

FDDI AIST Quantitative & Analytical Ability

Sample Paper – 8

Duration: 25 Minutes

Maximum Marks: 25

Instructions

- This paper contains **25** Multiple Choice Questions (Single Correct Answer), modelled on the Quantitative & Analytical Ability section of **FDDI AIST**.
- Each correct answer carries **+1 mark**. There is **no negative marking** for incorrect or unattempted answers.
- Only **one** option is correct per question.
- Syllabus level: **Class 10–12 Mathematics and basic analytical reasoning**.
- Use of mobile phones, calculators, or electronic gadgets is strictly prohibited.

Q1. What is the units digit of 3^{35} ?

- (A) 9
- (B) 7
- (C) 3
- (D) 1

Q2. How many 2-digit prime numbers are there (i.e., primes from 10 to 99)?

- (A) 20
- (B) 22
- (C) 21
- (D) 23

Q3. Using the Euclidean algorithm, find the GCD of 252 and 360.



- (A) 12
- (B) 18
- (C) 24
- (D) 36

Q4. A 40 L solution contains 15% salt. How much water (in litres) must be added to make the concentration 10%?

- (A) 20 L
- (B) 25 L
- (C) 15 L
- (D) 30 L

Q5. A is 40% more than B. By what percentage is B less than A?

- (A) 30%
- (B) $28.\overline{57}\%$
- (C) 40%
- (D) 25%

Q6. In a 40 L mixture, petrol and oil are in ratio 7:3. If 4 L of oil is removed and replaced with 4 L of petrol, what is the new ratio of petrol to oil?

- (A) 3:1
- (B) 7:2
- (C) 4:1
- (D) 5:2

Q7. A trader marks goods 50% above cost price and gives a discount of 10% on the marked price. What is the profit percentage?

- (A) 25%
- (B) 30%



(C) 40%

(D) 35%

Q8. Two articles are each sold at Rs. 1,000. On one, there is a 20% profit; on the other, a 20% loss. What is the overall result?

(A) 4% loss

(B) 4% gain

(C) No profit, no loss

(D) 2% loss

Q9. A and B together finish a job in 12 days, B and C together in 20 days, and A and C together in 15 days. In how many days will all three working together finish the job?

(A) 8 days

(B) 10 days

(C) 12 days

(D) 15 days

Q10. Three pipes fill a tank in 6, 10 and 15 hours respectively. All three are opened for 1 hour; then the fastest pipe is closed. How many total hours does it take to fill the tank?

(A) 4 h

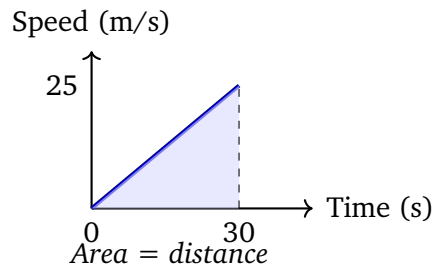
(B) 6 h

(C) 5 h

(D) 7 h

Q11. The speed-time graph below shows a vehicle accelerating uniformly from rest to 25 m/s in 30 seconds. What is the distance covered during this acceleration?





- (A) 250 m
- (B) 300 m
- (C) 350 m
- (D) 375 m

Q12. A boat's speed in still water is 10 km/h and the stream flows at 2 km/h. If the boat travels downstream for 6 hours, how long will it take to return upstream the same distance?

- (A) 9 hours
- (B) 7 hours
- (C) 8 hours
- (D) 10 hours

Q13. Rs. 6,000 is split into two parts: one part is invested at 5% per annum and the rest at 8% per annum. If the total simple interest after one year is Rs. 390, what is the split?

- (A) Rs. 2,000 at 5%, Rs. 4,000 at 8%
- (B) Rs. 3,000 at each rate
- (C) Rs. 4,000 at 5%, Rs. 2,000 at 8%
- (D) Rs. 1,000 at 5%, Rs. 5,000 at 8%

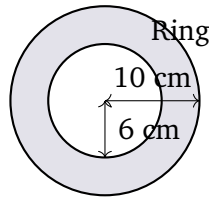
Q14. Rs. 20,000 is invested at 5% per annum compound interest. After how many years does it become Rs. 22,050?

