

# FDDI AIST Quantitative & Analytical Ability

## Sample Paper – 6

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.** The sum of the first  $n$  natural numbers equals 1,275. Find  $n$ .

- (A) 45
- (B) 50
- (C) 55
- (D) 60

**Q2.** Find the HCF of 144, 180, and 252.

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

**Q3.** If  $2^n = 64$ , find the value of  $3^n$ .



- (A) 729
- (B) 512
- (C) 243
- (D) 216

**Q4.** Two numbers are in the ratio 5 : 8. When 6 is subtracted from each, the ratio becomes 1 : 2. What are the two numbers?

- (A) 10 and 16
- (B) 20 and 32
- (C) 15 and 24
- (D) 25 and 40

**Q5.** A can contains milk and water in ratio 5 : 3. When 16 L of the mixture is removed and 16 L of water is added, the ratio becomes 3 : 5. What is the capacity of the can?

- (A) 40 L
- (B) 50 L
- (C) 60 L
- (D) 80 L

**Q6.** A salary is first increased by 30%, then decreased by 30%. What is the net percentage change?

- (A) 0%
- (B) -6%
- (C) -8%
- (D) -9%

**Q7.** A shopkeeper marks goods 40% above cost price and gives a discount of 20%. What is the profit percentage?



- (A) 8%
- (B) 10%
- (C) 12%
- (D) 15%

**Q8.** After a discount of 30%, an article is sold for Rs. 350. What is the marked price?

- (A) Rs. 500
- (B) Rs. 450
- (C) Rs. 400
- (D) Rs. 600

**Q9.** A, B and C can complete a work in 20, 30 and 60 days respectively. A works alone for 5 days, then B joins him. How many more days are needed to complete the remaining work?

- (A) 6 days
- (B) 9 days
- (C) 12 days
- (D) 15 days

**Q10.** Pipe X fills a tank in 20 hours, Pipe Y in 30 hours. A leak empties the full tank in 60 hours. With all three active, how long does it take to fill the tank?

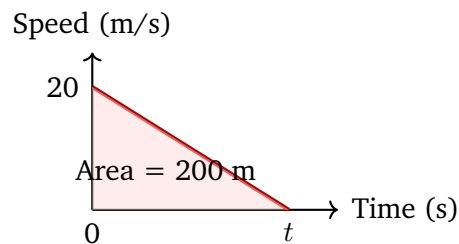
- (A) 20 h
- (B) 12 h
- (C) 15 h
- (D) 10 h

**Q11.** An athlete runs 400 m in 40 seconds. What is her speed in km/h?



- (A) 30 km/h
- (B) 32 km/h
- (C) 34 km/h
- (D) 36 km/h

**Q12.** A vehicle decelerates uniformly from 72 km/h to rest over a distance of 200 m. Using the speed-time graph shown, what is the magnitude of deceleration?



- (A)  $1 \text{ m/s}^2$
- (B)  $2 \text{ m/s}^2$
- (C)  $3 \text{ m/s}^2$
- (D)  $4 \text{ m/s}^2$

