collegedunia

TANATA General Aptitude & Mental Ability

Sample Paper – 1

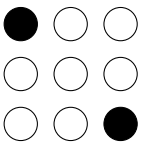
Duration: 38 Minutes	**Total Questions:** 25	**Max Marks:** 50	**Marking:** +2 / No Negative

Instructions

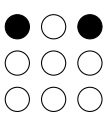
1. This paper contains **25** Multiple Choice Questions (Single Correct Answer), modelled on the General Aptitude & Mental Ability portion of **TANATA** entrance.
2. Each correct answer carries **+2 marks**. There is **no negative marking** for incorrect or unattempted answers.
3. Only **one** option is correct. Choose carefully.
4. Syllabus level: **General Aptitude section of TANATA — Mental Ability (visual, numerical, verbal), Architectural Awareness (Indian & International), Mathematical Reasoning, and Sets & Relations.**
5. Use of mobile phones, calculators, or electronic gadgets is strictly prohibited.

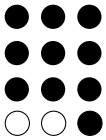
Questions

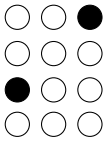
Q1. The figure below shows a pattern. Which of the following is its correct mirror image (reflection about the vertical axis)?

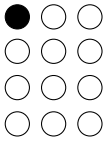


Original

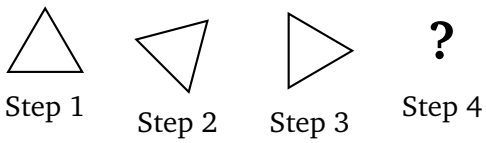
(A)  top-left and top-right filled

(B)  all circles filled

(C)  top-right and bottom-left filled **[Mirror Image]**

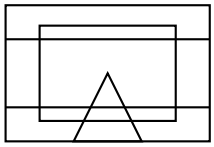
(D)  all circles empty

Q2. In the following figure series, each shape rotates 45° clockwise at each step. The first three steps are shown below. What comes next (Step 4)?



(A) △ upward-pointing triangle (same as Step 1)
(B) ◁ triangle pointing toward lower-right (135° rotation)
(C) ◁ leftward-pointing triangle
(D) ▽ downward-pointing triangle (180°)

Q3. Which of the following simple figures is *embedded* (hidden) in the complex figure shown below?



(A) A triangle
(B) A circle
(C) A pentagon
(D) A hexagon

Q4. A square sheet of paper is folded once along its horizontal midline (the bottom half is folded up). A circular hole is then punched in the top-right corner of the folded paper. When the paper is completely unfolded, where will the holes appear?

(A) One hole at the top-right corner only
(B) One hole at the bottom-right corner only
(C) Two holes at the top-left and bottom-left corners
(D) Two holes at the top-right and bottom-right corners

Q5. Filled Circle : Circle : : Filled Square : ?

(A) Triangle
(B) Square
(C) Filled Triangle
(D) Rectangle

Q6. Find the missing term in the series: $2,\ 6,\ 12,\ 20,\ 30,\ \_\_\_\_$

(A) 42
(B) 36
(C) 40
(D) 38

Q7. Find the next term in the series: $5,\ 10,\ 20,\ 40,\ \_\_\_\_$

(A) 60
(B) 70
(C) 75
(D) 80

Q8. A sum of Rs. 5400 is divided among three friends in the ratio $2 : 3 : 4$. What is the *smallest* share (in Rs.)?

(A) Rs. 900
(B) Rs. 1000
(C) Rs. 1200
(D) Rs. 1800

Q9. A shirt is sold for Rs. 800 after a 20% discount on its marked price. What was the original marked price (in Rs.)?

(A) Rs. 850
(B) Rs. 1000
(C) Rs. 960
(D) Rs. 1100

Q10. Architect : Blueprint : : Chef : _____

(A) Recipe
(B) Spatula
(C) Kitchen
(D) Ingredient

Q11. Which of the following is the *odd one out*?

(A) Pantheon
(B) Colosseum
(C) Eiffel Tower
(D) Parthenon

Q12. Which of the following is **NOT** a type of arch used in architecture?

(A) Pointed arch
(B) Horseshoe arch
(C) Segmental arch
(D) Cantilever arch

Q13. Pen : Writer : : Trowel : _____

(A) Painter
(B) Mason
(C) Architect
(D) Carpenter

Q14. Who became the first Indian architect to win the **Pritzker Architecture Prize** — the highest honour in architecture — awarded in 2018?

(A) B. V. Doshi
(B) Charles Correa
(C) Raj Rewal
(D) Laurie Baker

Q15. The **Kanchanjunga Apartments** in Mumbai, a landmark high-rise residential tower featuring interlocking terraces and a distinctive stepped profile, was designed by which Indian architect?