- (A) 1 year



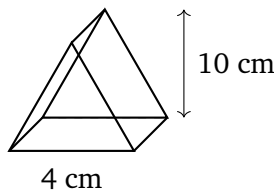
- (B) 1.5 years
- (C) 2 years
- (D) 3 years

Q15. A ring-shaped region has outer radius 10 cm and inner radius 6 cm. Find its area. (Use $\pi = 3.14$)



- (A) 196 cm^2
- (B) 314 cm^2
- (C) 254 cm^2
- (D) 201 cm^2

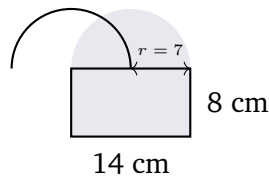
Q16. A triangular prism has an equilateral triangular cross-section with side 4 cm, and a length of 10 cm. Find its volume. (Use $\sqrt{3} = 1.73$)



- (A) $40\sqrt{3} \text{ cm}^3$
- (B) $80\sqrt{3} \text{ cm}^3$
- (C) $20\sqrt{3} \text{ cm}^3$
- (D) 160 cm^3

Q17. A figure consists of a rectangle $14 \text{ cm} \times 8 \text{ cm}$ with a semicircle placed on top of the 14 cm side. Find the total area. (Use $\pi = \frac{22}{7}$)





- (A) 183 cm^2
- (B) 189 cm^2
- (C) 196 cm^2
- (D) 200 cm^2

Q18. Cards numbered 1 to 30 are placed in a box. One card is drawn at random. What is the probability that the number on the card is prime?

- (A) $\frac{1}{5}$
- (B) $\frac{2}{5}$
- (C) $\frac{1}{3}$
- (D) $\frac{1}{6}$

Q19. 3 boys and 3 girls sit in a row of 6. What is the probability that the first two seats are occupied by girls?

- (A) $\frac{1}{10}$
- (B) $\frac{1}{4}$
- (C) $\frac{1}{6}$
- (D) $\frac{1}{5}$

Q20. A car travels three equal distances of 120 km each at speeds of 30 km/h, 40 km/h and 60 km/h. What is the average speed for the entire journey?

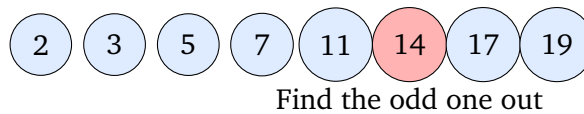
- (A) 40 km/h
- (B) 42 km/h
- (C) 44 km/h
- (D) 45 km/h



Q21. Five consecutive even numbers have an average of 58. What is the sum of the largest and smallest of these numbers?

- (A) 112
- (B) 116
- (C) 118
- (D) 120

Q22. Which number is the odd one out in the following set? {2, 3, 5, 7, 11, 14, 17, 19}



- (A) 11
- (B) 17
- (C) 14
- (D) 19

Q23. Using positional sum coding (A= 1, B= 2, ...), if SUN= 54, what is the value of STAR?

- (A) 50
- (B) 54
- (C) 56
- (D) 58

Q24. Mohan is Raju's grandfather. Raju is the only son of his mother and has a son named Veer. How is Mohan related to Veer?

- (A) Great-grandfather
- (B) Grandfather
- (C) Father
- (D) Uncle



- Q25.** 4 boys and 4 girls are to sit alternately in a row (BGBGBGBG or GBGBGBGB). If boys are in fixed positions, in how many ways can the 4 girls be arranged?
- (A) 16
- (B) 24
- (C) 48
- (D) 96



Detailed Solutions

Q1.

Solution

Quick Solution: Concept: Units Digit Cycle. **Chapter:** Number System. The units digits of successive powers of 3 repeat in a cycle of length 4: **Answer:** B.

Concept — Units Digit Cycle: The units digits of successive powers of 3 repeat in a cycle of length 4: $3^1 \rightarrow 3$, $3^2 \rightarrow 9$, $3^3 \rightarrow 7$, $3^4 \rightarrow 1$, $3^5 \rightarrow 3, \dots$

Step 1 — Find the remainder: Divide the exponent by 4.

$$35 = 4 \times 8 + 3 \implies \text{remainder} = 3$$

Step 2 — Read the cycle: The 3rd position in the cycle (3, 9, 7, 1) gives units digit = 7.

Why other options are wrong:

- Option A (9): Units digit when remainder is 2, e.g., $3^2, 3^6, \dots$
- Option C (3): Units digit when remainder is 1, e.g., $3^1, 3^5, \dots$
- Option D (1): Units digit when remainder is 0, e.g., $3^4, 3^8, \dots$

Final Answer: Units digit of 3^{35} is 7 $\Rightarrow$ B

Answer: (B) [Go Back to Q1](#)

Q2.