**Q13.** Find the principal if the simple interest for 5 years at 6% per annum is Rs. 1,800.

- (A) Rs. 5,000
- (B) Rs. 5,500
- (C) Rs. 6,000
- (D) Rs. 7,000

**Q14.** Find the amount when Rs. 15,000 is invested at 12% per annum compound interest for 2 years.

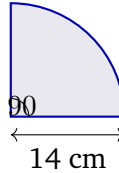
- (A) Rs. 18,000
- (B) Rs. 18,816



(C) Rs. 19,200

(D) Rs. 20,000

**Q15.** A sector has radius 14 cm and central angle 90°. Find its area. (Use  $\pi = \frac{22}{7}$ )



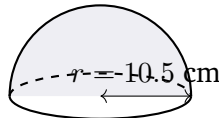
(A)  $130 \text{ cm}^2$

(B)  $142 \text{ cm}^2$

(C)  $148 \text{ cm}^2$

(D)  $154 \text{ cm}^2$

**Q16.** A solid hemisphere has radius 10.5 cm. Find its curved surface area. (Use  $\pi = \frac{22}{7}$ )



(A)  $693 \text{ cm}^2$

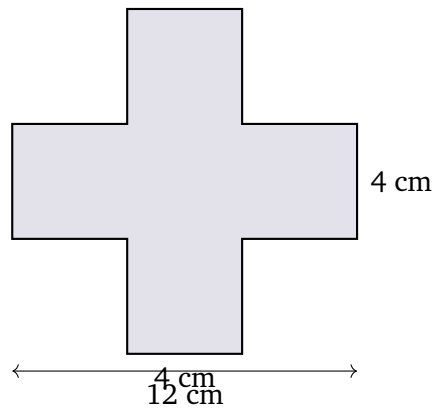
(B)  $725 \text{ cm}^2$

(C)  $750 \text{ cm}^2$

(D)  $800 \text{ cm}^2$

**Q17.** A cross-shaped figure is formed by two rectangles, each  $12 \text{ cm} \times 4 \text{ cm}$ , placed perpendicular to each other and overlapping in a  $4 \text{ cm} \times 4 \text{ cm}$  square at the centre. What is the total area of the cross?





- (A)  $72 \text{ cm}^2$
- (B)  $80 \text{ cm}^2$
- (C)  $88 \text{ cm}^2$
- (D)  $96 \text{ cm}^2$

**Q18.** A card is drawn at random from a standard deck of 52. What is the probability of drawing an ace or a spade?

- (A)  $\frac{1}{4}$
- (B)  $\frac{1}{3}$
- (C)  $\frac{4}{13}$
- (D)  $\frac{5}{13}$

**Q19.** A team of 11 players is to be selected from 15 players, of which exactly 3 must come from a group of 5 senior players. In how many ways can this be done?

- (A) 200
- (B) 300
- (C) 400
- (D) 450



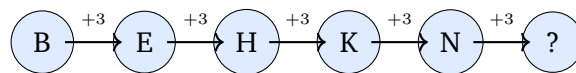
**Q20.** The average daily production of a factory over 25 days is 500 units. For the first 12 days the average is 490, and for the last 8 days it is 510. What is the average for the remaining 5 days?

- (A) 508
- (B) 500
- (C) 496
- (D) 512

**Q21.** A student scores 62, 68, 72, and 57 in four tests. What score must he obtain in the fifth test to have an average of 65?

- (A) 63
- (B) 66
- (C) 68
- (D) 70

**Q22.** What is the next letter in the series: B, E, H, K, N, \_\_\_\_ ?



- (A) O
- (B) P
- (C) R
- (D) Q

**Q23.** If  $ACE = 9$  (sum of letter positions:  $A = 1$ ,  $C = 3$ ,  $E = 5$ ), what is the value of MOB?

- (A) 27
- (B) 28
- (C) 30



(D) 32

**Q24.** My mother's only daughter's son is Rahul. How is Rahul related to me?

(A) Son

(B) Nephew

(C) Brother

(D) Grandson

**Q25.** In how many distinct ways can 5 people be seated around a circular table?

(A) 12

(B) 24

(C) 48

(D) 120



## Detailed Solutions

Q1.

### Solution

**Quick Solution: Concept:** Sum of First  $n$  Natural Numbers. **Chapter:** Number System. The formula is  $S = \frac{n(n+1)}{2}$ . **Answer:** B.

**Concept — Sum of First  $n$  Natural Numbers:** The formula is  $S = \frac{n(n+1)}{2}$ .

**Step 1 — Set up the equation:**

$$\frac{n(n+1)}{2} = 1275 \implies n(n+1) = 2550$$

**Step 2 — Solve by factorisation:** Try  $n = 50$ :  $50 \times 51 = 2550$ . ✓

**Why other options are wrong:**

- Option A ( $n = 45$ ):  $45 \times 46 = 2070 \neq 2550$ .
- Option C ( $n = 55$ ):  $55 \times 56 = 3080 \neq 2550$ .
- Option D ( $n = 60$ ):  $60 \times 61 = 3660 \neq 2550$ .

**Final Answer:**  $n = 50 \Rightarrow \boxed{B}$

**Answer: (B)**    [Go Back to Q1](#)

Q2.

### Solution

**Quick Solution: Concept:** HCF using Prime Factorisation. **Chapter:** Number System. HCF = product of lowest powers of all common prime factors. **Answer:** D.