(A) B. V. Doshi
(B) Hafiz Contractor
(C) Charles Correa
(D) Achyut Kanvinde

Q16. Which architect, originally from Britain but who settled in India, is celebrated for his low-cost, ecologically sensitive buildings using local materials like brick and laterite, primarily in Kerala?

(A) Buckminster Fuller
(B) Raj Rewal
(C) Satish Gujral
(D) Laurie Baker

Q17. **Humayun's Tomb** in Delhi is considered the first example of which garden-tomb typology introduced to India by the Mughal dynasty?

(A) Rock-cut tomb
(B) Charbagh garden tomb
(C) Cenotaph tomb
(D) Stupa tomb

Q18. The **Capitol Complex of Chandigarh** — including the Secretariat, High Court, and Assembly — was primarily designed by which Swiss-French architect?

(A) Le Corbusier
(B) Frank Lloyd Wright
(C) Mies van der Rohe
(D) Walter Gropius

Q19. **Fallingwater** (Kaufmann Residence) in Mill Run, Pennsylvania, USA, famous for cantilevered terraces over a waterfall, was designed by which American architect?

(A) Louis Kahn

(B) Walter Gropius
(C) Frank Lloyd Wright
(D) Philip Johnson

Q20. The **Heydar Aliyev Centre** in Baku, Azerbaijan, known for its sweeping, fluid, curvilinear form with no sharp angles, was designed by which architect?

(A) Santiago Calatrava
(B) Zaha Hadid
(C) Renzo Piano
(D) Tadao Ando

Q21. Which of the following is the *negation* of the statement: *"All birds can fly"*?

(A) No bird can fly
(B) All birds cannot fly
(C) Some birds can fly
(D) Some birds cannot fly

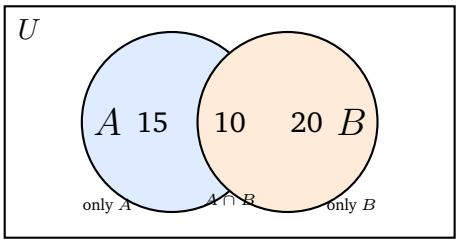
Q22. Given that $p \rightarrow q$ is true and p is true, what can be concluded about q? (Modus Ponens)

(A) q is true
(B) q is false
(C) q may be true or false
(D) The conclusion cannot be drawn

Q23. Which of the following is always TRUE (a tautology) regardless of the truth value of p?

(A) $p \wedge \sim p$
(B) $p \rightarrow \sim p$
(C) $p \vee \sim p$
(D) $\sim p \wedge \sim p$

Q24. In a group of students, $n(A) = 25$, $n(B) = 30$, and $n(A \cap B) = 10$. Using the Venn diagram below, find $n(A \cup B)$.



(A) 55
(B) 45
(C) 35
(D) 65

Q25. If $A = \{1, 2, 3, 4\}$, how many elements does the power set $\mathcal{P}(A)$ have?

(A) 4
(B) 8
(C) 12
(D) 16

Detailed Solutions

Sol. 1.

Solution

Concept & Chapter: Mirror Image — Visual Reasoning. Reflect about vertical axis: top-left→top-right and bottom-right→bottom-left; mirror image has top-right and bottom-left filled. **Answer: C**

Concept — Mirror Image (Reflection about Vertical Axis): When a figure is reflected about the vertical axis, every point at the left moves to the right and vice versa. Specifically, top-left becomes top-right, and bottom-right becomes bottom-left.

Step 1 — Identify filled circles in original: The original has the top-left circle filled and the bottom-right circle filled.

Step 2 — Apply vertical reflection: Reflecting the pattern: top-left → top-right, and bottom-right → bottom-left. Therefore, the mirror image has the **top-right** and **bottom-left** circles filled.

Why other options are wrong:

- Option A: Top-left and top-right filled — this is not a vertical reflection; no column swap for the bottom row.
- Option B: All circles filled — incorrect; only two specific circles should be filled.
- Option D: All circles empty — incorrect; a mirror image retains the filled positions (just swapped side).

Final Answer: Mirror image has top-right and bottom-left filled $\Rightarrow$ $\boxed{\text{C}}$

$\boxed{\textbf{Answer: (C)}}$

Go Back to Q 1

Sol. 2.

Solution

Concept & Chapter: Figure Rotation Series — Visual Reasoning. Each step rotates 45° clockwise; Step 4 is at 135° (lower-right pointing apex). **Answer: B**

Concept — Figure Rotation Series: In this series, the triangle rotates 45° clockwise at each step. Starting from upward-pointing (0°), each successive step adds 45° clockwise.

