collegedunia

TANATA General Aptitude & Mental Ability

Sample Paper – 3

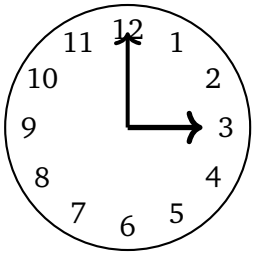
Duration: 38 Minutes	**Total Questions:** 25	**Max Marks:** 50	**Marking:** +2 / No Negative

Instructions

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

Questions

Q1. A clock shows the time 3:00. What time will its mirror image (reflection about vertical axis) show?



Original (3:00)

(A) 12:00
(B) 6:00
(C) 3:00
(D) 9:00

Q2. In the series below, each figure has one more dot than the previous. What is the 5th figure?

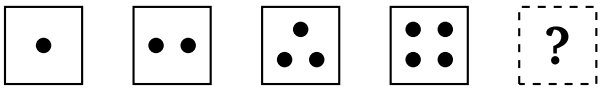
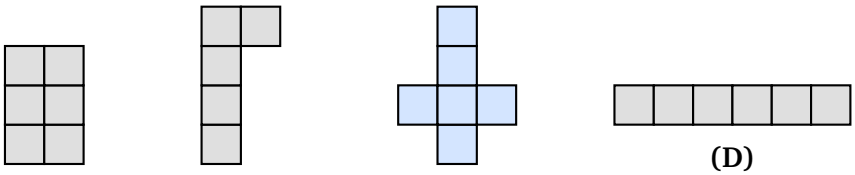


Fig. 1 **Fig. 2** **Fig. 3** **Fig. 4** **Fig. 5**

(A) A box with 5 dots
(B) A box with 4 dots
(C) A box with 6 dots
(D) A box with 3 dots

Q3. Which of the following nets (unfolded layouts) can be folded into a cube?



(A) **(B)** **(C)** **(D)**

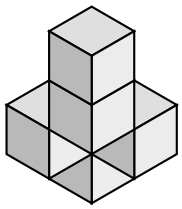
(A) A 2×3 rectangle arrangement
(B) An L-shape of 5 squares
(C) A cross with 6 squares (centre plus 4 arms plus 1 extended) **[highlighted above]**
(D) A straight line of 6 squares

Q4. Three of the following four figures follow the same pattern (a polygon with *fewer* sides placed inside a polygon with *more* sides). Which is the *odd one out*?

(A) A triangle inside a pentagon
(B) A hexagon inside a square

(C) A square inside a hexagon
(D) A triangle inside a hexagon

Q5. How many unit cubes are there in the 3D arrangement shown below?



(A) 4
(B) 6
(C) 7
(D) 5

Q6. Find the missing term in the series: $1,\ 8,\ 27,\ 64,\ \_\_\_\_\_$

(A) 81
(B) 100
(C) 125
(D) 216

Q7. $3 : 27 :: 5 : \_\_\_\_\_$

(A) 125
(B) 25
(C) 75
(D) 150

Q8. Two trains start simultaneously from stations A and B, which are 200 km apart, and move towards each other. Train 1 travels at 60 km/h and Train 2 at 40 km/h. After how many hours will they meet?

(A) 1.5 hours
(B) 2 hours
(C) 2.5 hours

(D) 3 hours

Q9. A sum of Rs. 2000 is invested at 10% per annum compound interest for 2 years. What is the interest earned (in Rs.)?

(A) Rs. 360
(B) Rs. 380
(C) Rs. 400
(D) Rs. 420

Q10. Eye : Telescope : : Ear : _____

(A) Stethoscope
(B) Microphone
(C) Speaker
(D) Camera

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

(A) Pyramid
(B) Ziggurat
(C) Amphitheatre
(D) Pagoda

Q12. Which of the following buildings was designed by an Indian architect?

(A) Fallingwater, Pennsylvania (USA)
(B) Aranya Housing Complex, Indore
(C) Sydney Opera House (Australia)
(D) Eiffel Tower (Paris, France)

Q13. Wall : Brick : : Road : _____

(A) Tar
(B) Gravel
(C) Sand
(D) Asphalt

Q14. The New Parliament Building of India, inaugurated in 2023 in New Delhi, was designed by which Indian architect?

(A) Charles Correa
(B) Raj Rewal
(C) Bimal Patel
(D) B. V. Doshi

Q15. Jawahar Kala Kendra, a vibrant arts and crafts centre in Jaipur inspired by the nine-square grid plan of the city, was designed by which architect?