**Concept — HCF using Prime Factorisation:** HCF = product of lowest powers of all common prime factors.

**Step 1 — Factorise each number:**

$$144 = 2^4 \times 3^2, \quad 180 = 2^2 \times 3^2 \times 5, \quad 252 = 2^2 \times 3^2 \times 7$$

**Step 2 — Identify common factors:** Common prime factors: 2 and 3. Lowest powers:  $2^2$  and  $3^2$ .

$$\text{HCF} = 2^2 \times 3^2 = 4 \times 9 = 36$$



Why other options are wrong:

- Option A (12):  $2^2 \times 3 = 12$  – uses only power  $3^1$ , not highest common.
- Option B (18):  $2 \times 3^2 = 18$  – uses only power  $2^1$ .
- Option C (24):  $2^3 \times 3 = 24$  –  $2^3$  is not common to all three.

Final Answer:  $\text{HCF} = 36 \Rightarrow \boxed{D}$

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

Q3.

### Solution

**Quick Solution: Concept:** Laws of Exponents. **Chapter:** Number System. If  $a^n = k$ , find  $n$  first, then evaluate any other base raised to  $n$ . **Answer:** A.

**Concept — Laws of Exponents:** If  $a^n = k$ , find  $n$  first, then evaluate any other base raised to  $n$ .

Step 1 — Find  $n$ :

$$2^n = 64 = 2^6 \implies n = 6$$

Step 2 — Compute  $3^n$ :

$$3^6 = 729$$

Why other options are wrong:

- Option B (512):  $512 = 2^9$  or  $8^3$ , not  $3^6$ .
- Option C (243):  $243 = 3^5$ , corresponds to  $n = 5$ .
- Option D (216):  $216 = 6^3$ , unrelated.

Final Answer:  $3^6 = 729 \Rightarrow \boxed{A}$

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



Q4.

**Solution**

**Quick Solution: Concept:** Ratio and Proportion. **Chapter:** Ratio & Proportion. Let the numbers be  $5k$  and  $8k$ , then apply the changed ratio condition. **Answer:** C.

**Concept — Ratio and Proportion:** Let the numbers be  $5k$  and  $8k$ , then apply the changed ratio condition.

**Step 1 — Form the equation:**

$$\frac{5k-6}{8k-6} = \frac{1}{2} \implies 2(5k-6) = 8k-6 \implies 10k-12 = 8k-6 \implies 2k = 6 \implies k = 3$$

**Step 2 — Find the numbers:**

$$5k = 15, \quad 8k = 24$$

**Why other options are wrong:**

- Option A (10, 16): Ratio  $10 : 16 = 5 : 8$  ✓ but  $(10 - 6) : (16 - 6) = 4 : 10 = 2 : 5 \neq 1 : 2$ .
- Option B (20, 32):  $(20 - 6) : (32 - 6) = 14 : 26 = 7 : 13 \neq 1 : 2$ .
- Option D (25, 40):  $(25 - 6) : (40 - 6) = 19 : 34 \neq 1 : 2$ .

**Final Answer:** 15 and 24  $\Rightarrow$  C

**Answer: (C)** [Go Back to Q4](#)

Q5.

**Solution**

**Quick Solution: Concept:** Mixture and Alligation. **Chapter:** Ratio & Proportion. When a fraction of mixture is removed and replaced with one component, track the remaining quantity of each component. **Answer:** A.

**Concept — Mixture and Alligation:** When a fraction of mixture is removed and replaced with one component, track the remaining quantity of each component.

**Step 1 — Express initial quantities:** Let the capacity of the can be  $C$  litres. Initial milk =  $\frac{5C}{8}$ , water =  $\frac{3C}{8}$ .

**Step 2 — Apply the operation:** Removing 16 L of mixture (which has the same



ratio) removes  $\frac{5}{8} \times 16 = 10$  L of milk and 6 L of water. Then 16 L of pure water is added.

$$\text{Milk after} = \frac{5C}{8} - 10, \quad \text{Water after} = \frac{3C}{8} - 6 + 16 = \frac{3C}{8} + 10$$

**Step 3 — Use new ratio 3 : 5:**

$$\frac{\frac{5C}{8} - 10}{\frac{3C}{8} + 10} = \frac{3}{5} \implies 5\left(\frac{5C}{8} - 10\right) = 3\left(\frac{3C}{8} + 10\right) \implies \frac{25C}{8} - 50 = \frac{9C}{8} + 30 \implies \frac{16C}{8} = 80 \implies C = 40$$

**Why other options are wrong:**

- Options B, C, D: Substituting  $C = 50, 60, 80$  does not satisfy the ratio equation.