Step 1 — List rotation angles:

- Step 1: 0° (upward-pointing)
- Step 2: 45° clockwise
- Step 3: 90° clockwise (pointing rightward)
- Step 4: 135° clockwise (pointing toward lower-right)

Step 2 — Identify Step 4: At 135° clockwise rotation from the original upward-pointing position, the apex of the triangle points toward the lower-right quadrant.

Why other options are wrong:

- Option A: Upward-pointing triangle (0°) — this would only be correct if the series completes a full 360° cycle (8 steps).
- Option C: Leftward-pointing triangle (270°) — too far in the rotation.
- Option D: Downward-pointing triangle (180°) — that would be Step 5, not Step 4.

Final Answer: Step 4 is the triangle at 135° clockwise (lower-right pointing) $\Rightarrow$ B

Answer: (B)

Go Back to Q 2

Sol. 3.

Solution

Concept & Chapter: Embedded Figure — Visual Reasoning. Trace existing lines in the complex figure to find the hidden triangle formed at the base. **Answer: A**

Concept — Embedded (Hidden) Figure: A figure is "embedded" in a complex figure if its outline can be traced exactly within the complex figure using existing lines, without adding new ones.

Step 1 — Examine the complex figure: The complex figure consists of overlapping rectangles, horizontal lines, and a triangle formed by the lines at the base $(1.0, 0)$, $(2.0, 0)$, and $(1.5, 1.0)$.

Step 2 — Identify the hidden shape: The triangle with vertices at these three points is clearly embedded within the complex figure and can be traced using existing lines.

Why other options are wrong:

- Option B: A circle — no curved lines appear anywhere in the figure.
- Option C: A pentagon — no five-sided closed figure is traceable within the complex figure.
- Option D: A hexagon — no six-sided closed figure exists within the complex figure.

Final Answer: A triangle is embedded in the complex figure $\Rightarrow \boxed{\text{A}}$

Answer: (A)

Go Back to Q 3

Sol. 4.

Solution

Concept & Chapter: Paper Folding — Visual Reasoning. Folding along horizontal midline and punching top-right creates symmetric holes at top-right and bottom-right on unfolding. **Answer: D**

Concept — Paper Folding: When a paper is folded and a hole is punched, the hole passes through both layers simultaneously. Upon unfolding, a symmetric hole appears in the corresponding position on the other layer.

Step 1 — Describe the fold: The square sheet is folded along the horizontal midline so the bottom half lies on top of the upper half. The right side aligns

with the right side.

Step 2 — Trace the punch location: A hole is punched at the top-right corner of the folded paper. This punches through: (a) the original top-right corner of the upper half, and (b) the corresponding position on the folded-up bottom half, which maps to the bottom-right corner of the original sheet.

Why other options are wrong:

- Option A: One hole at top-right only — ignores that both layers are punched simultaneously.
- Option B: One hole at bottom-right only — ignores the top layer.
- Option C: Two holes at top-left and bottom-left — the punch was on the right side, not the left.

Final Answer: Two holes appear at top-right and bottom-right $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D)

Go Back to Q 4

Sol. 5.

Solution

Concept & Chapter: Visual Analogy — Visual Reasoning. Filled Circle:Circle = filled shape to outline; Filled Square corresponds to Square (outline only). **Answer: B**

Concept — Visual Analogy: The analogy "Filled Circle : Circle" establishes the relationship that the first term is the "filled" version of the second term. Equivalently, the second term is the "outline" (unfilled) form of the first.

Step 1 — Identify the relationship: Filled Circle is related to Circle as a filled shape is to its unfilled outline counterpart.

Step 2 — Apply to the second pair: Filled Square is related to ? . Following the same pattern, the answer is the unfilled outline version of a square — i.e., a **Square** (outline only).

Why other options are wrong:

- Option A: Triangle — a different shape entirely; the shape must remain a square.
- Option C: Filled Triangle — wrong shape and wrong fill type.

- Option D: Rectangle — a rectangle is not the same shape as a square.

Final Answer: Filled Square : Square $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B)

Go Back to Q 5

Sol. 6.

Solution

Concept & Chapter: Number Series — Numerical Ability. Pattern $T_n = n(n+1)$; for $n = 6$, next term $= 6 \times 7 = 42$. **Answer: A**

Concept — Number Series (Product of Consecutive Integers): The series follows the pattern $T_n = n(n+1)$ for $n = 1, 2, 3, \ldots$

Step 1 — Verify the pattern:

$$1 \times 2 = 2, \quad 2 \times 3 = 6, \quad 3 \times 4 = 12, \quad 4 \times 5 = 20, \quad 5 \times 6 = 30$$

Step 2 — Find the next term: For $n = 6$: $\quad 6 \times 7 = 42$.