(A) Charles Correa
(B) Bimal Patel
(C) Laurie Baker
(D) Achyut Kanvinde

Q16. Qutub Minar, the world's tallest brick minaret, built in Delhi, was constructed by which dynasty?

(A) Mughal dynasty
(B) Slave (Mamluk) dynasty
(C) Lodi dynasty
(D) Tughlaq dynasty

Q17. Jaipur, the 'Pink City,' was added to UNESCO's World Heritage List as a World Heritage Site (Urban Settlement) in which year?

(A) 2003
(B) 2010
(C) 2015
(D) 2019

Q18. The Church of the Light in Osaka, Japan, famous for a cross-shaped slot cut through the concrete wall allowing light to form a luminous cross, was designed by which Japanese architect?

(A) Kengo Kuma

(B) Toyo Ito
(C) Tadao Ando
(D) Fumihiko Maki

Q19. The City of Arts and Sciences (*Ciutat de les Arts i les Ciències*) in Valencia, Spain, a complex of futuristic buildings resembling bones and shells, was designed by which architect?

(A) Santiago Calatrava
(B) Frank Gehry
(C) Rem Koolhaas
(D) Daniel Libeskind

Q20. The Japan National Stadium (Olympic Stadium) used for the 2020 Tokyo Olympics, with its design inspired by traditional Japanese architecture and using locally sourced timber, was designed by which Japanese architect?

(A) Tadao Ando
(B) Kengo Kuma
(C) Toyo Ito
(D) Arata Isozaki

Q21. According to De Morgan's Law, $\sim (p \vee q)$ is equal to:

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

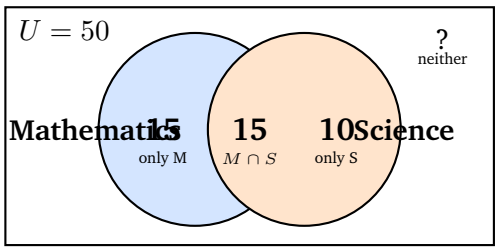
Q22. 'p is necessary for q' means which of the following?

(A) $p \rightarrow q$
(B) $p \leftrightarrow q$
(C) $q \rightarrow p$
(D) $\sim p \rightarrow \sim q$

Q23. Given $p \to q$ and $q \to r$, what can we conclude by the Law of Syllogism?

(A) $p \to r$
(B) $r \to p$
(C) $p \wedge q \wedge r$
(D) $\sim p \to \sim r$

Q24. In a class of 50 students, 30 study Mathematics, 25 study Science, and 15 study both Mathematics and Science. How many students study neither subject? Refer to the Venn diagram.



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

Q25. If $A \subseteq B$, then $A \cap B$ equals:

(A) B
(B) $A \cup B$
(C) $\emptyset$
(D) A

Solutions & Answer Key

Quick Answer Key

Solution

Concept & Chapter: Mirror Image — Visual Reasoning. Reflecting a clock about the vertical axis swaps left and right, so the hour hand at 3 maps to 9, giving 9:00. Answer: **(D)**.

Q1. A clock showing 3:00 has the hour hand pointing to the right (towards 3). When reflected about a vertical axis, the right side becomes the left side. The hour hand, originally pointing right (toward 3), now points left (toward 9). Therefore, the mirror image reads **9:00**.

Answer: (D) Go Back to Q 1

Solution

Concept & Chapter: Figure Series — Visual Reasoning. Each successive figure adds one dot; Fig. 5 follows the pattern with 5 dots. Answer: **(A)**.

Q2. The series follows a clear pattern: Fig. 1 has 1 dot, Fig. 2 has 2 dots, Fig. 3 has 3 dots, Fig. 4 has 4 dots. Each figure adds one dot to the previous. Therefore, Fig. 5 must have **5 dots**.

Answer: (A) Go Back to Q 2

Solution

Concept & Chapter: Paper Folding / Cube Net — Visual Reasoning. A valid cube net needs exactly 6 squares; the cross-shaped arrangement (C) is the only option that folds into a cube without overlap. Answer: **(C)**.

Q3. A valid net for a cube must have exactly 6 squares arranged so that folding them along shared edges produces a closed cube without gaps or overlaps.

- (A) A 2×3 rectangle has 6 squares but cannot fold into a cube — it creates overlapping faces.
- (B) An L-shape of 5 squares has only 5 faces — insufficient.
- (C) The cross shape (1 centre + 4 arms + 1 extended from centre) is the classic valid cube net with 6 squares.