**Final Answer:** Capacity = 40 L  $\Rightarrow$  A

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

**Q6.**

### Solution

**Quick Solution: Concept:** Successive Percentage Changes. **Chapter:** Percentage. Apply both changes as multipliers. **Answer:** D.

**Concept — Successive Percentage Changes:** Apply both changes as multipliers.

**Step 1 — Compute net multiplier:**

$$1.30 \times 0.70 = 0.91$$

**Step 2 — Net change:**

$$0.91 - 1 = -0.09 \implies -9\%$$

**Why other options are wrong:**

- Option A (0%): Wrong – increases and decreases by the same percentage do NOT cancel.
- Option B (–6%): Would be true for  $\pm 10\%$  ( $0.9 \times 1.1 = 0.99$ ,  $-1\%$ ; not the case here).



- Option C (−8%): Incorrect arithmetic.

**Final Answer:** Net change = −9% ⇒ D

**Answer: (D)** [Go Back to Q6](#)

**Q7.**

### Solution

**Quick Solution: Concept:** Profit/Loss with Mark-up and Discount. **Chapter:** Profit & Loss.  $SP = MP \times (1 - \text{discount}\%)$ ;  $\text{Profit}\% = \frac{SP - CP}{CP} \times 100$ . **Answer:** C.

**Concept — Profit/Loss with Mark-up and Discount:**  $SP = MP \times (1 - \text{discount}\%)$ ;  
 $\text{Profit}\% = \frac{SP - CP}{CP} \times 100$ .

**Step 1 — Assume CP = 100:**

$$MP = 100 \times 1.40 = 140$$

**Step 2 — Calculate SP after 20% discount:**

$$SP = 140 \times 0.80 = 112$$

**Step 3 — Profit%:**

$$\text{Profit}\% = \frac{112 - 100}{100} \times 100 = 12\%$$

**Why other options are wrong:**

- Option A (8%), B (10%), D (15%): Arise from incorrect discount or mark-up application.

**Final Answer:** Profit = 12% ⇒ C

**Answer: (C)** [Go Back to Q7](#)



Q8.

**Solution**

**Quick Solution: Concept:** Reverse Discount Calculation. **Chapter:** Discount.  $SP = MP \times (1 - d)$ , so  $MP = SP \div (1 - d)$ . **Answer:** A.

**Concept — Reverse Discount Calculation:**  $SP = MP \times (1 - d)$ , so  $MP = SP \div (1 - d)$ .

**Step 1 — Apply formula:**

$$MP \times (1 - 0.30) = 350 \implies MP \times 0.70 = 350 \implies MP = \frac{350}{0.70} = 500$$

**Why other options are wrong:**

- Option B (450):  $450 \times 0.7 = 315 \neq 350$ .
- Option C (400):  $400 \times 0.7 = 280 \neq 350$ .
- Option D (600):  $600 \times 0.7 = 420 \neq 350$ .

**Final Answer:** Marked Price = Rs. 500  $\Rightarrow$  A

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

Q9.

**Solution**

**Quick Solution: Concept:** Time and Work. **Chapter:** Time & Work. Work done = rate  $\times$  time; rates are additive when workers collaborate. **Answer:** B.

**Concept — Time and Work:** Work done = rate  $\times$  time; rates are additive when workers collaborate.

**Step 1 — Work done by A in 5 days:**

$$\text{Rate of A} = \frac{1}{20} \text{ work/day; Work done} = 5 \times \frac{1}{20} = \frac{1}{4}$$

**Step 2 — Remaining work:**

$$1 - \frac{1}{4} = \frac{3}{4}$$

**Step 3 — Combined rate of A and B:**

$$\frac{1}{20} + \frac{1}{30} = \frac{3}{60} + \frac{2}{60} = \frac{5}{60} = \frac{1}{12} \text{ work/day}$$



**Step 4 — Time to finish:**

$$t = \frac{3/4}{1/12} = \frac{3}{4} \times 12 = 9 \text{ days}$$

**Why other options are wrong:**

- Option A (6): Corresponds to remaining work =  $1/2$ , not  $3/4$ .
- Option C (12): Overcounts remaining work.
- Option D (15): Forgets A continues after B joins.