Solution

Quick Solution: Concept: 2-Digit Primes. **Chapter:** Number System. A prime is divisible only by 1 and itself. **Answer:** C.

Concept — 2-Digit Primes: A prime is divisible only by 1 and itself. We list all primes between 10 and 99.

Step 1 — Complete list:

11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

Step 2 — Count: Counting the list above gives exactly 21 primes.

Why other options are wrong:



- Option A (20): Undercounts by one.
- Option B (22): Overcounts by one.
- Option D (23): Overcounts by two.

Final Answer: There are 21 two-digit prime numbers $\Rightarrow$ C

Answer: (C) [Go Back to Q2](#)

Q3.

Solution

Quick Solution: Concept: Euclidean Algorithm. **Chapter:** Number System. Repeatedly apply $\gcd(a, b) = \gcd(b, a \bmod b)$ until the remainder is zero. **Answer:** D.

Concept — Euclidean Algorithm: Repeatedly apply $\gcd(a, b) = \gcd(b, a \bmod b)$ until the remainder is zero.

Step 1: $360 = 252 \times 1 + 108$

Step 2: $252 = 108 \times 2 + 36$

Step 3: $108 = 36 \times 3 + 0 \Rightarrow$ last non-zero remainder is 36.

Verification: $252 = 36 \times 7 \checkmark$ $360 = 36 \times 10 \checkmark$

Why other options are wrong:

- Option A (12): Divides both numbers but is not the *greatest* common divisor.
- Option B (18): Also divides both numbers but is less than 36.
- Option C (24): $252 \div 24 = 10.5$ — not an integer, so 24 does not divide 252.

Final Answer: $\gcd(252, 360) = 36 \Rightarrow$ D

Answer: (D) [Go Back to Q3](#)



Q4.

Solution

Quick Solution: Concept: Dilution of a Solution. **Chapter:** Ratio & Proportion. Adding water keeps the amount of solute constant; only the total volume increases. **Answer:** A.

Concept — Dilution of a Solution: Adding water keeps the amount of solute constant; only the total volume increases.

Step 1 — Find the quantity of salt:

$$\text{Salt} = 15\% \times 40 = 6 \text{ L}$$

Step 2 — Set up the equation: Let x litres of water be added.

$$\frac{6}{40 + x} = 0.10 \implies 40 + x = 60 \implies x = 20 \text{ L}$$

Verification: $\frac{6}{60} = 10\% \checkmark$

Why other options are wrong:

- Option B (25 L): $6/65 \approx 9.23\%$, not 10%.
- Option C (15 L): $6/55 \approx 10.9\%$, not 10%.
- Option D (30 L): $6/70 \approx 8.57\%$, not 10%.

Final Answer: 20 L of water must be added $\Rightarrow$ A

Answer: (A) [Go Back to Q4](#)

Q5.

Solution

Quick Solution: Concept: Percentage Difference. **Chapter:** Percentage. “By what % is B less than A” uses A as the base: $\frac{A - B}{A} \times 100$. **Answer:** B.

Concept — Percentage Difference: “By what % is B less than A” uses A as the base: $\frac{A - B}{A} \times 100$.

Step 1 — Express relationship: $A = 1.4B$.



Step 2 — Compute required percentage:

$$\frac{A - B}{A} \times 100 = \frac{1.4B - B}{1.4B} \times 100 = \frac{0.4}{1.4} \times 100 = \frac{2}{7} \times 100 = 28.\overline{57}\%$$

Why other options are wrong:

- Option A (30%): Uses B as base instead of A.
- Option C (40%): The percentage by which A exceeds B, not the reverse.
- Option D (25%): Would imply $A = \frac{4}{3}B$, i.e., A is 33.3% more than B.

Final Answer: B is $28.\overline{57}\%$ less than A $\Rightarrow$ B

Answer: (B) [Go Back to Q5](#)

Q6.

Solution

Quick Solution: Concept: Mixture Replacement. **Chapter:** Percentage. Remove a component, then add another; track each quantity individually. **Answer:** C.

Concept — Mixture Replacement: Remove a component, then add another; track each quantity individually.

