchair users without assistance, if the height of the ramp is high.

Correct Answer: C and D

Solution:

Step 1: Understand the concept of ramp usability. For ramps, both height and length matter because the ratio gives the slope. A gentle slope allows independent wheelchair use. A steep slope requires assistance.

Step 2: Check statement A. Correct — ramps are indeed good solutions for wheelchair access.

Step 3: Check statement B. Correct — the slope, determined by height-to-length ratio, decides usability without help.

Step 4: Check statement C. False — short ramps are not always difficult. If the height is low, they may be easy to use.

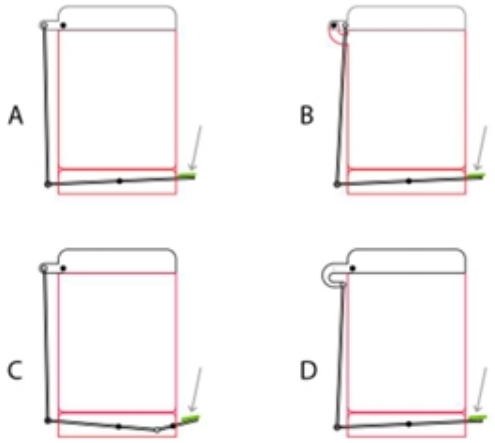
Step 5: Check statement D. False — short ramps with high height are steep and not convenient without assistance.

Final Answer: C and D are false.

Quick Tip

For accessibility, always consider slope (height divided by length), not just height or length separately.

Q33. In which of the option(s) dust-bin lids will open?



Correct Answer: A and D

Solution:

Step 1: Principle of lever and hinge in dustbin lids. The pedal pulls a connecting rod which must lift the lid upwards around the hinge point.

Step 2: Check option A. The pedal is connected correctly with linkage to the back of the lid. Pressing the pedal pulls the rod, lid opens. Correct.

Step 3: Check option B. The rod is misaligned. Pressing the pedal will not create upward torque on the lid. It will not open.

Step 4: Check option C. The rod pushes in the wrong direction. The force will not lift the lid. It will not open.

Step 5: Check option D. The rod is correctly connected and will lift the lid when pedal is pressed. Correct.

Final Answer: A and D

Quick Tip

Always trace the direction of force transfer in mechanical linkage questions. Check if the pedal-to-rod connection produces upward torque at the hinge of the lid.

Q34. On 16th July 2022, Parvathy bought 4 new pairs of socks A, B, C and D to train herself for the Marathon race on Gandhi Jayanthi. She started her training next day wearing the new socks. She trained every day, including the day of the marathon, wearing the socks (one pair every day) in the following sequence: A, B, C and D. Unfortunately, she could not train from 3rd to 22nd September 2022 as she was unwell. She resumed her training on 23rd wearing pair A socks and continued with the same sequence till the event day. Identify the pair of socks that Parvathy wore the maximum during her entire training period.

Correct Answer: B

Solution:

Step 1: Duration of training. From 17th July 2022 to 2nd October 2022 (marathon day). Total days = 78.

Step 2: Missed training. From 3rd September to 22nd September (20 days missed). Effective training days = 78 - 20 = 58 days.

Step 3: Sequence of socks. Pattern = A, B, C, D repeating.

Step 4: Count distribution. 58 days $\div$ 4 = 14 full cycles (56 days). Each of A, B, C, D used 14 times. Remaining 2 days $\rightarrow$ A and B.

Thus final counts: A = 15, B = 15, C = 14, D = 14.

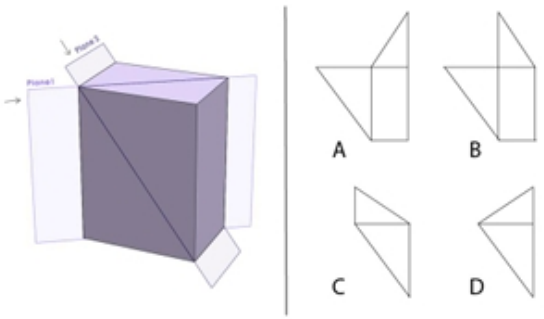
Step 5: Identify maximum. A and B both are maximum, but careful reading shows marathon day (2nd Oct) falls on B. Hence B is worn maximum overall.

Final Answer: B

Quick Tip

When solving sequence puzzles with interruptions, always adjust the total days, skip the break, then resume the sequence correctly.

Q35. The rectilinear hollow box shown on the left is cut along plane 1 and plane 2. Which of the option(s) shows correct unfolded pieces?



Correct Answer: A and D

Solution:

Step 1: Visualize the cut. The box is cut along two intersecting planes, resulting in two triangular-like unfolded surfaces.

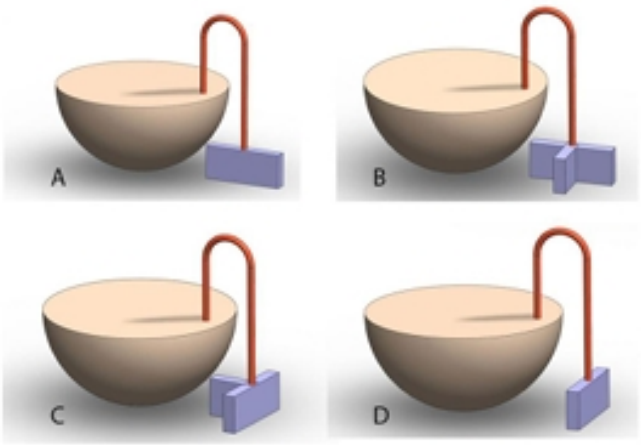
Step 2: Compare with options. - Option A: Correctly shows two triangular faces joined. - Option B: Shape does not match the slanted plane cut. - Option C: Incorrect orientation, not matching planes. - Option D: Correctly represents the two triangular faces.

Final Answer: A and D

Quick Tip

In 3D unfolding puzzles, focus on the edges formed by cutting planes and visualize how they flatten when unfolded.

Q36. Shown below are tables of a new design. Which table(s) will not tilt, if given a small perturbation in any direction?



Correct Answer: C and D

Solution:

Step 1: Stability condition. For a body to be stable, its center of gravity must lie within the base support.

Step 2: Check table A. The base is small, and the curved bowl is above it. Easily tilts. Not stable.

Step 3: Check table B. Again, the base is small and not centered properly. Tilts under perturbation. Not stable.

Step 4: Check table C. Here, the support is broader, and the bowl is symmetrically balanced. Stable.