- (D) A straight line of 6 squares cannot be folded into a cube.

The correct answer is **(C)**.

Answer: (C) Go Back to Q 3

Solution

Concept & Chapter: Figure Classification / Odd One Out — Visual Reasoning. Pattern is inner polygon has fewer sides than outer; only (B) hexagon-inside-square breaks this rule. Answer: **(B)**.

Visual — Odd One Out (Polygon Nesting).

The pattern is: a polygon with *fewer* sides placed *inside* a polygon with *more* sides.

- (A) Triangle (3 sides) inside Pentagon (5 sides): $3 < 5$ ✓
- (B) Hexagon (6 sides) inside Square (4 sides): $6 > 4$ × **[breaks pattern]**
- (C) Square (4 sides) inside Hexagon (6 sides): $4 < 6$ ✓
- (D) Triangle (3 sides) inside Hexagon (6 sides): $3 < 6$ ✓

Option (B) is the only figure where the inner polygon has *more* sides than the outer polygon, making it the odd one out.

$\therefore$ Answer **(B)**.

Answer: (B) Go Back to Q 4

Solution

Concept & Chapter: 3D Block Counting — Visual Reasoning. Count the 2×2 base (4 cubes) plus 1 cube stacked on top, giving 5 unit cubes in total. Answer: **(D)**.

Q5. The arrangement consists of a 2×2 base layer (4 unit cubes) with 1 additional unit cube stacked on top of the back position. Counting all unit cubes:

$$\text{Base layer} = 4, \quad \text{Top layer} = 1 \quad \Rightarrow \quad \text{Total} = \mathbf{5} \text{ unit cubes.}$$

Answer: (D) Go Back to Q 5

Solution

Concept & Chapter: Number Series — Numerical Ability. The terms $1, 8, 27, 64$ are $1^3, 2^3, 3^3, 4^3$; the next term is $5^3 = 125$. Answer: **(C)**.

Q6. The series is composed of perfect cubes:

$$1 = 1^3, \quad 8 = 2^3, \quad 27 = 3^3, \quad 64 = 4^3, \quad \boxed{125} = 5^3.$$

The missing term is $5^3 = \mathbf{125}$.

Answer: (C) Go Back to Q 6

Solution

Concept & Chapter: Number Analogy / Ratio — Numerical Ability. The rule is $n : n^3$; since $3 : 27 = 3 : 3^3$, applying to 5 gives $5^3 = 125$. Answer: **(A)**.

Q7. The pattern is $n : n^3$. Here $3 : 27$ because $3^3 = 27$. Applying the same pattern: $5 : 5^3 = \mathbf{125}$.

Answer: (A) Go Back to Q 7

Solution

Concept & Chapter: Speed, Time & Distance — Numerical Ability. Add both speeds (relative speed $= 100$ km/h) then divide distance 200 km to find meeting time of 2 hours. Answer: **(B)**.

Q8. When two objects move towards each other, their speeds add up (relative speed).

$$\text{Relative speed} = 60 + 40 = 100 \text{ km/h}.$$

$$\text{Time to meet} = \frac{\text{Distance}}{\text{Relative speed}} = \frac{200}{100} = \mathbf{2} \text{ hours}.$$

Answer: (B) Go Back to Q 8

Solution

Concept & Chapter: Compound Interest — Numerical Ability. Apply $A = P(1+r/100)^n$: $2000 \times 1.21 = 2420$; interest = Rs. 420. Answer: **(D)**.

Q9. Using the compound interest formula $A = P\left(1 + \dfrac{r}{100}\right)^n$:

$$A = 2000 \times \left(1 + \frac{10}{100}\right)^2 = 2000 \times (1.1)^2 = 2000 \times 1.21 = \text{Rs. } 2420.$$

$$\text{Interest} = A - P = 2420 - 2000 = \mathbf{Rs.\ 420}.$$

Answer: (D) Go Back to Q 9

Solution

Concept & Chapter: Word Analogy — Verbal Reasoning. Telescope enhances the eye's vision; analogously stethoscope enhances the ear's ability to hear internal sounds. Answer: **(A)**.

Q10. A *telescope* is an optical instrument that enhances the eye's ability to see distant objects. Analogously, a *stethoscope* is an acoustic instrument that enhances the ear's ability to hear internal body sounds. The relationship is: sensory organ : instrument that enhances that organ's perception.