Step 1 — Initial composition (ratio 7:3 in 40 L):

$$\text{Petrol} = \frac{7}{10} \times 40 = 28 \text{ L}, \quad \text{Oil} = \frac{3}{10} \times 40 = 12 \text{ L}$$

Step 2 — After removing 4 L oil and adding 4 L petrol:

$$\text{Petrol} = 28 + 4 = 32 \text{ L}, \quad \text{Oil} = 12 - 4 = 8 \text{ L}$$

Step 3 — New ratio:

$$32 : 8 = 4 : 1$$

Why other options are wrong:

- Option A (3:1): Petrol would need to be 30 L — not the result here.
- Option B (7:2): Gives petrol ≈ 31.1 L — doesn't match.
- Option D (5:2): Gives oil $= 40 \times 2/7 \approx 11.4$ L — doesn't match.

Final Answer: New ratio of petrol to oil $= 4 : 1 \Rightarrow$ C



Answer: (C) [Go Back to Q6](#)

Q7.

Solution

Quick Solution: Concept: Marked Price, Discount and Profit. **Chapter:** Profit & Loss. **Answer:** D.

Concept — Marked Price, Discount and Profit:

$$SP = MP \times (1 - d\%), \quad \text{Profit}\% = \frac{SP - CP}{CP} \times 100$$

Step 1 — Let CP = 100:

$$MP = 100 \times 1.50 = 150$$

Step 2 — Apply 10% discount:

$$SP = 150 \times 0.90 = 135$$

Step 3 — Profit percentage:

$$\text{Profit}\% = \frac{135 - 100}{100} \times 100 = 35\%$$

Why other options are wrong:

- Option A (25%): SP would need to be 125; not the case.
- Option B (30%): SP would need to be 130; not the case.
- Option C (40%): Corresponds to no discount being applied.

Final Answer: Profit percentage = 35% $\Rightarrow$ D

Answer: (D) [Go Back to Q7](#)



Q8.

Solution

Quick Solution: Concept: Equal SP with Equal % Gain and Loss. **Chapter:** Discount. The net result is always a **loss**. **Answer:** A.

Concept — Equal SP with Equal % Gain and Loss: The net result is always a **loss**. The shortcut formula: $\text{Loss}\% = \left(\frac{x}{10}\right)^2$ where x is the common percentage.

Step 1 — Cost prices:

$$\text{CP}_1 = \frac{1000}{1.20} = \frac{2500}{3} \approx 833.33, \quad \text{CP}_2 = \frac{1000}{0.80} = 1250$$

Step 2 — Net calculation:

$$\text{Total CP} = 833.33 + 1250 = 2083.33, \quad \text{Total SP} = 2000$$

$$\text{Loss}\% = \frac{2083.33 - 2000}{2083.33} \times 100 \approx 4\%$$

Formula check: $\left(\frac{20}{10}\right)^2 = 4\% \text{ loss } \checkmark$

Why other options are wrong:

- Option B (4% gain): In equal % profit/loss at same SP, result is always a loss.
- Option C (no profit/loss): Incorrect; net loss is always incurred.
- Option D (2% loss): Underestimates; correct formula gives 4%.

Final Answer: Overall result is 4% loss $\Rightarrow$ A

Answer: (A) [Go Back to Q8](#)

Q9.

Solution

Quick Solution: Concept: Work Rates in Pairs. **Chapter:** Time & Work. Adding the three pair-wise rates gives $2(A + B + C)$. **Answer:** B.

Concept — Work Rates in Pairs: Adding the three pair-wise rates gives $2(A + B + C)$.



Step 1 — Sum of pair rates:

$$\begin{aligned}(A + B) + (B + C) + (A + C) &= \frac{1}{12} + \frac{1}{20} + \frac{1}{15} \\ &= \frac{5 + 3 + 4}{60} = \frac{12}{60} = \frac{1}{5}\end{aligned}$$

Step 2 — Combined rate of all three:

$$2(A + B + C) = \frac{1}{5} \implies A + B + C = \frac{1}{10} \text{ (job per day)}$$

Step 3 — Days: $\frac{1}{1/10} = 10$ days.

Why other options are wrong:

- Option A (8 days): Requires combined rate $1/8$; our result is $1/10$.
- Option C (12 days): Rate of A+B alone; not the trio.
- Option D (15 days): Rate of A+C alone; not the trio.

Final Answer: All three together finish in 10 days $\Rightarrow$ B

Answer: (B) [Go Back to Q9](#)

Q10.