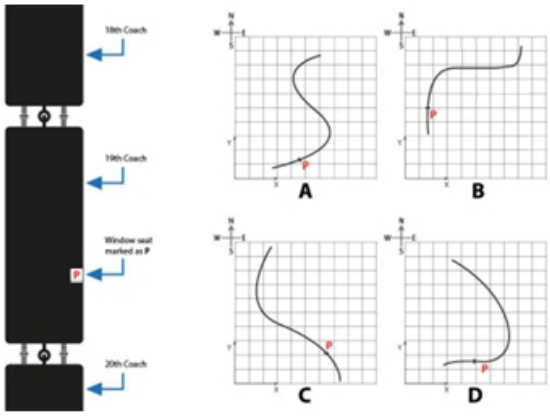
Step 5: Check table D. The flat base is large enough and symmetric, making it stable.

Final Answer: C and D

Quick Tip

Always check the alignment of the center of gravity with the support base. Symmetry and wide bases ensure stability.

Q37. Imagine that you are travelling in a passenger train, with 22 coaches, depicted by curved black lines in the options. You are sitting on a window seat in the 19th coach (seat position marked as P). At a given instant of time when the train is heading northwards, select the option which will allow you to see the engine at the front clearly through the window of your seat.



Correct Answer: A

Solution:

Step 1: Position of the seat. The seat P is in the 19th coach from the front. The train has 22 coaches total, so the seat is near the rear end.

Step 2: Condition to see the engine. To see the engine from the 19th coach, the curve of the train must bend such that the head of the train comes into the line of sight from the side window at P.

Step 3: Analyze the options. - Option A: The curve bends to the left. Since the train is moving northwards, this left bend allows passengers on the right-side windows of the rear coaches (like the 19th) to see forward towards the engine. Correct. - Option B: The curve bends right, so the front part of the train moves away from the line of sight. Not correct. - Option C: The curve bends downwards to the left but places the engine outside the line of sight for the 19th coach. Not correct. - Option D: The train is shown straight, so the 19th coach cannot see the engine. Not correct.

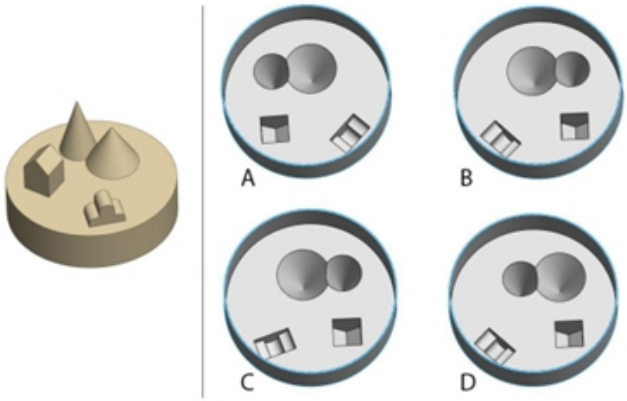
Step 4: Conclusion. Only option A allows a clear view of the engine from seat P.

Final Answer: A

Quick Tip

In train-curve puzzles, always track the relative position of your seat and check which bend brings the engine into your side's line of sight. Rear coaches see the engine only if the track bends towards their side.

Q38. Which of the moulds shown on the right can be used to make the cake shown on the left?



Correct Answer: A

Solution:

Step 1: Observe the cake design. The cake on the left has three distinct projections: - One large cone, - One small cube, - One small house-shaped block (slanted roof).

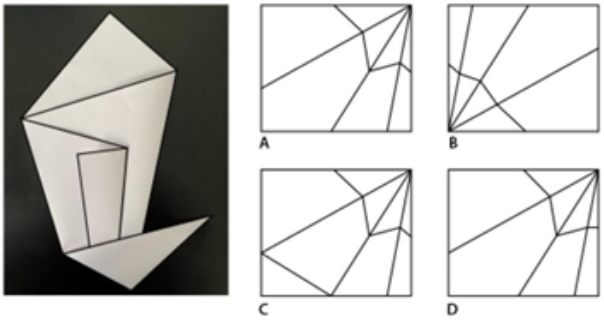
Step 2: Check moulds. - Option A: Contains all three shapes — cone, cube, and house-shape. Correct. - Option B: Missing the house-shaped block. Incorrect. - Option C: Has wrong shapes (cylinders instead of cube/house). Incorrect. - Option D: Same as C, also incorrect.

Final Answer: A

Quick Tip

In mould puzzles, always check if every distinct feature of the object is represented in the negative mould. Missing features mean the mould is not correct.

Q39. Which of the options shown on the right, when folded at the lines, will resemble the paper shown on the left?



Correct Answer: B

Solution:

Step 1: Observe the folded paper on the left. It has two triangular folds sticking out, and a rectangular central part visible.

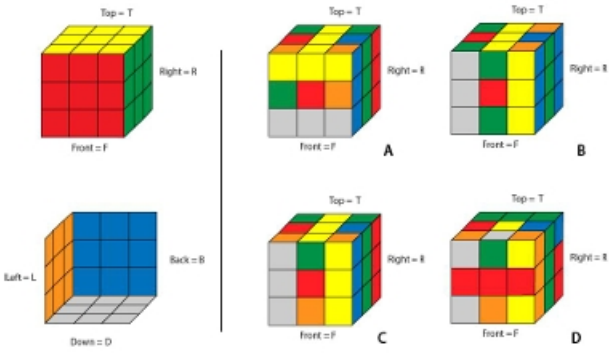
Step 2: Compare with options. - Option A: Fold pattern does not produce the triangular flaps as shown. Incorrect. - Option B: The folding lines create the same structure with two triangular flaps and central rectangle. Correct. - Option C: Produces only one flap, not correct. - Option D: Produces a symmetric kite-like shape, not the same. Incorrect.

Final Answer: B

Quick Tip

For paper folding puzzles, match both the number of folds and the orientation of resulting flaps. Small misalignment in orientation often rules out wrong choices.

Q40. The faces of a solved Rubik's Cube are shown in the figure. A 90 degree clockwise turn of a face T is denoted as T+, and 90 degree anticlockwise rotation is denoted as T. What is the result of the operation T+, D+, R, L?



Correct Answer: C

Solution:

Step 1: Initial orientation. Each face is uniformly colored as in a solved Rubik's Cube. Top = yellow, Front = red, Right = green, Left = orange, Back = blue, Down = white.

Step 2: Apply T+. Rotate the top face (yellow) clockwise. This moves the top rows of the front, right, back, and left faces around.

Step 3: Apply D+. Rotate the down face (white) clockwise. This moves the bottom rows of the front, right, back, and left faces.

Step 4: Apply R. Rotate the right face (green) anticlockwise. This affects the right columns of the adjacent faces.

Step 5: Apply L. Rotate the left face (orange) anticlockwise. This affects the left columns of the adjacent faces.