Why other options are wrong:

- Option B: 36 — would imply a difference of 6, but the differences increase by 2 each time (4, 6, 8, 10, 12).
- Option C: 40 — difference would be 10, but the correct next difference is 12.
- Option D: 38 — difference of 8, which is too small.

Final Answer: The next term is $6 \times 7 = 42 \Rightarrow \boxed{\text{A}}$

Answer: (A)

Go Back to Q 6

Sol. 7.

Solution

Concept & Chapter: Geometric Series — Numerical Ability. Each term doubles; $40 \times 2 = 80$. **Answer: D**

Concept — Geometric Series (Common Ratio = 2): In this series, each term is obtained by multiplying the previous term by 2.

Step 1 — Verify the pattern:

$$5 \times 2 = 10, \quad 10 \times 2 = 20, \quad 20 \times 2 = 40$$

Step 2 — Find the next term: $40 \times 2 = 80$.

Why other options are wrong:

- Option A: 60 — this would imply adding 20, making it arithmetic, not geometric.
- Option B: 70 — no consistent pattern leads to 70 from this series.
- Option C: 75 — no pattern justification.

Final Answer: Next term $= 40 \times 2 = 80 \Rightarrow \boxed{\text{D}}$

Answer: (D)

Go Back to Q 7

Sol. 8.

Solution

Concept & Chapter: Ratio and Proportion — Numerical Ability. Total parts $= 9$; smallest share $= \frac{2}{9} \times 5400 = \text{Rs. } 1200$. **Answer: C**

Concept — Ratio and Proportion: To divide a total amount in a given ratio, find the total number of parts and assign each share proportionally.

Step 1 — Find total parts: Ratio $= 2 : 3 : 4$, so total parts $= 2 + 3 + 4 = 9$.

Step 2 — Calculate the smallest share: The smallest ratio is 2.

$$\text{Smallest share} = \frac{2}{9} \times 5400 = \frac{10800}{9} = \text{Rs. } 1200$$

Why other options are wrong:

- Option A: Rs. 900 $= \frac{1}{6} \times 5400$ — corresponds to ratio $1:6$, not this problem.
- Option B: Rs. 1000 — does not correspond to any part of ratio $2:3:4$ with sum 5400.
- Option D: Rs. 1800 $= \frac{4}{9} \times 5400$ — this is the *largest* share, not the smallest.

Final Answer: Smallest share $=$ Rs. 1200 $\Rightarrow$ C

Answer: (C)

Go Back to Q 8

Sol. 9.

Solution

Concept & Chapter: Percentage Discount — Numerical Ability. MP $\times$ 0.80 $=$ 800 $\Rightarrow$ MP $=$ Rs. 1000. **Answer: B**

Concept — Percentage Discount: If a discount of $d\%$ is given on the marked price (MP), then the selling price (SP) $=$ MP $\times \left(1 - \frac{d}{100}\right)$.

Step 1 — Set up the equation:

$$\text{SP} = \text{MP} \times \frac{80}{100} \implies 800 = \text{MP} \times 0.80$$

Step 2 — Solve for MP:

$$\text{MP} = \frac{800}{0.80} = \text{Rs. } 1000$$

Why other options are wrong:

- Option A: Rs. 850 — $850 \times 0.80 = 680 \neq 800$.
- Option C: Rs. 960 — $960 \times 0.80 = 768 \neq 800$.
- Option D: Rs. 1100 — $1100 \times 0.80 = 880 \neq 800$.

Final Answer: Marked Price $=$ Rs. 1000 $\Rightarrow$ B

Answer: (B)

Go Back to Q 9

Sol. 10.

Solution

Concept & Chapter: Word Analogy — Verbal Reasoning. Architect creates Blueprint; Chef creates Recipe as the core professional document. **Answer: A**

Concept — Word Analogy (Tool/Product Relationship): "Architect : Blueprint" establishes that an Architect creates a Blueprint as a core professional output. The analogy asks for the equivalent product created by a Chef.

Step 1 — Identify the relationship: An Architect's primary professional document/creation is a Blueprint. Similarly, a Chef's primary professional creation/guide is a Recipe.

Step 2 — Evaluate options: Recipe is the correct analogous term.