**Final Answer:** 9 more days  $\Rightarrow$  B

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

**Q10.**

### Solution

**Quick Solution: Concept:** Pipes and Cisterns. **Chapter:** Pipes & Cisterns. Net fill rate = sum of inlet rates – leak rate. **Answer:** C.

**Concept — Pipes and Cisterns:** Net fill rate = sum of inlet rates – leak rate.

**Step 1 — Individual rates (fraction of tank per hour):**

$$X : \frac{1}{20}, \quad Y : \frac{1}{30}, \quad \text{Leak} : -\frac{1}{60}$$

**Step 2 — Net rate:**

$$\frac{1}{20} + \frac{1}{30} - \frac{1}{60} = \frac{3}{60} + \frac{2}{60} - \frac{1}{60} = \frac{4}{60} = \frac{1}{15}$$

**Step 3 — Time to fill:**

$$t = 15 \text{ hours}$$

**Why other options are wrong:**

- Option A (20): Ignores pipe Y.
- Option B (12): Ignores the leak.
- Option D (10): Arithmetic error in net rate.

**Final Answer:** 15 hours  $\Rightarrow$  C

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



Q11.

**Solution**

**Quick Solution: Concept:** Speed, Distance, Time and Unit Conversion. **Chapter:** Time & Distance. Speed (m/s)  $\times \frac{18}{5}$  = Speed (km/h). **Answer:** D.

**Concept — Speed, Distance, Time and Unit Conversion:** Speed (m/s)  $\times \frac{18}{5}$  = Speed (km/h).

**Step 1 — Speed in m/s:**

$$v = \frac{400}{40} = 10 \text{ m/s}$$

**Step 2 — Convert to km/h:**

$$10 \times \frac{18}{5} = 36 \text{ km/h}$$

**Why other options are wrong:**

- Options A–C: Arise from incorrect distance or time values used.

**Final Answer:** 36 km/h  $\Rightarrow$  D

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

Q12.

**Solution**

**Quick Solution: Concept:** Kinematics (Equations of Motion). **Chapter:** Time & Distance. Use  $v^2 = u^2 - 2as$  for uniform deceleration; area of velocity-time triangle = distance. **Answer:** A.

**Concept — Kinematics (Equations of Motion):** Use  $v^2 = u^2 - 2as$  for uniform deceleration; area of velocity-time triangle = distance.

**Step 1 — Convert initial speed:**

$$u = 72 \text{ km/h} = 72 \times \frac{5}{18} = 20 \text{ m/s}; \quad v = 0$$

**Step 2 — Apply  $v^2 = u^2 - 2as$ :**

$$0 = (20)^2 - 2a(200) \Rightarrow 400 = 400a \Rightarrow a = 1 \text{ m/s}^2$$



**Alternative via area:** Area of triangle =  $\frac{1}{2} \times t \times 20 = 200 \implies t = 20 \text{ s};$   
 $a = u/t = 20/20 = 1 \text{ m/s}^2.$

**Why other options are wrong:**

- Option B (2): Requires  $s = 100 \text{ m}$ , not  $200 \text{ m}$ .
- Options C, D: Require even shorter stopping distances.

**Final Answer:** Deceleration =  $1 \text{ m/s}^2 \Rightarrow \boxed{A}$

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

**Q13.**

### Solution

**Quick Solution: Concept:** Simple Interest. **Chapter:** Simple Interest.  $SI = \frac{PRT}{100}$ , so  $P = \frac{SI \times 100}{R \times T}$ . **Answer: C.**

**Concept — Simple Interest:**  $SI = \frac{PRT}{100}$ , so  $P = \frac{SI \times 100}{R \times T}$ .

**Step 1 — Substitute values:**

$$P = \frac{1800 \times 100}{6 \times 5} = \frac{180000}{30} = 6000$$

**Why other options are wrong:**

- Option A (5000):  $SI$  would be  $5000 \times 6 \times 5/100 = 1500 \neq 1800$ .
- Option B (5500):  $SI = 1650 \neq 1800$ .
- Option D (7000):  $SI = 2100 \neq 1800$ .