Eye : Telescope :: Ear : **Stethoscope**.

Answer: (A) Go Back to Q 10

Solution

Concept & Chapter: Odd One Out — Verbal Reasoning. Pyramid, Ziggurat, and Pagoda are tower/stepped structures; Amphitheatre is a horizontal bowl-shaped performance venue. Answer: **(C)**.

Q11. Pyramid, Ziggurat, and Pagoda are all vertically dominant, tower-like or stepped monumental structures. An *Amphitheatre* is fundamentally different — it is a large, open-air, bowl-shaped venue for performances or sports, designed horizontally around a central arena. The odd one out is **(C) Amphitheatre**.

Answer: (C) Go Back to Q 11

Solution

Concept & Chapter: Architectural Awareness (Indian Architects) — Architectural Awareness. Aranya Housing Complex, Indore was designed by B.V. Doshi (Indian, Pritzker 2018); all other options are by foreign architects. Answer: **(B)**.

Q12.

- (A) Fallingwater — designed by Frank Lloyd Wright (American).
- (B) Aranya Housing Complex, Indore — designed by **B. V. Doshi** (Indian), winner of the 2018 Pritzker Prize. ✓
- (C) Sydney Opera House — designed by Jørn Utzon (Danish).
- (D) Eiffel Tower — designed by Gustave Eiffel (French).

The correct answer is **(B)**.

Answer: (B) Go Back to Q 12

Solution

Concept & Chapter: Word Relationship (Material–Structure) — Verbal Reasoning. As brick is the primary constituent of a wall, asphalt is the primary surface material used to build roads. Answer: **(D)**.

Q13. A wall is constructed of *bricks* — bricks are the primary constituent material. A road is constructed of *asphalt* — asphalt (bituminous concrete) is the primary surface material used to build roads.

Wall : Brick :: Road : **Asphalt**.

Answer: (D) Go Back to Q 13

Solution

Concept & Chapter: Indian Architecture (Contemporary) — Architectural Awareness. The New Parliament Building (inaugurated 2023) was designed by Bimal Patel of HCP Design, Ahmedabad. Answer: **(C)**.

Q14. The New Parliament Building of India (Sansad Bhavan), inaugurated on 28 May 2023, was designed by **Bimal Patel** of HCP Design, Planning and Management Pvt. Ltd., Ahmedabad. The triangular building is inspired by the Harappan civilisation and uses the concept of a "Sengol" consecration.

Answer: (C) Go Back to Q 14

Solution

Concept & Chapter: Indian Architecture (Post-Independence) — Architectural Awareness. Jawahar Kala Kendra (1992), Jaipur was designed by Charles Correa using the nine-square Navagraha grid of the city's original layout. Answer: **(A)**.

Q15. Jawahar Kala Kendra (JKK), Jaipur (1992), was designed by **Charles Correa**. The plan is based on the nine-square (Navagraha) grid of Jaipur's original city layout, with one square shifted to represent the mythological displacement in the plan of Jaipur.

Answer: (A) Go Back to Q 15

Solution

Concept & Chapter: Indian Architecture (Medieval Monuments) — Architectural Awareness. Qutub Minar was begun by Qutb ud-Din Aibak of the Slave (Mamluk) dynasty around 1193 CE, not the Mughals. Answer: **(B)**.

Q16. Qutub Minar was begun by Qutb ud-Din Aibak, founder of the **Slave (Mamluk)**

dynasty, around 1193 CE, and completed by his successor Iltutmish. It is not a Mughal structure; the Mughal dynasty was established only in 1526 CE.

Answer: (B) Go Back to Q 16

Solution

Concept & Chapter: Indian Architecture (UNESCO Heritage) — Architectural Awareness. Jaipur was inscribed on UNESCO's World Heritage List on 6 July 2019 at the 43rd session in Baku. Answer: **(D)**.

Q17. Jaipur was inscribed on UNESCO's World Heritage List on **6 July 2019** during the 43rd session of the UNESCO World Heritage Committee held in Baku, Azerbaijan. It was recognised as an Outstanding Universal Value for its planned urban layout and vibrant culture.

Answer: (D) Go Back to Q 17

Solution

Concept & Chapter: International Architecture (Japanese) — Architectural Awareness. Church of the Light (1989, Osaka) was designed by Tadao Ando, known for minimalist concrete and dramatic use of natural light. Answer: **(C)**.