Why other options are wrong:

- Option B: Spatula — a tool used by a chef, not a product created by one.
- Option C: Kitchen — the workplace of a chef, not a creation.
- Option D: Ingredient — an input used by a chef, not a professional output.

Final Answer: Chef creates a Recipe $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A)

Go Back to Q 10

Sol. 11.

Solution

Concept & Chapter: Odd One Out — Verbal Reasoning. Pantheon, Colosseum, Parthenon are ancient classical structures; Eiffel Tower is a modern 19th-century iron structure. **Answer: C**

Concept — Odd One Out (Classification by Architectural Era/Style): Three of the four options belong to the same category; one does not.

Step 1 — Classify each option:

- Pantheon (Rome, 125 AD) — Ancient classical Roman temple.
- Colosseum (Rome, 80 AD) — Ancient classical Roman amphitheatre.
- Parthenon (Athens, 438 BC) — Ancient classical Greek temple.
- Eiffel Tower (Paris, 1889) — Modern iron lattice structure of the Industrial Age.

Step 2 — Identify the odd one: Pantheon, Colosseum, and Parthenon are all ancient classical stone/masonry structures from the Greco-Roman era. The Eiffel Tower is a modern iron engineering structure built in the 19th century — a completely different era and material system.

Why other options are wrong:

- Option A (Pantheon): Ancient Roman masonry — belongs with the group.
- Option B (Colosseum): Ancient Roman masonry — belongs with the group.
- Option D (Parthenon): Ancient Greek masonry — belongs with the group.

Final Answer: Eiffel Tower is the odd one out $\Rightarrow$ C

Answer: (C)

Go Back to Q 11

Sol. 12.

Solution

Concept & Chapter: Types of Arches — Architectural Awareness. Pointed, horseshoe, segmental are real arch types; cantilever is a beam element, not an arch form. **Answer: D**

Concept — Types of Arches in Architecture: An arch is a curved structural element that spans an opening and supports load. Various arch forms exist based on their geometric profile.

Step 1 — Verify genuine arch types:

- Pointed arch: Gothic architecture staple; two curves meeting at a point.
- Horseshoe arch: Islamic/Moorish architecture; extends beyond a semicircle.
- Segmental arch: Shallow arch; a segment (less than semicircle) of a circle.

Step 2 — Evaluate "Cantilever arch": A cantilever is a structural beam or slab projecting horizontally, supported at only one end. It is NOT an arch form — it is a structural element in its own category (bending/moment resisting). The term "cantilever arch" is not a recognised arch typology.

Why other options are wrong:

- Options A, B, C: All are recognised arch types found in architectural history.

Final Answer: Cantilever arch is not a recognised arch type ⇒ D

Answer: (D)

Go Back to Q 12

Sol. 13.

Solution

Concept & Chapter: Tool-to-Profession Analogy — Verbal Reasoning. Pen is to Writer as Trowel is to Mason (trowel is the primary tool of masonry). **Answer: B**

Concept — Tool-to-Profession Analogy: "Pen : Writer" establishes that the Pen is the primary/signature tool of a Writer. The analogy seeks the profession whose primary tool is a Trowel.

Step 1 — Identify the relationship: A Trowel (a flat-bladed hand tool) is the primary tool of a Mason, used to spread, shape, and apply mortar or plaster.

Step 2 — Evaluate options: Mason is the correct profession.

Why other options are wrong:

- Option A: Painter — uses brushes, rollers, and scrapers, not a trowel.
- Option C: Architect — uses drawing instruments, CAD software; not a trowel.
- Option D: Carpenter — uses saws, chisels, hammers; not a trowel.

Final Answer: Trowel is the primary tool of a Mason ⇒ B

Answer: (B)

Go Back to Q 13

Sol. 14.

Solution

Concept & Chapter: Pritzker Prize — Architectural Awareness. B. V. Doshi won the 2018 Pritzker Architecture Prize, the first Indian architect to receive this honour. **Answer: A**

Concept — Architectural Awareness (Indian): The Pritzker Architecture Prize is the Nobel Prize equivalent in architecture, awarded annually since 1979.

Step 1 — Recall the 2018 Pritzker laureate: Balkrishna Vithaldas Doshi (B. V. Doshi, 1927–2023) was awarded the Pritzker Architecture Prize in 2018, becoming the first Indian architect to receive this honour. He was known for blending Modernist influences (from his work with Le Corbusier and Louis Kahn) with India's social context and traditional forms.

Why other options are wrong:

- Option B: Charles Correa (1930–2015) — eminent Indian architect but never received the Pritzker.
- Option C: Raj Rewal — notable Indian architect, but not a Pritzker laureate.
- Option D: Laurie Baker (1917–2007) — British-born architect celebrated in Kerala; not a Pritzker laureate.