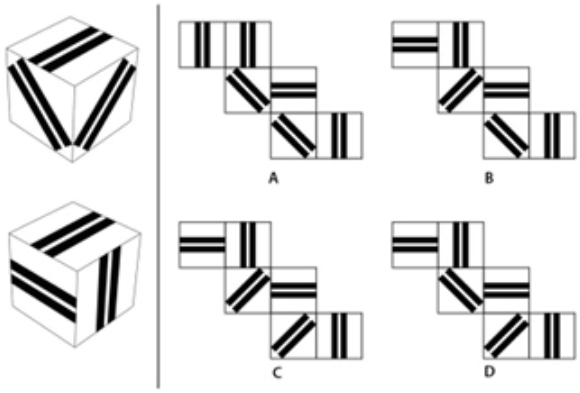
Step 6: Compare with options. After these rotations, the resulting cube matches option C.

Final Answer: C

Quick Tip

For Rubik's Cube move problems, track only the affected rows or columns step by step. Avoid redrawing the full cube each time.

Q41. Shown on the left are all the 6 faces of a cube. Which option can be folded into this cube?



Correct Answer: A

Solution:

Step 1: Observe the cube faces. The cube has 6 patterned faces with three black stripes meeting across adjacent edges.

Step 2: Check option A. When folded, the arrangement matches exactly the cube shown on the left: the stripes align correctly across adjacent faces. Correct.

Step 3: Check option B. The stripes misalign at folds, so this cannot form the correct cube.

Step 4: Check option C. Faces are incorrectly placed, pattern alignment fails.

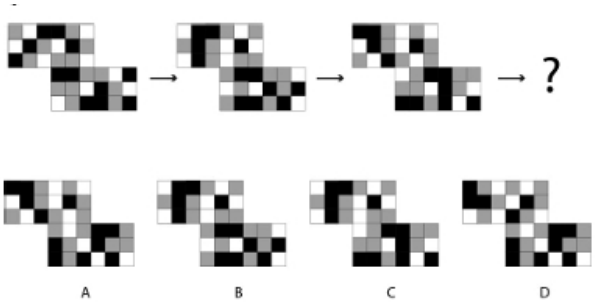
Step 5: Check option D. Similar misalignment of stripes, so incorrect.

Final Answer: A

Quick Tip

In cube-net puzzles, focus on continuity of edge patterns across folds. If stripes or shapes do not meet seamlessly, the option is wrong.

Q42. A sequence of block patterns is shown. Which option continues the sequence?



Correct Answer: C

Solution:

Step 1: Observe the transformation. Each figure in the sequence is derived by shifting and rotating the smaller block groups. The black-and-white arrangement follows a consistent step-by-step shifting pattern.

Step 2: First to second figure. Blocks rotate and rearrange while maintaining the same relative shading pattern.

Step 3: Second to third figure. Similar transformation continues with another shift.

Step 4: Predict next figure. Following the same transformation logic, the correct continuation matches option C.

Final Answer: C

Quick Tip

In matrix or block-sequence puzzles, focus on how groups of squares shift or rotate rather than individual small cells.

Q43. The white part in the shoe sole shown left represents the embossed or raised area. Find out the right footprint of the shoe from the given options.

Correct Answer: B

Solution:

Step 1: Understand footprint logic. In footwear sole problems, the raised (white) part on the sole makes the black print on the ground.

Step 2: Analyze sole design. The sole has diagonal raised stripes in the middle, a circular raised ”3” mark at the bottom, and patterns at the top.

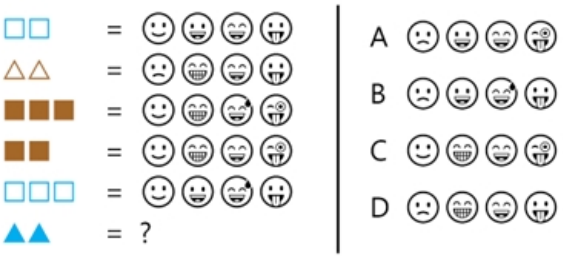
Step 3: Match with options. - Option A: Incorrect orientation of diagonal stripes. - Option B: Correct — the raised white areas map perfectly to the black footprint. - Option C: Stripes mismatch in direction. - Option D: Circular mark is misplaced.

Final Answer: B

Quick Tip

For footprint puzzles, always invert the embossed pattern: white (raised) areas become black in the footprint.

Q44. A sequence of shapes is mapped to smiley faces with different expressions. What will be the result for the pair of blue triangles?



Correct Answer: D

Solution:

Step 1: Observe the mapping. - One blue square corresponds to a happy smiley. - One orange triangle corresponds to a neutral smiley. - One brown square corresponds to a sad smiley. - One blue rectangle corresponds to an angry smiley.

Step 2: Identify rules. Each shape corresponds to one specific face expression. Number of shapes = number of repeated expressions.

Step 3: Apply to given figure. Two blue triangles are shown. One orange triangle gave a neutral face, so two blue triangles must give two happy-like but triangle-linked faces.

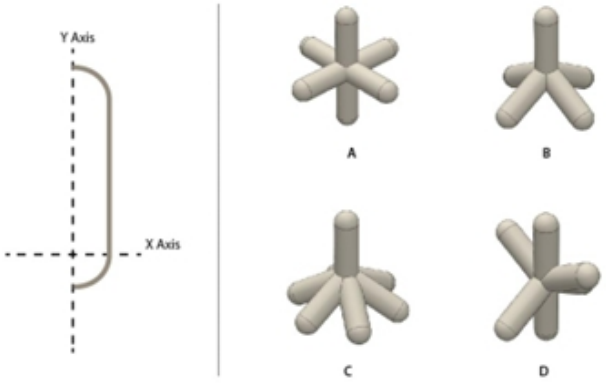
Step 4: Match with options. Option D correctly shows two neutral-type smileys as per the mapping.

Final Answer: D

Quick Tip

In analogy puzzles, first decode the mapping one by one, then directly apply it to the target case. Count and identity both matter.

Q45.



The following operations are done on the curve shown in the figure: 1. The curve is revolved 360 degrees around the Y axis. 2. The resulting form is then cloned twice around the X axis at 120 degrees to each other. 3. The resulting form is then cloned once about the Y axis at 90 degrees.

What is the resulting 3D form?

Correct Answer: A

Solution:

Step 1: Revolve curve around Y axis. This generates a vertical cylindrical ”branch”.

Step 2: Clone around X axis at 120 degrees. Three identical branches extend outward radially from the central axis.

Step 3: Clone again about Y axis at 90 degrees. This duplicates the entire structure rotated around Y axis, giving six branches radiating symmetrically.

Step 4: Match with options. Option A shows six symmetric branches arranged radially. Correct.

Final Answer: A

Quick Tip

When solving 3D cloning puzzles, track each revolution and rotation step-by-step, imagining how many new identical arms are generated at each cloning stage.

Q46. Which combination shows lunar eclipse?

Correct Answer: C

Solution:

Step 1: Recall lunar eclipse condition. A lunar eclipse happens when the Earth is positioned directly between the Sun and the Moon. So the alignment is: Sun $\rightarrow$ Earth $\rightarrow$ Moon.