**Final Answer:** Principal = Rs. 6,000  $\Rightarrow \boxed{C}$

**Answer: (C)** [Go Back to Q13](#)



Q14.

**Solution****Quick Solution: Concept:** Compound Interest. **Chapter:** Compound Interest.

$$A = P \left( 1 + \frac{r}{100} \right)^n. \text{ Answer: B.}$$

$$\text{Concept — Compound Interest: } A = P \left( 1 + \frac{r}{100} \right)^n.$$

**Step 1 — Compute the multiplier:**

$$\left( 1 + \frac{12}{100} \right)^2 = (1.12)^2 = 1.2544$$

**Step 2 — Calculate amount:**

$$A = 15000 \times 1.2544 = 18816$$

**Why other options are wrong:**

- Option A (18000): Simple interest for 2 years at 12% adds only  $15000 \times 0.12 \times 2 = 3600$ ;  $15000 + 3600 \neq 18816$ .
- Option C (19200): Uses  $r = 20\%$  (over-estimated).
- Option D (20000): Uses simple interest at higher rates.

**Final Answer:** Amount = Rs. 18,816  $\Rightarrow$  BAnswer: (B) [Go Back to Q14](#)

Q15.

**Solution****Quick Solution: Concept:** Area of a Sector. **Chapter:** Mensuration 2D. Area  $= \frac{\theta}{360} \times \pi r^2$ . **Answer: D.**

$$\text{Concept — Area of a Sector: Area} = \frac{\theta}{360} \times \pi r^2.$$

**Step 1 — Substitute values ( $r = 14$ ,  $\theta = 90$ ,  $\pi = \frac{22}{7}$ ):**

$$\text{Area} = \frac{90}{360} \times \frac{22}{7} \times 14^2 = \frac{1}{4} \times \frac{22}{7} \times 196 = \frac{1}{4} \times 22 \times 28 = \frac{616}{4} = 154 \text{ cm}^2$$

**Why other options are wrong:**

- Option A (130), B (142), C (148): Arise from incorrect values of  $r^2$  or  $\pi$ .

**Final Answer:** Area =  $154 \text{ cm}^2 \Rightarrow \boxed{D}$

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

**Q16.**

### Solution

**Quick Solution: Concept:** Curved Surface Area of a Hemisphere. **Chapter:** Mensuration 3D.  $\text{CSA} = 2\pi r^2$ . **Answer:** A.

**Concept — Curved Surface Area of a Hemisphere:**  $\text{CSA} = 2\pi r^2$ .

**Step 1 — Compute  $r^2$ :**

$$r = 10.5 = \frac{21}{2} \text{ cm}; \quad r^2 = \frac{441}{4} = 110.25 \text{ cm}^2$$

**Step 2 — Apply formula:**

$$\text{CSA} = 2 \times \frac{22}{7} \times 110.25 = 2 \times \frac{22 \times 110.25}{7} = 2 \times \frac{2425.5}{7} = 2 \times 346.5 = 693 \text{ cm}^2$$

**Why other options are wrong:**

- Option B (725), C (750), D (800): Use incorrect value of  $r$  or formula.

**Final Answer:**  $\text{CSA} = 693 \text{ cm}^2 \Rightarrow \boxed{A}$

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

**Q17.**

### Solution

**Quick Solution: Concept:** Area of Composite Figures. **Chapter:** Mensuration Combined. Use inclusion-exclusion: add areas of parts, then subtract the overlapping region counted twice. **Answer:** B.

**Concept — Area of Composite Figures:** Use inclusion-exclusion: add areas of parts, then subtract the overlapping region counted twice.

**Step 1 — Area of each rectangle:**

$$12 \times 4 = 48 \text{ cm}^2$$



**Step 2 — Total without correction:**

$$2 \times 48 = 96 \text{ cm}^2$$

**Step 3 — Subtract the overlap (counted twice):**

$$4 \times 4 = 16 \text{ cm}^2 \implies \text{Area of cross} = 96 - 16 = 80 \text{ cm}^2$$

**Why other options are wrong:**

- Option A (72): Subtracts two overlaps ( $2 \times 12 = 24$ ; incorrect).
- Option C (88): Subtracts only  $8 \text{ cm}^2$ .
- Option D (96): Forgets to subtract the overlap at all.