Solution

Quick Solution: Concept: Pipes Working in Stages. **Chapter:** Pipes & Cisterns. Compute work done when all pipes are open, then compute remaining work with fewer pipes. **Answer:** C.

Concept — Pipes Working in Stages: Compute work done when all pipes are open, then compute remaining work with fewer pipes.

Step 1 — Rate of all three pipes together:

$$\frac{1}{6} + \frac{1}{10} + \frac{1}{15} = \frac{5 + 3 + 2}{30} = \frac{10}{30} = \frac{1}{3} \text{ tank/hour}$$

Step 2 — Work done in 1 hour: $\frac{1}{3}$ of tank.



Step 3 — Remaining work after closing fastest pipe (6-hour pipe):

$$\text{Remaining} = 1 - \frac{1}{3} = \frac{2}{3}; \quad \text{Rate of remaining pipes} = \frac{1}{10} + \frac{1}{15} = \frac{3+2}{30} = \frac{1}{6}$$

Step 4 — Time for remaining work:

$$t = \frac{2/3}{1/6} = 4 \text{ h}$$

Total time = 1 + 4 = 5 hours.

Why other options are wrong:

- Option A (4 h): Only the second stage duration, not the total.
- Option B (6 h): Overestimates the second stage.
- Option D (7 h): Based on incorrect combined rate.

Final Answer: Total time to fill = 5 hours $\Rightarrow$ C

Answer: (C) [Go Back to Q10](#)

Q11.

Solution

Quick Solution: Concept: Distance from Speed-Time Graph. **Chapter:** Time & Distance. The area under a speed-time graph equals the distance covered. **Answer:** D.

Concept — Distance from Speed-Time Graph: The area under a speed-time graph equals the distance covered. For uniform acceleration from rest, the graph is a right triangle.

Step 1 — Identify the triangle:

- Base (time) = 30 s
- Height (final speed) = 25 m/s

Step 2 — Compute area (= distance):

$$d = \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 30 \times 25 = 375 \text{ m}$$

Why other options are wrong:



- Option A (250 m): $\frac{1}{2} \times 20 \times 25 = 250$ — uses wrong time.
- Option B (300 m): $\frac{1}{2} \times 24 \times 25 = 300$ — uses wrong time.
- Option C (350 m): $\frac{1}{2} \times 28 \times 25 = 350$ — uses wrong time.

Final Answer: Distance covered = 375 m $\Rightarrow$ D

Answer: (D) [Go Back to Q11](#)

Q12.

Solution

Quick Solution: Concept: Boats and Streams. **Chapter:** Time & Distance. .
Answer: A.

Concept — Boats and Streams:

$$\text{Downstream speed} = u + v, \quad \text{Upstream speed} = u - v$$

where u = still-water speed, v = stream speed.

Step 1 — Downstream distance:

$$\text{Speed}_{\downarrow} = 10 + 2 = 12 \text{ km/h}, \quad d = 12 \times 6 = 72 \text{ km}$$

Step 2 — Upstream return time:

$$\text{Speed}_{\uparrow} = 10 - 2 = 8 \text{ km/h}, \quad t = \frac{72}{8} = 9 \text{ h}$$

Why other options are wrong:

- Option B (7 h): Uses incorrect upstream speed.
- Option C (8 h): Would require upstream speed = 9 km/h — not computed correctly.
- Option D (10 h): Uses still-water speed for upstream.

Final Answer: Return trip takes 9 hours $\Rightarrow$ A

Answer: (A) [Go Back to Q12](#)



Q13.

Solution

Quick Solution: Concept: Simple Interest with Two Parts. **Chapter:** Simple Interest. Let x = amount at 5%; then $(6000 - x)$ = amount at 8%. **Answer:** B.

Concept — Simple Interest with Two Parts: Let x = amount at 5%; then $(6000 - x)$ = amount at 8%.

Step 1 — Set up SI equation (1 year):

$$0.05x + 0.08(6000 - x) = 390$$

Step 2 — Solve:

$$0.05x + 480 - 0.08x = 390 \implies -0.03x = -90 \implies x = 3000$$

Step 3 — Split: Rs. 3,000 at 5% and Rs. 3,000 at 8%.