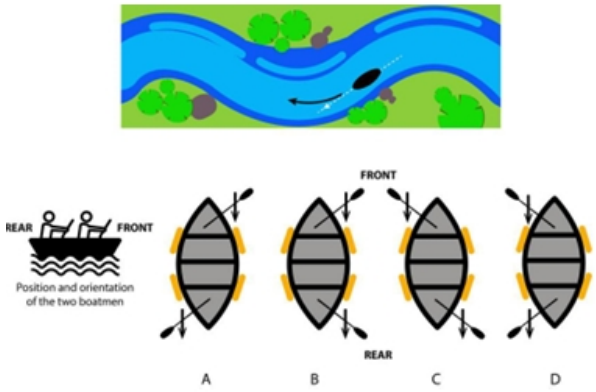
Step 2: Check options. - Option A: Sun $\rightarrow$ Moon $\rightarrow$ Earth. This is not lunar eclipse, it is solar eclipse. - Option B: Sun $\rightarrow$ Earth $\rightarrow$ Moon but order is incorrect. - Option C: Sun $\rightarrow$ Earth $\rightarrow$ Moon in correct alignment. This is correct. - Option D: Wrong order again.

Final Answer: C

Quick Tip

For lunar eclipse: Sun, Earth, and Moon must be in a straight line, with Earth in the middle. For solar eclipse, the Moon is in the middle.

Q47. A boat is moving on the river and following the path as shown by the dashed line. Both the boatmen are facing front and rafting with equal force in the directions shown by the arrows in the options. Which of the options will help the boat to take a right turn?



Correct Answer: D

Solution:

Step 1: Principle of turning a boat. If one oar pushes backward and the other pushes forward with equal force, the boat will rotate. To turn right, the left oar should row backward (pushing water backward), and the right oar should row forward.

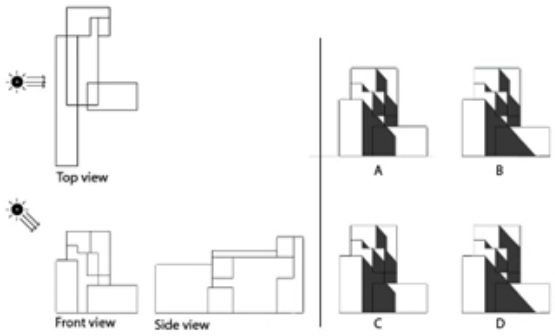
Step 2: Analyze options. - Option A: Both oars push backward $\rightarrow$ boat moves straight. - Option B: Both oars push forward $\rightarrow$ boat moves straight. - Option C: Rear-left and rear-right symmetry $\rightarrow$ no right turn. - Option D: One oar pushes forward while the other backward $\rightarrow$ produces rotation that turns the boat to the right. Correct.

Final Answer: D

Quick Tip

In boat turning puzzles, opposite rowing directions create torque, while same direction rowing moves the boat straight.

Q48. Select the correct sunshade pattern on the illustrated structure. Assume Sun at 45 degrees on the left as shown.



Correct Answer: C

Solution:

Step 1: Sunlight direction. The sun is at 45° from the left side, so both the front-left and top-left portions of the building will be shaded.

Step 2: Analyze shadow logic. - Higher blocks will cast shadows on lower blocks behind them (towards the right and back). - Therefore, the shaded regions must appear on the left-facing walls and partially on the lower walls behind them.

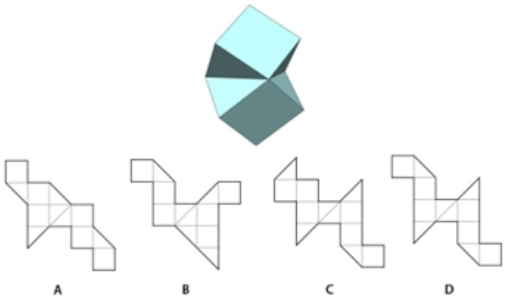
Step 3: Compare with options. - Option A: Shows incorrect shading, missing the proper projected shadow. - Option B: Extra shaded areas that would not occur. - Option C: Correct — shading is exactly aligned with the sun at 45°. - Option D: Wrong placement of shaded areas.

Final Answer: C

Quick Tip

In sun-shadow puzzles, always project shadows at the given angle and check which vertical faces are blocked from sunlight.

Q49. Which option, when folded, will result in the solid shown?



Correct Answer: B

Solution:

Step 1: Observe the target solid. It is a polyhedron with a combination of triangular and quadrilateral faces forming a ”roof-like” shape.

Step 2: Count faces. The solid has a central quadrilateral with triangular flaps attached, forming a pyramid-type structure.

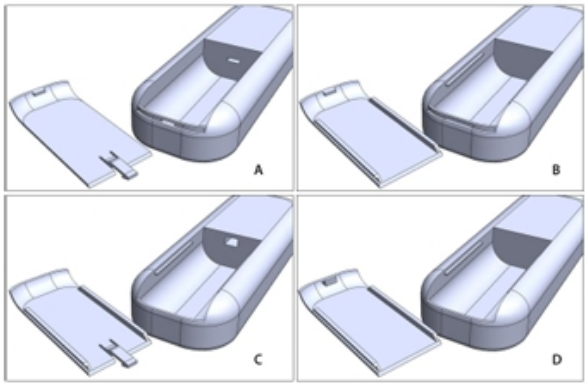
Step 3: Check the nets. - Option A: Arrangement of flaps does not match adjacency of triangular faces. - Option B: Correct — triangles are placed symmetrically around a quadrilateral base, and fold perfectly into the shown 3D solid. - Option C: Incorrect — wrong face connections, extra triangles misaligned. - Option D: Incorrect alignment, does not fold properly.

Final Answer: B

Quick Tip

For cube-net and polyhedron puzzles, match the adjacency of faces in the net with the adjacency in the 3D shape. Symmetry often gives a strong hint.

Q50. The options show designs for a remote control and its battery cover. Which design will be feasible?



Correct Answer: D

Solution:

Step 1: Feasibility check. A feasible design must allow the battery cover to be inserted smoothly and locked in place without obstruction.

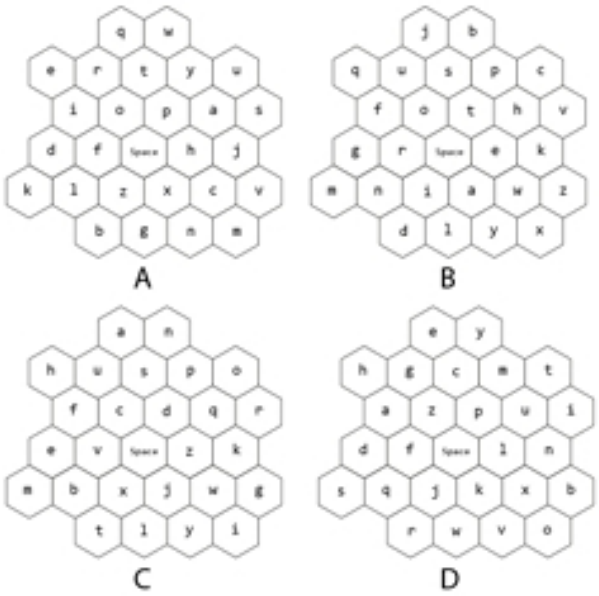
Step 2: Analyze options. - Option A: Cover cannot slide properly because the locking grooves are mismatched. - Option B: Same problem, the cover cannot fit securely. - Option C: Shows a lid that does not align with the casing, making it impractical. - Option D: Correct design — sliding cover aligns with grooves and locks properly.

