FDDI AIST Quantitative & Analytical Ability

Sample Paper – 10

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. Find the HCF of 252, 360 and 504.

(A) 12

(B) 36

(C) 18

(D) 72

Q2. What is the smallest positive integer that gives a remainder of 3 when divided by 5 and a remainder of 4 when divided by 7?

(A) 8

(B) 23

(C) 18

(D) 13

Q3. What is the remainder when 2^{50} is divided by 7?

(A) 1

(B) 2

(C) 3

(D) 4

Q4. Rs. 5,040 is divided among A, B, and C in the ratio $3:4:7$. What is A's share?

(A) Rs. 1,080

(B) Rs. 1,440

(C) Rs. 2,520

(D) Rs. 720

Q5. An item is marked at Rs. 2,000 and sold at Rs. 1,600. What is the percentage discount on the marked price?

(A) 15%

(B) 20%

(C) 25%

(D) 10%

Q6. A trader buys 10 books at Rs. 80 each. He sells 8 of them at Rs. 100 each and the remaining 2 at cost price. What is his profit percentage?

(A) 10%

(B) 15%

(C) 20%

(D) 25%

Q7. A can complete a piece of work in 20 days and B in 30 days. They work together for 6 days, then A leaves. How many more days does B take to finish the remaining work?

(A) 10 days

(B) 12 days

(C) 20 days

(D) 15 days

Q8. Pipe A can fill a tank in 15 minutes and Pipe B can empty it in 20 minutes. Both pipes are opened simultaneously when the tank is $\frac{3}{4}$ full. In how many minutes will the tank become completely empty?

(A) 45 minutes

(B) 30 minutes

(C) 60 minutes

(D) 20 minutes

Q9. Two cars start from the same point at the same time, moving in the same direction at 30 km/h and 50 km/h. After how many hours will they be 40 km apart?

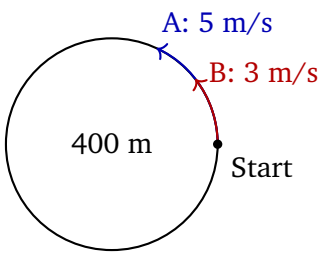
(A) 1 hour

(B) 2 hours

(C) 3 hours

(D) 4 hours

Q10. A and B start from the same point on a circular track of circumference 400 m and move in the **same direction**. A runs at 5 m/s and B runs at 3 m/s. After how many seconds do they first meet again at the starting point?



(A) 100 s

(B) 150 s

(C) 200 s

(D) 250 s

Q11. In how many years will Rs. 6,400 amount to Rs. 8,000 at 5% per annum simple interest?

(A) 3 years

(B) 4 years

(C) 6 years

(D) 5 years

Q12. Find the difference between compound interest and simple interest on Rs. 1,000 at 10% per annum for 2 years.

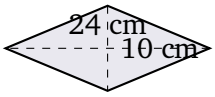
(A) Rs. 10

(B) Rs. 20

(C) Rs. 5

(D) Rs. 100

Q13. The two diagonals of a rhombus are 24 cm and 10 cm. Find the perimeter of the rhombus.



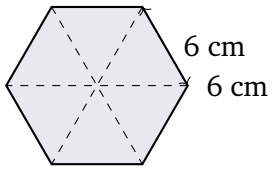
(A) 26 cm

(B) 52 cm

(C) 60 cm

(D) 48 cm

Q14. Find the area of a regular hexagon with side 6 cm. (Use $\sqrt{3} = 1.73$)



(A) $108\sqrt{3}$ cm^2

(B) $27\sqrt{3}$ cm^2

(C) $54\sqrt{3}$ cm^2

(D) $81\sqrt{3}$ cm^2

Q15. Find the total surface area of a sphere of radius 7 cm. (Use $\pi = \frac{22}{7}$)

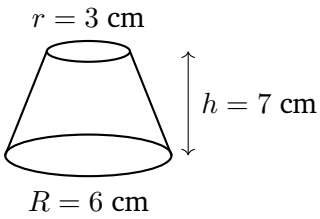
(A) 154 cm^2

(B) 308 cm^2

(C) 1,232 cm^2

(D) 616 cm^2

Q16. A frustum (truncated cone) has lower base radius $R = 6$ cm, upper base radius $r = 3$ cm, and height $h = 7$ cm. Find its volume. (Use $\pi = \frac{22}{7}$)



(A) 462 cm^3

(B) 924 cm^3

(C) 231 cm^3

(D) 616 cm^3

Q17. Two fair dice are thrown simultaneously. What is the probability that the sum of the numbers on top is **greater than 9**?

(A) $\frac{5}{36}$

(B) $\frac{1}{6}$

(C) $\frac{1}{4}$

(D) $\frac{7}{36}$

Q18. A card is drawn at random from a well-shuffled deck of 52 cards. What is the probability that the card drawn is either a **face card** or a **Heart**?