Verification: $0.05 \times 3000 + 0.08 \times 3000 = 150 + 240 = 390 \checkmark$

Why other options are wrong:

- Option A: $0.05(2000) + 0.08(4000) = 100 + 320 = 420 \neq 390$.
- Option C: $0.05(4000) + 0.08(2000) = 200 + 160 = 360 \neq 390$.
- Option D: $0.05(1000) + 0.08(5000) = 50 + 400 = 450 \neq 390$.

Final Answer: Rs. 3,000 at each rate $\Rightarrow$ B

Answer: (B) [Go Back to Q13](#)

Q14.

Solution

Quick Solution: Concept: Compound Interest Formula. **Chapter:** Compound Interest. **Answer:** C.

Concept — Compound Interest Formula:

$$A = P \left(1 + \frac{r}{100} \right)^t$$



Step 1 — Substitute known values:

$$22050 = 20000 \times (1.05)^t \implies (1.05)^t = \frac{22050}{20000} = 1.1025$$

Step 2 — Recognize the power:

$$(1.05)^2 = 1.05 \times 1.05 = 1.1025 \implies t = 2 \text{ years}$$

Why other options are wrong:

- Option A (1 year): $A = 20000 \times 1.05 = 21000 \neq 22050$.
- Option B (1.5 years): $A \approx 20000 \times 1.0759 \approx 21519 \neq 22050$.
- Option D (3 years): $A = 20000 \times 1.157625 \approx 23152 \neq 22050$.

Final Answer: $t = 2 \text{ years} \Rightarrow \boxed{C}$

Answer: (C) [Go Back to Q14](#)

Q15.

Solution

Quick Solution: Concept: Area of Annular Ring. **Chapter:** Mensuration 2D. .
Answer: D.

Concept — Area of Annular Ring:

$$\text{Area} = \pi(R^2 - r^2)$$

where R = outer radius, r = inner radius.

Step 1 — Substitute values:

$$\text{Area} = 3.14 \times (10^2 - 6^2) = 3.14 \times (100 - 36) = 3.14 \times 64$$

Step 2 — Calculate:

$$3.14 \times 64 = 200.96 \approx 201 \text{ cm}^2$$

Why other options are wrong:

- Option A (196): 64×3.0625 — uses an incorrect value of π .
- Option B (314): $\pi \times 100$ — uses only the outer radius; ignores the hole.
- Option C (254): $\approx \pi \times 81$, implying wrong radii of 9 and 0.



Final Answer: Area of ring $\approx 201 \text{ cm}^2 \Rightarrow \boxed{D}$

Answer: (D) [Go Back to Q15](#)

Q16.

Solution

Quick Solution: Concept: Volume of Triangular Prism. **Chapter:** Mensuration 3D. $V = \text{Base Area} \times \text{Length}$. **Answer:** A.

Concept — Volume of Triangular Prism: $V = \text{Base Area} \times \text{Length}$.

For an equilateral triangle with side a : $\text{Base Area} = \frac{\sqrt{3}}{4}a^2$.

Step 1 — Base area:

$$\text{Base Area} = \frac{\sqrt{3}}{4} \times 4^2 = \frac{\sqrt{3}}{4} \times 16 = 4\sqrt{3} \text{ cm}^2$$

Step 2 — Volume:

$$V = 4\sqrt{3} \times 10 = 40\sqrt{3} \text{ cm}^3$$

Numerical check: $40 \times 1.73 = 69.2 \text{ cm}^3$.

Why other options are wrong:

- Option B ($80\sqrt{3}$): Doubles the length — error of $l = 20 \text{ cm}$.
- Option C ($20\sqrt{3}$): Halves the length — error of $l = 5 \text{ cm}$.
- Option D (160): Uses 4×4 as base area, ignoring $\sqrt{3}/4$ factor.

Final Answer: Volume $= 40\sqrt{3} \text{ cm}^3 \Rightarrow \boxed{A}$

Answer: (A) [Go Back to Q16](#)

Q17.

Solution

Quick Solution: Concept: Composite Area. **Chapter:** Mensuration Combined. Total area = area of rectangle + area of semicircle. **Answer:** B.

Concept — Composite Area: Total area = area of rectangle + area of semicircle.