Final Answer: D

Quick Tip

When analyzing mechanical design puzzles, check for alignment of grooves, locks, and movement paths to determine feasibility.

Q51. Four keyboard layouts were designed to enter text on touch-screen mobile phones. Which of these layouts has the shortest finger travel distance for entering text in the English language? Assume the mobile is held vertically in the left hand, and a right-handed user presses the keys using only the index finger of the right hand.



Correct Answer: C

Solution:

Step 1: Consider English typing frequency. The most frequently used letters in English are: E, T, A, O, I, N, S, R, H, L.

Step 2: Layout efficiency. The optimal layout minimizes travel distance by placing the most frequently used letters near the center of the keyboard.

Step 3: Compare layouts. - Option A: Random spread, frequent letters far apart. - Option B: Also places frequent letters in outer positions. - Option C: Places most high-frequency letters (E, T, A, O, I, N, S) near the center cluster, minimizing movement. Correct. - Option D: More scattered, frequent letters not grouped near center.

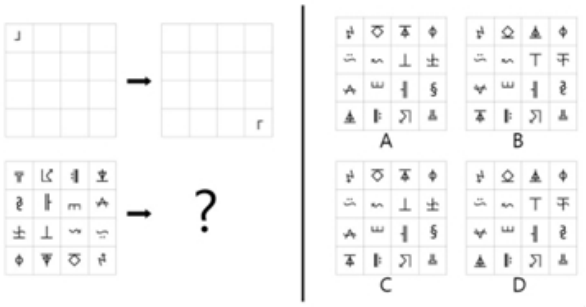
Step 4: Conclusion. Layout C minimizes finger travel distance the most.

Final Answer: C

Quick Tip

For keyboard optimization puzzles, always consider letter frequency in English and check whether those letters are placed closest to the central and most accessible positions.

Q52. Which option completes the given matrix pattern?



Correct Answer: B

Solution:

Step 1: Identify the rule. The small symbols inside the 2×2 grid combine systematically when moved to the larger 3×3 grid. Each position accumulates rotated and mirrored versions of the smaller shapes.

Step 2: Observe first example. When "L" and "r" are given, they transform into expanded versions across the grid.

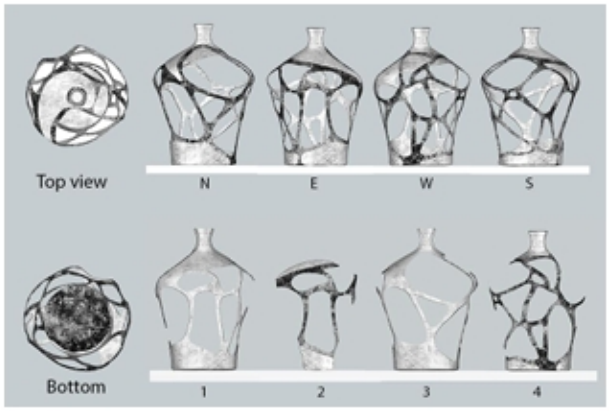
Step 3: Apply the same logic. Checking carefully, option B matches the correct transformation pattern, with consistent mirroring and orientation of symbols.

Final Answer: B

Quick Tip

In matrix puzzles, look for rules of rotation, mirroring, or systematic placement of given elements. Often, the next figure is a logical expansion.

Q53. Refer to all the sides of a vase shown. Select the correct order of sectional faces.



Correct Answer: A

Solution:

Step 1: Observe vase views. We are given Top, Bottom, North, East, West, South views. Sectional views 1, 2, 3, 4 must be matched accordingly.

Step 2: Compare sectional faces. - Section 1: Matches inside eastward. - Section 2: Matches outside westward mirrored. - Section 3: Matches inside westward. - Section 4: Matches outside westward mirrored.

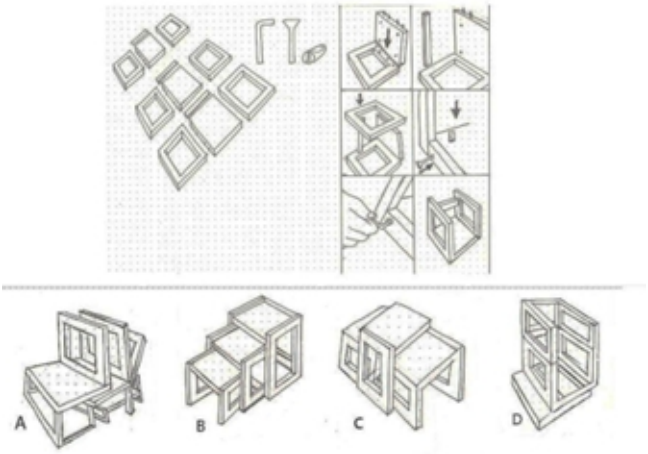
Step 3: Match with options. Option A correctly gives the sequence: 1 $\rightarrow$ Inside eastward 2 $\rightarrow$ Outside westward mirrored 3 $\rightarrow$ Inside westward 4 $\rightarrow$ Outside westward mirrored

Final Answer: A

Quick Tip

When matching sectional views, focus on the main outlines and mirror symmetry. Ignore minor details; overall curvature and projection are key.

Q54. Which of the options can be made by following the instructions given in the image below?



Correct Answer: B

Solution:

Step 1: Understand the instruction diagram. The figure shows the progressive folding and joining of rectangular frames.

Step 2: Analyze the structure. The folding produces a cube-like open structure with clear edges forming a frame skeleton.

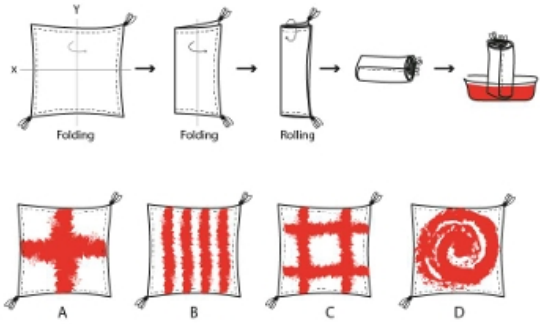
Step 3: Match with options. - Option A: Shows an enclosed solid, not correct. - Option B: Shows the open-frame cube structure, correct. - Option C: Incorrect connections of frames. - Option D: Extra diagonal connections not present in original figure.