Final Answer: B. V. Doshi (2018 Pritzker laureate) $\Rightarrow$ A

Answer: (A)

Go Back to Q 14

Sol. 15.

Solution

Concept & Chapter: Kanchanjunga Apartments — Architectural Awareness. Charles Correa designed this 32-storey Mumbai residential tower (1983) with interlocking terraces for tropical ventilation. **Answer: C**

Concept — Architectural Awareness (Indian): The Kanchanjunga Apartments is a landmark residential skyscraper in Mumbai's Cumballa Hill area.

Step 1 — Identify the architect: Charles Correa designed the Kanchanjunga Apartments (completed 1983). The building is 32 storeys tall and features interlocking split-level terraces that provide cross-ventilation and shading — a response to Mumbai's tropical climate. It is considered a masterpiece of Indian modernist residential architecture.

Why other options are wrong:

- Option A: B. V. Doshi — associated with projects like Aranya Housing in Indore and IIM Bangalore.
- Option B: Hafiz Contractor — prominent Mumbai architect known for luxury high-rises, but not Kanchanjunga.
- Option D: Achyut Kanvinde — known for IIT Kanpur campus and industrial architecture.

Final Answer: Kanchanjunga Apartments was designed by Charles Correa $\Rightarrow$ C

Answer: (C)

Go Back to Q 15

Sol. 16.

Solution

Concept & Chapter: Vernacular Architecture (Kerala) — Architectural Awareness. Laurie Baker, British-born architect in Kerala, championed low-cost eco-sensitive buildings using brick and laterite. **Answer: D**

Concept — Architectural Awareness (Indian): This question identifies the architect known for vernacular, low-cost construction methods in Kerala.

Step 1 — Identify the architect: Laurie Baker (1917–2007) was a British-born architect who emigrated to India and settled in Kerala. He championed affordable, sustainable architecture using locally available materials (brick, laterite, mud, timber) and vernacular construction techniques such as the Rat-trap bond brickwork to reduce costs and improve insulation.

Why other options are wrong:

- Option A: Buckminster Fuller — American inventor/architect, known for geodesic domes; never associated with India.
- Option B: Raj Rewal — Indian architect known for institutional and housing projects in Delhi.
- Option C: Satish Gujral — Indian multidisciplinary artist-architect; known for the Belgian Embassy in New Delhi.

Final Answer: Laurie Baker is celebrated for low-cost ecological buildings in Kerala $\Rightarrow$ D

Answer: (D)

Go Back to Q 16

Sol. 17.

Solution

Concept & Chapter: Charbagh Garden Tomb — Architectural Awareness. Humayun's Tomb introduced the charbagh four-garden Persian typology to India; later perfected at the Taj Mahal. **Answer: B**

Concept — Architectural Awareness (Indian): Humayun's Tomb (1572, Delhi) is the first great example of Mughal funerary architecture in India and a UNESCO World Heritage Site.

Step 1 — Identify the garden-tomb typology: The **Charbagh** (lit. "four gardens") is a Persian-Islamic garden layout divided into four equal quadrants by water channels or pathways, symbolising the four rivers of paradise mentioned in the Quran. Humayun's Tomb introduced this charbagh garden-tomb typology to the Indian subcontinent, which was later perfected at the Taj Mahal.

Why other options are wrong:

- Option A: Rock-cut tomb — refers to tombs carved into rock faces (e.g., ancient Egyptian style); not applicable here.
- Option C: Cenotaph tomb — a monument to someone buried elsewhere; not the typology being described.
- Option D: Stupa tomb — a Buddhist hemispherical mound structure; unrelated to Mughal architecture.

Final Answer: Humayun's Tomb introduced the Charbagh garden-tomb typology $\Rightarrow \boxed{\text{B}}$

Answer: (B)

Go Back to Q 17

Sol. 18.

Solution

Concept & Chapter: Capitol Complex Chandigarh — Architectural Awareness. Le Corbusier designed Chandigarh's Capitol Complex — Secretariat, High Court, and Assembly buildings. **Answer: A**

Concept — Architectural Awareness (International): The Capitol Complex at Chandigarh is India's most celebrated modernist urban planning and architectural achievement.

Step 1 — Identify the primary designer: Le Corbusier (Charles-Edouard Jean-

neret, 1887–1965), the Swiss-French pioneer of Modernism, was the chief architect of the Capitol Complex of Chandigarh. He designed the Assembly (Vidhan Sabha), Secretariat, and High Court buildings, along with the overall masterplan for the city, commissioned after India's independence in 1947.