Step 1 — Rectangle:

$$A_{\text{rect}} = 14 \times 8 = 112 \text{ cm}^2$$



Step 2 — Semicircle (diameter = 14 cm $\Rightarrow$ radius = 7 cm):

$$A_{\text{semi}} = \frac{1}{2}\pi r^2 = \frac{1}{2} \times \frac{22}{7} \times 7^2 = \frac{1}{2} \times \frac{22}{7} \times 49 = \frac{1}{2} \times 154 = 77 \text{ cm}^2$$

Step 3 — Total area:

$$A_{\text{total}} = 112 + 77 = 189 \text{ cm}^2$$

Why other options are wrong:

- Option A (183): Arithmetic error in semicircle step.
- Option C (196): Adds a full circle ($\pi r^2 = 154$) instead of a semicircle.
- Option D (200): Rounding error; $112 + 88 = 200$ uses wrong πr^2 .

Final Answer: Total area = 189 cm² $\Rightarrow$ B

Answer: (B) [Go Back to Q17](#)

Q18.

Solution

Quick Solution: Concept: Classical Probability. **Chapter:** Probability. $P(E) = \frac{\text{number of favourable outcomes}}{\text{total outcomes}}$. **Answer:** C.

Concept — Classical Probability: $P(E) = \frac{\text{number of favourable outcomes}}{\text{total outcomes}}$.

Step 1 — List primes from 1 to 30:

$$2, 3, 5, 7, 11, 13, 17, 19, 23, 29 \Rightarrow 10 \text{ primes}$$

Step 2 — Probability:

$$P = \frac{10}{30} = \frac{1}{3}$$

Why other options are wrong:

- Option A (1/5): Would require 6 primes — incorrect count.
- Option B (2/5): Would require 12 primes — incorrect.
- Option D (1/6): Would require 5 primes — incorrect.

Final Answer: $P = \frac{1}{3} \Rightarrow$ C

Answer: (C) [Go Back to Q18](#)



Q19.

Solution

Quick Solution: Concept: Probability via Counting. **Chapter:** Probability. Compute favourable and total arrangements. **Answer:** D.

Concept — Probability via Counting: Compute favourable and total arrangements.

Step 1 — Total arrangements of 6 people: $6! = 720$

Step 2 — Favourable arrangements (2 girls in seats 1 and 2):

- Choose and arrange 2 girls for seats 1 & 2: $P(3, 2) = 3 \times 2 = 6$
- Arrange remaining 4 people in seats 3–6: $4! = 24$
- Favourable = $6 \times 24 = 144$

Step 3 — Probability:

$$P = \frac{144}{720} = \frac{1}{5}$$

Why other options are wrong:

- Option A (1/10): Underestimates by not using permutations correctly.
- Option B (1/4): Incorrect total or favourable count.
- Option C (1/6): Off by a factor of 6/5.

Final Answer: $P = \frac{1}{5} \Rightarrow \boxed{D}$

Answer: (D) [Go Back to Q19](#)

Q20.

Solution

Quick Solution: Concept: Average Speed for Equal Distances. **Chapter:** Averages. **Answer:** A.

Concept — Average Speed for Equal Distances:

$$\bar{v} = \frac{\text{Total Distance}}{\text{Total Time}}$$



Step 1 — Compute time for each segment:

$$t_1 = \frac{120}{30} = 4 \text{ h}, \quad t_2 = \frac{120}{40} = 3 \text{ h}, \quad t_3 = \frac{120}{60} = 2 \text{ h}$$

Step 2 — Total time and distance:

$$T = 4 + 3 + 2 = 9 \text{ h}, \quad D = 3 \times 120 = 360 \text{ km}$$

Step 3 — Average speed:

$$\bar{v} = \frac{360}{9} = 40 \text{ km/h}$$

Why other options are wrong:

- Option B (42): Not derivable from these three speeds with equal distances.
- Option C (44): Not derivable.
- Option D (45): Simple arithmetic mean of 30, 40, 60 is $\frac{130}{3} \approx 43.3$, not 45; and arithmetic mean is incorrect for equal distances.

Final Answer: Average speed = 40 km/h $\Rightarrow$ A

Answer: (A) [Go Back to Q20](#)

Q21.

Solution

Quick Solution: Concept: Consecutive Even Numbers. **Chapter:** Averages. For five consecutive even numbers, the middle (3rd) value equals the average. **Answer:** B.

Concept — Consecutive Even Numbers: For five consecutive even numbers, the middle (3rd) value equals the average.

Step 1 — Find the middle number: Average = 58 $\Rightarrow$ middle = 58.