**Final Answer:** Area =  $80 \text{ cm}^2 \Rightarrow \boxed{B}$

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

**Q18.**

### Solution

**Quick Solution: Concept:** Addition Rule of Probability. **Chapter:** Probability.  
 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ . **Answer:** C.

**Concept — Addition Rule of Probability:**  $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ .

**Step 1 — Identify the events:** Aces: 4 cards; Spades: 13 cards; Ace of spades: 1 card (intersection).

**Step 2 — Apply the formula:**

$$P(\text{ace or spade}) = \frac{4}{52} + \frac{13}{52} - \frac{1}{52} = \frac{16}{52} = \frac{4}{13}$$

**Why other options are wrong:**

- Option A ( $1/4 = 13/52$ ): Counts spades only, ignoring the 3 non-spade aces.
- Option B ( $1/3$ ): Incorrect fraction.
- Option D ( $5/13 = 20/52$ ): Overcounts by not subtracting the intersection.

**Final Answer:**  $P = \frac{4}{13} \Rightarrow \boxed{C}$

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



Q19.

**Solution**

**Quick Solution: Concept:** Combinations with Constraints. **Chapter:** Combinations. Choose exactly 3 from the restricted group, then fill the remaining spots from the rest. **Answer:** D.

**Concept — Combinations with Constraints:** Choose exactly 3 from the restricted group, then fill the remaining spots from the rest.

**Step 1 — Choose 3 senior players from 5:**

$$\binom{5}{3} = 10$$

**Step 2 — Choose remaining  $11 - 3 = 8$  players from the  $15 - 5 = 10$  non-senior players:**

$$\binom{10}{8} = \binom{10}{2} = 45$$

**Step 3 — Total ways:**

$$10 \times 45 = 450$$

**Why other options are wrong:**

- Option A (200): Uses  $\binom{5}{3} \times \binom{10}{8}$  with a calculation error.
- Option B (300): Incorrect combination values.
- Option C (400): Arises from  $\binom{5}{2} \times \binom{10}{9} = 10 \times 10 = 100 \times 4$  – wrong setup.

**Final Answer:** 450 ways  $\Rightarrow$  D

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

Q20.

**Solution**

**Quick Solution: Concept:** Averages and Totals. **Chapter:** Averages. Total = Average  $\times$  Number of days; use subtraction to isolate the unknown group. **Answer:** A.

**Concept — Averages and Totals:** Total = Average  $\times$  Number of days; use subtraction to isolate the unknown group.



**Step 1 — Grand total:**

$$25 \times 500 = 12,500$$

**Step 2 — Total for first 12 and last 8 days:**

$$12 \times 490 = 5,880; \quad 8 \times 510 = 4,080$$

**Step 3 — Total for middle 5 days:**

$$12,500 - 5,880 - 4,080 = 2,540$$

**Step 4 — Average for middle 5 days:**

$$\frac{2,540}{5} = 508$$

**Why other options are wrong:**

- Option B (500): Grand average, not the sub-period average.
- Option C (496), D (512): Arithmetic errors in step 3.

**Final Answer:** Average = 508  $\Rightarrow$  A

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

**Q21.**

### Solution

**Quick Solution: Concept:** Missing Value from a Target Average. **Chapter:** Averages. Required sum = target average  $\times$  number of items; unknown = required sum – known sum. **Answer:** B.

**Concept — Missing Value from a Target Average:** Required sum = target average  $\times$  number of items; unknown = required sum – known sum.

**Step 1 — Sum of first four scores:**

$$62 + 68 + 72 + 57 = 259$$

**Step 2 — Required total for average 65 over 5 tests:**

$$5 \times 65 = 325$$



**Step 3 — Fifth test score:**

$$325 - 259 = 66$$

**Why other options are wrong:**

- Option A (63):  $259 + 63 = 322$ ; average =  $64.4 \neq 65$ .
- Option C (68):  $259 + 68 = 327$ ; average =  $65.4 \neq 65$ .
- Option D (70):  $259 + 70 = 329$ ; average =  $65.8 \neq 65$ .