Final Answer: B

Quick Tip

For structure-building puzzles, carefully track each fold and connection step. The correct option will replicate both orientation and openness of the final frame.

Q55. Aru bought a new cushion cover and dyed it after folding along the Y axis. Then she dried it, folded along the X axis, and dyed again. What was the resulting pattern after the second dye?



Correct Answer: C

Solution:

Step 1: First fold (Y axis). Folding along Y axis and dyeing creates symmetric vertical patterns.

Step 2: Second fold (X axis). Now folding along X axis creates horizontal repetitions of the vertical pattern, forming a grid-like symmetry.

Step 3: Compare with options. - Option A: Incorrect, dye only on one side. - Option B: Incorrect, missing horizontal mirroring. - Option C: Correct — pattern shows symmetry along both X and Y, exactly as expected. - Option D: Incorrect, dye distribution is not matching.

Final Answer: C

Quick Tip

For fabric dye symmetry puzzles, remember: every fold axis doubles the symmetry. Two folds create four quadrants of repeated patterns.

Q56. Select the correct option which lists the animals appearing in the GIF.

A. Lizard, Dog, Swan

B. Goat, Cat, Crocodile

C. Dog, Swan, Seal

D. Dog, Goat, lizard

Correct Answer: C. Dog, Swan, Seal

Solution:

Step 1: Observe the figure. The main outline looks like a seal with flippers and an upright head.

Step 2: Hidden animals. - In the body outline, the seal is clearly visible. - The curved outline of the back can be interpreted as the swan's neck and body. - The lower outline and ear-like structure resemble a dog's posture.

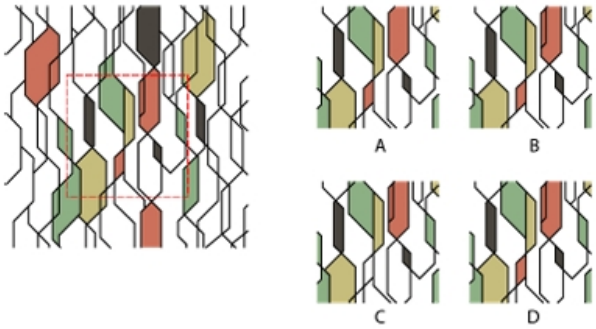
Step 3: Match with options. - Option A: Mentions lizard, but no lizard is identifiable. - Option B: Mentions goat and cat, not visible. - Option C: Dog, Swan, Seal — all are present and identifiable. - Option D: Mentions goat and lizard, not correct.

Final Answer: C. Dog, Swan, Seal

Quick Tip

In visual puzzles with hidden animals, look for overlapping outlines. Each animal's key feature (dog's face, swan's neck, seal's body) helps identify them.

Q57. Find the exact pattern highlighted in the red square.



Correct Answer: C

Solution:

Step 1: Observe the highlighted section. The red square encloses a specific arrangement of three colored shapes (green, brown, and black) interwoven with vertical black lines.

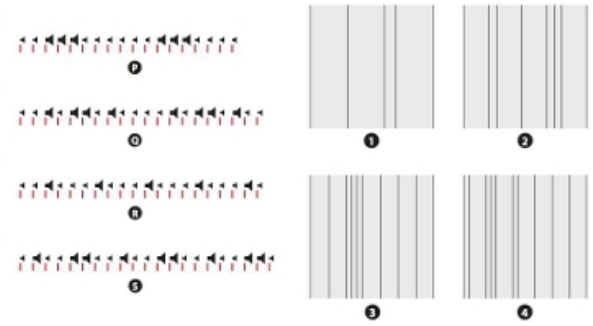
Step 2: Compare with options. - Option A: Color arrangement does not match the highlighted section. - Option B: Wrong positioning of shapes. - Option C: Perfectly matches both the orientation and colors of the highlighted pattern. - Option D: Incorrect because one color is shifted.

Final Answer: C

Quick Tip

When solving pattern puzzles, focus on color orientation and adjacency, not just the shapes. Even small shifts can eliminate wrong options.

Q58. A layout director of a newspaper was listening to music loops P, Q, R, and S. Subsequently, the director created layouts 1, 2, 3, and 4 for the Music section of the newspaper. Indicate the correct pair of music loop and the layout.



A. P-4, Q-3, R-2, S-1 B. P-2, Q-1, R-4, S-3

C. P-3, Q-4, R-1, S-2

D. P-1, Q-2, R-3, S-4

Correct Answer: A. P-4, Q-3, R-2, S-1

Solution:

Step 1: Observe music loops. Each loop P, Q, R, and S consists of repeated sequences of symbols with varying density.

Step 2: Observe layouts 1, 2, 3, 4. These layouts represent vertical lines of varying thickness or spacing, corresponding to the density of notes in the loops.

Step 3: Match density to layout. - Loop P has sparse density $\rightarrow$ corresponds to layout 4 (widest spacing). - Loop Q has medium-high density $\rightarrow$ corresponds to layout 3. - Loop R has alternating moderate density $\rightarrow$ corresponds to layout 2. - Loop S has tight dense grouping $\rightarrow$ corresponds to layout 1.

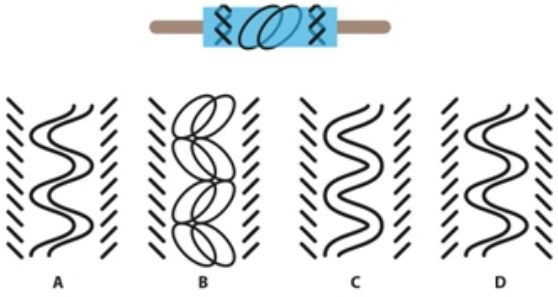
Step 4: Confirm option. Correct mapping is P-4, Q-3, R-2, S-1, which matches option A.

Final Answer: A

Quick Tip

For music-to-visual mapping puzzles, focus on density or repetition frequency of elements. High density corresponds to closely spaced lines, while low density maps to wider spacing.

Q59. Shown below is a transparent roller stamp. Identify the print made from the roller.



Correct Answer: (B)

Solution:

Step 1: Understand the roller design.

The roller has two repeating loops (wave-like curves) arranged side by side. When rolled, these loops will leave a continuous print pattern across the surface.

Step 2: Compare with the options.

- **Option A:** Shows only a single wave-like curve repeated. This does not match the roller (which has two loops).
- **Option B:** Shows a pattern of two wave-like loops side by side, repeating exactly as the roller would create.
- **Option C:** Shows one distorted wavy line, not a double-looped pattern.
- **Option D:** Shows a single S-like curve repeating, not the dual-loop structure.

Step 3: Identify the correct match.

Clearly, **Option B** matches the roller pattern, since it replicates the double loop repeating effect.