Why other options are wrong:

- Option B: Frank Lloyd Wright — American architect; had no involvement in Chandigarh.
- Option C: Mies van der Rohe — German-American architect; never worked on Chandigarh.
- Option D: Walter Gropius — founder of Bauhaus; had no role in Chandigarh's Capitol Complex.

Final Answer: Le Corbusier designed the Capitol Complex of Chandigarh $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A)

Go Back to Q 18

Sol. 19.

Solution

Concept & Chapter: Fallingwater — Architectural Awareness. Frank Lloyd Wright designed Fallingwater (1935) with cantilevered terraces over a waterfall, embodying organic architecture. **Answer: C**

Concept — Architectural Awareness (International): Fallingwater is one of the most celebrated works of American residential architecture.

Step 1 — Identify the architect: Frank Lloyd Wright (1867–1959) designed Fallingwater (1935, completed 1939) for the Kaufmann family over a waterfall on Bear Run in Mill Run, Pennsylvania. The building is celebrated for its dramatic cantilevered reinforced-concrete terraces extending out over the waterfall, embodying Wright's principle of "organic architecture" (harmony between humans and nature).

Why other options are wrong:

- Option A: Louis Kahn — American modernist; associated with Salk Institute, IIM Ahmedabad.
- Option B: Walter Gropius — Bauhaus founder; never designed Fallingwater.

- Option D: Philip Johnson — American architect; known for Glass House, AT&T Building.

Final Answer: Fallingwater was designed by Frank Lloyd Wright ⇒ C

Answer: (C)

Go Back to Q 19

Sol. 20.

Solution

Concept & Chapter: Heydar Aliyev Centre — Architectural Awareness. Zaha Hadid designed this Baku building (2012) with fluid curvilinear form and no sharp corners. **Answer: B**

Concept — Architectural Awareness (International): The Heydar Aliyev Centre is a landmark of 21st-century parametric/deconstructivist architecture.

Step 1 — Identify the architect: Zaha Hadid (1950–2016) designed the Heydar Aliyev Centre (completed 2012) in Baku, Azerbaijan. The building is defined by its flowing, curvilinear form — a continuous surface that seamlessly transitions from plaza to walls to roof, with no sharp corners. It won the Design of the Year Award from the Design Museum, London, in 2014.

Why other options are wrong:

- Option A: Santiago Calatrava — Spanish-Swiss architect/engineer known for bridges and transportation hubs (e.g., City of Arts and Sciences, Valencia); not Heydar Aliyev Centre.
- Option C: Renzo Piano — Italian architect; known for Centre Pompidou, Shard London; uses high-tech aesthetic, not flowing curves.
- Option D: Tadao Ando — Japanese architect; known for minimalist raw concrete; not associated with this building.

Final Answer: Heydar Aliyev Centre was designed by Zaha Hadid ⇒ B

Answer: (B)

Go Back to Q 20

Sol. 21.

Solution

Concept & Chapter: Negation of Universal Statements — Mathematical Reasoning. Negation of "All birds can fly" is "Some birds cannot fly" ($\exists x$ that cannot fly). **Answer: D**

Concept — Mathematical Logic: Negation of Universal Statements: The negation of a universally quantified statement "All P are Q" is the existential statement "Some P are not Q" (i.e., at least one P exists that is not Q).

Step 1 — Formal analysis: Let $P(x)$ = "x is a bird" and $Q(x)$ = "x can fly".

- Original: $\forall x,\ P(x) \Rightarrow Q(x)$ (All birds can fly)
- Negation: $\exists x,\ P(x) \wedge \neg Q(x)$ (Some birds cannot fly)

Why other options are wrong:

- Option A: "No bird can fly" $= \forall x,\ \neg Q(x)$ — this is too strong; over-negation.
- Option B: "All birds cannot fly" — same as "No bird can fly"; incorrect negation.
- Option C: "Some birds can fly" — this does not negate the original statement.

Final Answer: Negation of "All birds can fly" is "Some birds cannot fly" $\Rightarrow$ $\boxed{\text{D}}$

$\boxed{\textbf{Answer: (D)}}$

Go Back to Q 21

Sol. 22.

Solution

Concept & Chapter: Modus Ponens — Mathematical Reasoning. Given $p \to q$ true and p true, q must be true by Modus Ponens. **Answer: A**

Concept — Mathematical Logic: Modus Ponens: Modus Ponens is the fundamental rule of inference: if the conditional $p \to q$ is true, and p (the antecedent) is true, then q (the consequent) must be true.