**Final Answer:** Fifth test score = 66  $\Rightarrow$  B

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

**Q22.**

### Solution

**Quick Solution: Concept:** Alphabetical Series. **Chapter:** Analytical — Series. Assign numerical positions (A=1, B=2, ..., Z=26) and identify the common difference. **Answer:** D.

**Concept — Alphabetical Series:** Assign numerical positions (A=1, B=2, ..., Z=26) and identify the common difference.

**Step 1 — Position values:**

$$B = 2, \quad E = 5, \quad H = 8, \quad K = 11, \quad N = 14$$

**Step 2 — Common difference:**

$$5 - 2 = 3, \quad 8 - 5 = 3, \quad 11 - 8 = 3, \quad 14 - 11 = 3 \Rightarrow d = +3$$

**Step 3 — Next term:**

$$14 + 3 = 17 \Rightarrow 17\text{th letter} = Q$$

**Why other options are wrong:**

- Option A (O=15): Difference of only +1 from N.
- Option B (P=16): Difference of +2 from N.
- Option C (R=18): Difference of +4 from N.

**Final Answer:** Next letter = Q  $\Rightarrow$  D



**Answer: (D)** [Go Back to Q22](#)

Q23.

### Solution

**Quick Solution: Concept:** Coding-Decoding. **Chapter:** Coding-Decoding. The code value of a word equals the sum of the positional values of its letters ( $A=1, B=2, \dots$ ). **Answer:** C.

**Concept — Coding-Decoding:** The code value of a word equals the sum of the positional values of its letters ( $A=1, B=2, \dots$ ).

**Step 1 — Verify with ACE:**

$$A = 1, \quad C = 3, \quad E = 5; \quad 1 + 3 + 5 = 9 \checkmark$$

**Step 2 — Decode MOB:**

$$M = 13, \quad O = 15, \quad B = 2; \quad 13 + 15 + 2 = 30$$

**Why other options are wrong:**

- Option A (27): Corresponds to  $M = 12, O = 13, B = 2$  (wrong positions).
- Option B (28): Off by 2; arithmetic error.
- Option D (32): Uses incorrect letter positions.

**Final Answer:**  $MOB = 30 \Rightarrow C$

**Answer: (C)** [Go Back to Q23](#)

Q24.

### Solution

**Quick Solution: Concept:** Blood Relations. **Chapter:** Blood Relations. Trace the chain of relationships step by step. **Answer:** A.

**Concept — Blood Relations:** Trace the chain of relationships step by step.

**Step 1 — Identify “my mother’s only daughter”:** If my mother has only one daughter, that daughter is *me*.

**Step 2 — Identify Rahul:** My mother’s only daughter’s son = my son = Rahul.



**Why other options are wrong:**

- Option B (Nephew): Would require the daughter to be a sister, not me.
- Option C (Brother): Rahul cannot be my brother if he is my son.
- Option D (Grandson): Grandson is one generation further (my child's child).

**Final Answer:** Rahul is my **Son**  $\Rightarrow$  A

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

**Q25.**

### Solution

**Quick Solution: Concept:** Circular Permutations. **Chapter:** Direction Sense. In a circular arrangement of  $n$  distinct objects, the number of distinct arrangements is  $(n-1)!$ , because one position is fixed to eliminate rotational equivalence. **Answer:** B.

**Concept — Circular Permutations:** In a circular arrangement of  $n$  distinct objects, the number of distinct arrangements is  $(n-1)!$ , because one position is fixed to eliminate rotational equivalence.

**Step 1 — Apply the formula for  $n = 5$ :**

$$(5-1)! = 4! = 4 \times 3 \times 2 \times 1 = 24$$

**Why other options are wrong:**

- Option A (12): Equals  $4!/2 = 3!$ , which accounts for reflections (necklace formula); not required here.
- Option C (48):  $2 \times 4!$  – double counts.
- Option D (120):  $5!$  – linear permutations, not circular.

**Final Answer:** 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  | D   | 3  | A   | 4  | C   | 5  | A   |
| 6  | D   | 7  | C   | 8  | A   | 9  | B   | 10 | C   |
| 11 | D   | 12 | A   | 13 | C   | 14 | B   | 15 | D   |
| 16 | A   | 17 | B   | 18 | C   | 19 | D   | 20 | A   |
| 21 | B   | 22 | D   | 23 | C   | 24 | A   | 25 | B   |