Step 2 — Construct the sequence:

$$54, 56, 58, 60, 62$$



Step 3 — Sum of largest and smallest:

$$54 + 62 = 116$$

Why other options are wrong:

- Option A (112): $54 + 58 = 112$ — sums smallest with the middle, not the largest.
- Option C (118): Assumes a different sequence or wrong middle.
- Option D (120): Would imply a sequence centred on 60, not 58.

Final Answer: Sum of largest and smallest = 116 $\Rightarrow$ B

Answer: (B) [Go Back to Q21](#)

Q22.

Solution

Quick Solution: Concept: Odd One Out (Primality). **Chapter:** Analytical — Odd One Out. Identify the common property shared by most elements and find the one that breaks it. **Answer:** C.

Concept — Odd One Out (Primality): Identify the common property shared by most elements and find the one that breaks it.

Step 1 — Test each number:

$$2 \checkmark, 3 \checkmark, 5 \checkmark, 7 \checkmark, 11 \checkmark, 14 = 2 \times 7 \text{ (composite)}, 17 \checkmark, 19 \checkmark$$

Step 2 — Identify the exception: All numbers in the set are prime *except* 14.

Why other options are wrong:

- Option A (11): 11 is prime.
- Option B (17): 17 is prime.
- Option D (19): 19 is prime.

Final Answer: The odd one out is 14 $\Rightarrow$ C

Answer: (C) [Go Back to Q22](#)



Q23.

Solution

Quick Solution: Concept: Positional Sum Coding. **Chapter:** Coding-Decoding. Each letter is replaced by its alphabet position (A= 1, B= 2, ..., Z= 26) and the values are summed. **Answer:** D.

Concept — Positional Sum Coding: Each letter is replaced by its alphabet position (A= 1, B= 2, ..., Z= 26) and the values are summed.

Step 1 — Verify with SUN:

$$S = 19, \quad U = 21, \quad N = 14; \quad 19 + 21 + 14 = 54 \checkmark$$

Step 2 — Compute STAR:

$$S = 19, \quad T = 20, \quad A = 1, \quad R = 18$$

$$19 + 20 + 1 + 18 = 58$$

Why other options are wrong:

- Option A (50): Omits a letter or assigns wrong positional values.
- Option B (54): Value of SUN, not STAR.
- Option C (56): Possibly misreads T= 18 (position of R) or R= 16 (position of P).

Final Answer: STAR = 58 $\Rightarrow$ D

Answer: (D) [Go Back to Q23](#)

Q24.

Solution

Quick Solution: Concept: Blood Relations. **Chapter:** Blood Relations. Trace the chain of generations clearly. **Answer:** A.

Concept — Blood Relations: Trace the chain of generations clearly.

Step 1 — Generational chain:

$$\text{Mohan} \xrightarrow{\text{grandfather of}} \text{Raju} \xrightarrow{\text{father of}} \text{Veer}$$



Step 2 — Count generations above Veer: Mohan is 2 generations above Veer, making him Veer's **great-grandfather**.

Why other options are wrong:

- Option B (Grandfather): Mohan is Raju's grandfather, not Veer's.
- Option C (Father): Only one generation above; Raju is Veer's father.
- Option D (Uncle): A lateral (sibling-based) relation; does not apply here.

Final Answer: Mohan is Veer's **great-grandfather** $\Rightarrow$ A

Answer: (A) [Go Back to Q24](#)

Q25.

Solution

Quick Solution: Concept: Arrangements in Fixed Alternate Positions. **Chapter:** Permutations. When boys are fixed, only the girls need to be arranged in the remaining seats. **Answer:** B.

Concept — Arrangements in Fixed Alternate Positions: When boys are fixed, only the girls need to be arranged in the remaining seats.

Step 1 — Fixed boys: Boys occupy 4 fixed positions; the 4 girls fill the 4 alternating seats.

Step 2 — Arrange 4 girls in 4 seats:

$$4! = 4 \times 3 \times 2 \times 1 = 24 \text{ ways}$$

Why other options are wrong:

- Option A (16): $= 4^2$; confuses permutation with a repeated-choice count.
- Option C (48): $= 2 \times 4!$; counts both BGBG and GBGB patterns, but boys are already fixed, so only one pattern applies.
- Option D (96): $= 4 \times 4!$; further overcounting with no valid justification.

Final Answer: Girls can be arranged in 24 ways $\Rightarrow$ B

Answer: (B) [Go Back to Q25](#)



Answer Key

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