Step 1 — Apply Modus Ponens:

- Premise 1: $p \to q$ is TRUE
- Premise 2: p is TRUE

- Conclusion: q is TRUE

Why other options are wrong:

- Option B: q is false — contradicts Modus Ponens; if $p \to q$ is true and p is true, q cannot be false.
- Option C: q may be true or false — incorrect; the conclusion is definite under Modus Ponens.
- Option D: Conclusion cannot be drawn — incorrect; this is a valid and complete inference rule.

Final Answer: By Modus Ponens, q is TRUE $\Rightarrow$ A

Answer: (A)

Go Back to Q 22

Sol. 23.

Solution

Concept & Chapter: Tautology — Mathematical Reasoning. $p \vee \sim p$ (Law of Excluded Middle) is true for all values of p. **Answer: C**

Concept — Mathematical Logic: Tautology: A tautology is a propositional formula that is TRUE for all possible truth values of its variables.

Step 1 — Evaluate each option:

p	$p \wedge \sim p$	$p \to \sim p$	$p \vee \sim p$	$\sim p \wedge \sim p$
T	F	F	T	F
F	F	T	T	T

Step 2 — Identify the tautology: $p \vee \sim p$ (Law of Excluded Middle) is TRUE for both $p = T$ and $p = F$. This is always true — it is the tautology.

Why other options are wrong:

- Option A: $p \wedge \sim p$ — always FALSE (contradiction/absurdity).
- Option B: $p \to \sim p$ — FALSE when p is TRUE.
- Option D: $\sim p \wedge \sim p = \sim p$ — FALSE when p is TRUE.

Final Answer: $p \vee \sim p$ is always true (tautology) $\Rightarrow$ C

Answer: (C)

Go Back to Q 23

Sol. 24.

Solution

Concept & Chapter: Set Union Formula — Sets & Relations. $n(A \cup B) = 25 + 30 - 10 = 45$ using inclusion-exclusion. **Answer: B**

Concept — Set Theory: Union Formula: For any two sets A and B:

$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

This formula avoids double-counting elements in the intersection.

Step 1 — Substitute given values:

$$n(A \cup B) = 25 + 30 - 10 = 45$$

Step 2 — Verify using the Venn diagram: The diagram shows 25 elements in A (including intersection) and 30 elements in B (including intersection), with 10 in the overlap. Elements only in $A = 25 - 10 = 15$; elements only in $B = 30 - 10 = 20$. Total $= 15 + 10 + 20 = 45$.

Why other options are wrong:

- Option A: 55 — this is simply $25 + 30 = 55$, ignoring the subtraction of intersection; classic double-counting error.
- Option C: 35 — subtracts incorrectly or uses wrong values.
- Option D: 65 — adds 10 instead of subtracting: $25 + 30 + 10 = 65$; wrong direction.

Final Answer: $n(A \cup B) = 25 + 30 - 10 = 45 \Rightarrow$ B

Answer: (B)

Go Back to Q 24

Sol. 25.

Solution

Concept & Chapter: Power Set — Sets & Relations. For $|A| = 4$, $|\mathcal{P}(A)| = 2^4 = 16$ subsets. **Answer: D**

Concept — Set Theory: Power Set: The power set $\mathcal{P}(A)$ of a set A is the collection of ALL subsets of A, including the empty set $\emptyset$ and A itself. If $|A| = n$, then $|\mathcal{P}(A)| = 2^n$.

Step 1 — Find the cardinality of A: $A = \{1, 2, 3, 4\}$, so $|A| = 4$.

Step 2 — Apply the power set formula:

$$|\mathcal{P}(A)| = 2^4 = 16$$

The 16 subsets range from $\emptyset$ to $\{1, 2, 3, 4\}$ (all subsets of 0, 1, 2, 3, and 4 elements: $\binom{4}{0} + \binom{4}{1} + \binom{4}{2} + \binom{4}{3} + \binom{4}{4} = 1 + 4 + 6 + 4 + 1 = 16$).

Why other options are wrong:

- Option A: $4 = |A|$ — this is just the number of elements in A, not the power set size.
- Option B: $8 = 2^3$ — correct formula but wrong exponent (for a 3-element set).
- Option C: 12 — no formula gives 12 for a 4-element set.

Final Answer: $|\mathcal{P}(A)| = 2^4 = 16 \Rightarrow$ D

Answer: (D)

Go Back to Q 25

Answer Key

Questions 1 – 25									
1	C	2	B	3	A	4	D	5	B
6	A	7	D	8	C	9	B	10	A
11	C	12	D	13	B	14	A	15	C
16	D	17	B	18	A	19	C	20	B
21	D	22	A	23	C	24	B	25	D