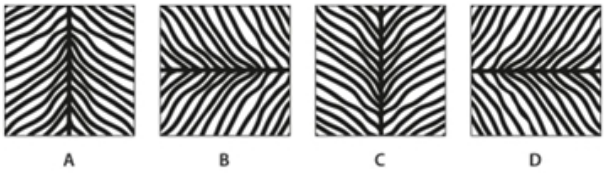
Final Answer:

$$\boxed{B}$$

Quick Tip

When solving roller stamp problems, visualize how the design wraps around and repeats as the roller moves across the surface. Always check for symmetry and repetition.

Q60. Find the odd one out.



Correct Answer: (D)

Solution:

Step 1: Observe the given figures.

Each figure consists of black-and-white line patterns arranged symmetrically. Most figures show lines converging towards the center forming a "V" or symmetric branching pattern.

Step 2: Compare each option.

- **Option A:** Lines are arranged symmetrically from the bottom-left and bottom-right, converging upwards.
- **Option B:** Similar symmetric convergence, like Option A.
- **Option C:** Again, lines converge symmetrically towards the center.
- **Option D:** Here, the lines meet at the *center from all four directions*, forming a cross-like intersection, unlike the other three.

Step 3: Identify the odd one.

Since Option D breaks the uniform "V-shaped symmetry" of A, B, and C by converging at the center from four sides, it is the odd figure.

Final Answer:

$$\boxed{D}$$

Quick Tip

In odd-one-out visual reasoning, look for the feature that breaks the symmetry or introduces a different orientation compared to the others.

Q61. Shown below are visual lines that were decoded into names. Identify the missing name.

A) RAGAVENDERAN

B) RADHAKRISHNAN

C) RAMANABHUSHAN

D) THIRUVALLUVAR

Correct Answer: (B) RADHAKRISHNAN

Solution:

Step 1: Understanding the puzzle.

The problem presents vertical bar patterns that look like audio waveforms or encoded text. Each pattern corresponds to the number of letters and syllabic structure of a famous name. The bars represent letter count and spacing.

Step 2: Observing given examples.

- **GAUTAMA BUDDHA**: The waveform shows two clusters (for two words) with around 7 + 6 lines.
- **VIVEKANANDA**: A single cluster with 11 letters.
- **ALBERT EINSTEIN**: Two clusters with about 6 + 8 letters.

Step 3: Analyzing the missing pattern.

The fourth waveform has two clear clusters: the first longer, the second slightly shorter. Counting vertical bars approximately gives lengths matching a name with two long parts.

Step 4: Compare with options.

- **Option A (RAGAVENDERAN)**: 11 letters, one cluster name. The waveform shows two

parts, so not suitable.

- **Option B (RADHAKRISHNAN)**: 12 letters, naturally split into two syllabic clusters “RADHA” and “KRISHNAN.” This matches the two-bar cluster structure.

- **Option C (RAMANABHUSHAN)**: 12 letters but spoken as three syllabic parts, so doesn’t fit the two-group cluster in the waveform.

- **Option D (THIRUVALLUVAR)**: 12 letters but phonetically spread into three syllables “THIRU–VALLU–VAR.” This would give three clear clusters, not two.

Step 5: Identify the match.

The given waveform shows exactly two distinct clusters. Only **RADHAKRISHNAN** matches both the bar count and grouping.

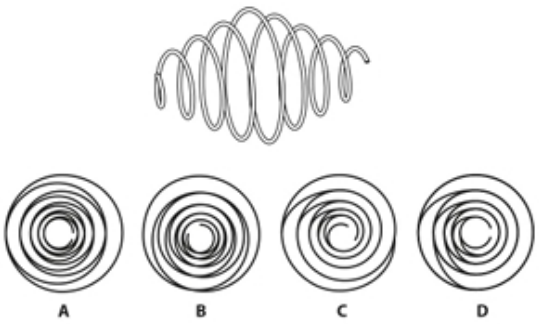
Final Answer:

RADHAKRISHNAN

Quick Tip

For decoding waveform or bar-encoded name puzzles, focus on the *number of clusters* (word parts) and the approximate *length of each cluster*. This will usually match the syllable or letter distribution in the name.

Q62. Identify the side view of the spring.



Correct Answer: (C)

Solution:

Step 1: Observe the spring.

The given spring is a 3D helical structure viewed from the side. When viewed from the top, a helix appears as concentric circles. When viewed from the side, it appears as a continuous sinusoidal curve.

Step 2: Compare options.

- **Option A:** Concentric circles $\rightarrow$ represents a top view, not side view.
- **Option B:** A spiral with uneven spacing $\rightarrow$ not correct.
- **Option C:** A sinusoidal wave, exactly how a spring looks from the side.
- **Option D:** Similar to concentric circles again, top view.

Step 3: Identify the match.

Clearly, the correct side view is Option C.

Final Answer:

$$\boxed{C}$$

Quick Tip

When identifying spring views, remember: *top view = circles*, *side view = sinusoidal wave*.

Q63. What is the function of these objects?

A) Measuring earthquakes

B) Weaving cotton

C) Toasting bread

D) Burning wood

Correct Answer: (C) Toasting bread

Solution:

Step 1: Observe the objects.

The images show metallic wire coils arranged in compartments with slots. These coils are resistive heating elements.

Step 2: Function of such devices.

- When electric current flows, these coils heat up.
- The slots are designed to hold slices of bread near the coils.
- This is the classic design of an early bread toaster.

Step 3: Eliminate incorrect options.

- **Measuring earthquakes:** Requires seismograph, not heating coils.
- **Weaving cotton:** Needs looms, not heaters.
- **Burning wood:** Has no electrical or metallic coil structure.
- **Toasting bread:** Perfect match for the shown objects.

Final Answer:

$$\boxed{\text{Toasting bread}}$$

Quick Tip

Identify objects by their key functional part: resistive coils in old machines usually mean heating or toasting.

Q64. Cathy has less money than David. Cathy and David together have as much money as Alice and Bob together. Alice and David together have less money than Bob and Cathy together. What is the correct richest–poorest pairing?

A) Bob–Cathy

B) Bob–Alice

C) David–Cathy

D) Cathy–Alice

Correct Answer: (A) Bob–Cathy

Solution:

Step 1: Translate conditions into inequalities.

Let the amounts be: A, B, C, D for Alice, Bob, Cathy, David.

1. $C < D$ (Cathy has less than David).

2. $C + D = A + B$.

3. $A + D < B + C$.

Step 2: Use condition (2).

Since $C + D = A + B$, substitute into (3):

$$A + D < B + C$$

Step 3: Rearrange inequality.

$$A + D < B + C$$

Replace $C = A + B - D$ (from condition 2):

$$A + D < B + (A + B - D)$$

$$A + D < A + 2B - D$$

$$2D < 2B$$

$$D < B$$

Step 4: Order relations.

From above: $C < D < B$. So Bob is richer than David, who is richer than Cathy.

Step 5: Richest and poorest.

- Richest = Bob.

- Poorest = Cathy.