Q18. The Church of the Light (Hikari no Kyoukai) in Ibaraki, Osaka, Japan (1989), is one of the most celebrated works of **Tadao Ando**. A cross-shaped slot in the concrete altar wall allows sunlight to project a glowing cross onto the dark interior, exemplifying Ando's mastery of light and minimalist concrete architecture.

Answer: (C) Go Back to Q 18

Solution

Concept & Chapter: International Architecture (Spanish) — Architectural Awareness. City of Arts and Sciences, Valencia was designed by Santiago Calatrava with iconic biomimetic skeletal forms opened 1998–2005. Answer: **(A)**.

Q19. The City of Arts and Sciences (*Ciutat de les Arts i les Ciències*), Valencia, Spain, was designed by **Santiago Calatrava** (in collaboration with Félix Candela for the Oceanogràfic). The complex, opened in stages from 1998 to 2005, features biomimetic forms — the buildings resemble a skeleton, an eye, and shells — and is a landmark of contemporary Spanish architecture.

Answer: (A) Go Back to Q 19

Solution

Concept & Chapter: International Architecture (Japanese) — Architectural Awareness. Japan National Stadium (Tokyo 2020 Olympics) was designed by Kengo Kuma using timber from all 47 Japanese prefectures. Answer: **(B)**.

Q20. The Japan National Stadium (used for the 2020 Tokyo Olympics, held in 2021) was designed by **Kengo Kuma**. Kuma replaced Zaha Hadid's original winning design after cost concerns. His design uses eaves inspired by traditional Japanese architecture and incorporates timber from all 47 prefectures of Japan.

Answer: (B) Go Back to Q 20

Solution

Concept & Chapter: De Morgan's Laws — Mathematical Reasoning. Negating a disjunction gives a conjunction of negations: $\sim (p \vee q) \equiv \sim p \wedge \sim q$. Answer: **(D)**.

Q21. De Morgan's Laws state:

$$\sim (p \vee q) \equiv \sim p \wedge \sim q \qquad \text{and} \qquad \sim (p \wedge q) \equiv \sim p \vee \sim q.$$

Therefore $\sim (p \vee q) = \sim \mathbf{p} \wedge \sim \mathbf{q}$.

Answer: (D) Go Back to Q 21

Solution

Concept & Chapter: Logical Connectives (Necessary Condition) — Mathematical Reasoning. "p is necessary for q" means q cannot hold without p, i.e. $q \to p$. Answer: **(C)**.

Q22. "p is *necessary* for q" means that q cannot be true without p being true, i.e., q implies p. In symbolic form: $q \to p$.

(Compare: "p is *sufficient* for q" means $p \to q$.)

Answer: (C) Go Back to Q 22

Solution

Concept & Chapter: Law of Syllogism (Hypothetical Syllogism) — Mathematical Reasoning. If $p \to q$ and $q \to r$, the transitive property of conditionals yields $p \to r$. Answer: **(A)**.

Q23. The Law of Syllogism (Hypothetical Syllogism) states: if $p \to q$ and $q \to r$ are both

true, then $p \to r$ is also true. This is the transitive property of conditional statements.

$$p \to q, \quad q \to r \quad \Longrightarrow \quad \mathbf{p \to r}.$$

Answer: (A) Go Back to Q 23

Solution

Concept & Chapter: Venn Diagram (Inclusion-Exclusion) — Sets & Relations. $n(M \cup S) = 30 + 25 - 15 = 40$; students studying neither $= 50 - 40 = 10$. Answer: **(B)**.

Q24. Using the inclusion-exclusion principle:

$$n(M \cup S) = n(M) + n(S) - n(M \cap S) = 30 + 25 - 15 = 40.$$

Students studying *neither* subject:

$$n(\text{neither}) = n(U) - n(M \cup S) = 50 - 40 = \mathbf{10}.$$

Answer: (B) Go Back to Q 24

Solution

Concept & Chapter: Sets (Subset & Intersection) — Sets & Relations. If $A \subseteq B$, every element of A is already in B, so by definition $A \cap B = A$. Answer: **(D)**.

Q25. If $A \subseteq B$, then every element of A is also an element of B. By the definition of intersection:

$$A \cap B = \{x \mid x \in A \text{ and } x \in B\}.$$

Since all elements of A are already in B, we have $A \cap B = A$. Therefore:

$$\boxed{A \cap B = A}.$$

Answer: (D) Go Back to Q 25