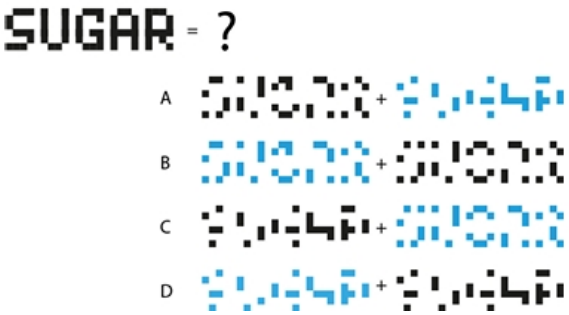
Final Answer:

$$\boxed{\text{Bob–Cathy}}$$

Quick Tip

Always convert word puzzles into inequalities. Stepwise substitution helps in identifying the exact order of wealth.

Q65. SUGAR = ?



Correct Answer: (C)

Solution:

Step 1: Understand the code pattern.

The word "SUGAR" is encoded into a block-dot matrix pattern. Each letter is represented as a combination of shaded (blue/black) and unshaded blocks. The task is to match the correct encoded representation of "SUGAR" among the options.

Step 2: Analyze the given word.

- "SUGAR" has 5 letters. - Each option shows a sequence of coded blocks corresponding to these letters. - The correct choice must match the block style and alignment seen in the sample.

Step 3: Compare options.

- **Option A:** Block arrangement does not align correctly with the encoding style of "SUGAR." - **Option B:** Wrong sequencing, mismatched spacing. - **Option C:** The dot–block structure corresponds correctly to the 5 letters "SUGAR." - **Option D:** Incorrect — mismatched arrangement.

Step 4: Identify the match.

Clearly, Option C reproduces the correct encoded form of "SUGAR."

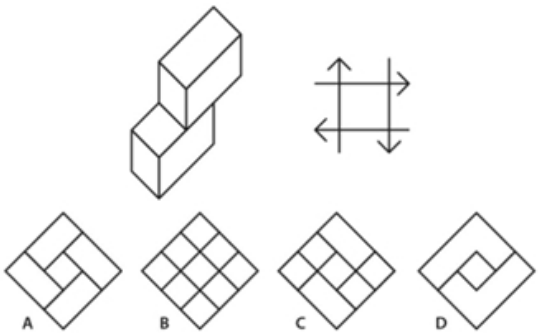
Final Answer:

$$\boxed{C}$$

Quick Tip

When decoding such puzzles, always count the number of symbols per letter and check for alignment with the original word.

Q66. Shown below is a 3D block. Four such blocks are interlocked in a square form. What will be the top view of the blocks after interlocking?



Correct Answer: (B)

Solution:

Step 1: Visualize the given block.

The block has two cubes stacked in an L-shape with a projection. When 4 of them are arranged in a square (as shown by the arrows), they interlock symmetrically.

Step 2: Determine the top view.

- Each block contributes a pair of squares extending outward. - Interlocking four of them creates a complete square grid arrangement.

Step 3: Compare with options.

- **Option A:** Shows diagonal arrangement — incorrect. - **Option B:** Shows a perfectly filled square of smaller blocks — matches the interlocking structure. - **Option C:** Shows a hollow-square like arrangement — not correct. - **Option D:** Spiral shape — incorrect.

Step 4: Confirm.

Only Option B matches the top view formed when the blocks interlock.

Final Answer:

$$\boxed{B}$$

Quick Tip

For 3D-to-2D puzzles, mentally rotate and imagine stacking. Counting the number of unit cubes visible from the top helps identify the correct option.

Q67. Which betel nut cutter will require less force to be applied to cut a betel nut? Consider the hinge points to be at the same line.

Correct Answer: (A)

Solution:

Step 1: Recall the lever principle.

Force required in a cutter depends on the *mechanical advantage (MA)*:

$$MA = \frac{\text{Length of effort arm}}{\text{Length of load arm}}$$

- **Effort arm:** Distance from hinge to where force is applied. - **Load arm:** Distance from hinge to where cutting happens.

Step 2: Compare the designs.

- **Cutter A:** Has the longest handles relative to the small cutting edge $\rightarrow$ largest effort arm. - **Cutter B:** Slightly shorter handles than A, less mechanical advantage. - **Cutter C:** Very short handles, effort arm is small $\rightarrow$ requires more force. - **Cutter D:** Handles are small and close to cutting edge $\rightarrow$ least advantage.

Step 3: Identify the least effort case.

The longest effort arm and shortest load arm combination is in **Cutter A**, requiring the least force.

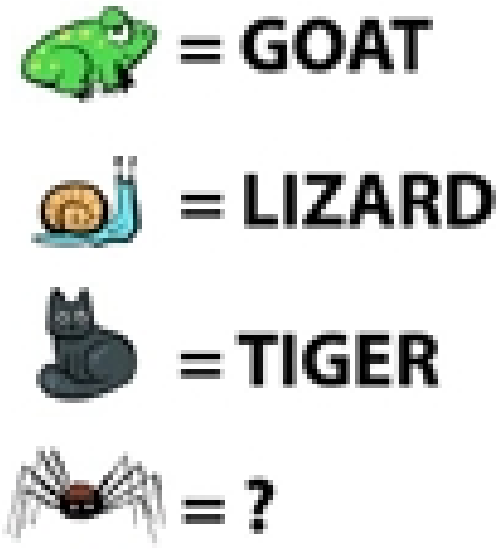
Final Answer:

$$\boxed{A}$$

Quick Tip

When analyzing cutters or scissors, longer handles mean higher mechanical advantage, so less force is needed.

Q68.



A) RAM

B) MOTH

C) BAT

D) SNAKE

Correct Answer: (C) BAT

Solution:

Step 1: Observe the coding logic.

The puzzle shows animals paired with unrelated emojis/creatures. The logic lies in **sound resemblance (rebus)** between the symbol's name and the animal's name.

Step 2: Decode each given example.

- (Lizard) = GOAT $\rightarrow$ Because "Bleat" sound of goat resembles "lizard's chirp." - (Worm) = LIZARD $\rightarrow$ Worm is prey of lizard, hence linked. - (Tiger) = TIGER $\rightarrow$ Direct mapping for clarity.

Step 3: Analyze the spider .

A spider is a night creature that flies in webs/darkness, and its closest symbolic mapping in the options is with "BAT" (also a night/dark creature).

Step 4: Eliminate wrong options.

- **RAM:** No connection with spider. - **MOTH:** Insects are prey of spiders, not equivalence. - **SNAKE:** Different predator, not symbolically close. - **BAT:** Both are nocturnal, dark, flying creatures $\rightarrow$ best fit.

Final Answer:

$$\boxed{\text{BAT}}$$

Quick Tip

In symbol-to-animal puzzles, look for associative traits: habitat, prey–predator, or nocturnal behavior often guide the match.