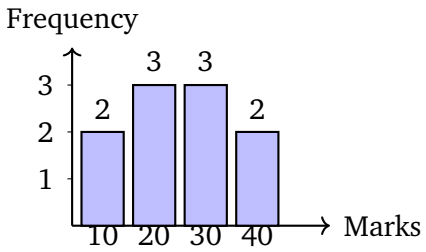
(A) $\frac{1}{4}$

(B) $\frac{3}{13}$

(C) $\frac{11}{26}$

(D) $\frac{9}{26}$

Q19. The table below shows the marks distribution of 10 students. Find the mean marks.



(A) 20

(B) 22

(C) 28

(D) 25

Q20. The marks scored by five students in a test are: 60, 75, 50, 85, 40. What is the range of the data?

(A) 45

(B) 35

(C) 40

(D) 50

Q21. Find the missing letter in the series: B, D, G, K, P, ?

(A) T

(B) V

(C) U

(D) W

Q22. Five people A, B, C, D, E sit in a row. D is at the leftmost position. E is at the rightmost position. B sits between A and D. C sits between B and E. Who is sitting in the **middle** (3rd position from the left)?

(A) B

(B) D

(C) A

(D) C

Q23. In a code language, CAT $= 24$ and DOG $= 26$ (using positional values: A $= 1$, B $= 2$, ...). Using the same rule, what is the value of RAT?

(A) 38

(B) 40

(C) 36

(D) 39

Q24. Library : Books :: Gallery : ?

(A) Paintings

(B) Coins

(C) Stamps

(D) Plants

Q25. What is the average of three numbers?

Statement I: The sum of the three numbers is 120.

Statement II: The three numbers are in the ratio $1:2:3$.

Which statement(s) alone is/are sufficient to answer the question?

(A) Statement II alone is sufficient

(B) Statement I alone is sufficient

(C) Both statements together are needed

(D) Neither statement is sufficient

Detailed Solutions

Q1.

Solution

Quick Solution: Concept: HCF by Prime Factorisation. **Chapter:** Number System. . **Answer:** B.

Concept — HCF by Prime Factorisation:

$$252 = 2^2 \times 3^2 \times 7; \quad 360 = 2^3 \times 3^2 \times 5; \quad 504 = 2^3 \times 3^2 \times 7$$

Step 1 — Take the lowest power of each *common* prime factor:

$$\text{HCF} = 2^{\min(2,3,3)} \times 3^{\min(2,2,2)} = 2^2 \times 3^2 = 4 \times 9 = \mathbf{36}$$

Verification: $252 \div 36 = 7$; $360 \div 36 = 10$; $504 \div 36 = 14$ — all integers ✓

Why other options are wrong:

- Option A (12): $= 2^2 \times 3$ — misses 3^2 from the common factor.
- Option C (18): $= 2 \times 3^2$ — misses 2^2 from the common factor.
- Option D (72): $= 2^3 \times 3^2$ — uses 2^3, but 252 only has 2^2.

Final Answer: $\text{HCF}(252, 360, 504) = \mathbf{36} \Rightarrow \boxed{B}$

Answer: (B) Go Back to Q1

Q2.

Solution

Quick Solution: Concept: Simultaneous Congruences. **Chapter:** Number System. Find the smallest $x > 0$ satisfying $x \equiv 3 \pmod 5$ and $x \equiv 4 \pmod 7$. **Answer:** C.

Concept — Simultaneous Congruences: Find the smallest $x > 0$ satisfying $x \equiv 3 \pmod 5$ and $x \equiv 4 \pmod 7$.

Step 1 — List candidates satisfying $x \equiv 3 \pmod 5$:

$$3,\ 8,\ 13,\ \mathbf{18},\ 23,\ \ldots$$

Step 2 — Check each against $x \equiv 4 \pmod 7$:

$$18 \div 7 = 2 \text{ remainder } \mathbf{4} \checkmark$$

Step 3 — Confirm: $18 \div 5 = 3$ rem $3 \checkmark$; $18 \div 7 = 2$ rem $4 \checkmark$.

Why other options are wrong:

- Option A (8): $8 \div 7 = 1$ rem $1 \neq 4$.
- Option B (23): $23 \div 7 = 3$ rem $2 \neq 4$.
- Option D (13): $13 \div 7 = 1$ rem $6 \neq 4$.

Final Answer: Smallest such integer $= \mathbf{18} \Rightarrow \boxed{C}$

Answer: (C) Go Back to Q2

Q3.

Solution

Quick Solution: Concept: Modular Arithmetic (Cyclicity). **Chapter:** Number System. Powers of 2 modulo 7 repeat with a cycle of length 3. **Answer:** D.

Concept — Modular Arithmetic (Cyclicity): Powers of 2 modulo 7 repeat with a cycle of length 3.

Step 1 — Find the cycle:

$$2^1 \equiv 2, \quad 2^2 \equiv 4, \quad 2^3 \equiv 8 \equiv 1, \quad 2^4 \equiv 2, \ \ldots \pmod 7$$

Cycle: $\{2, 4, 1\}$ with period 3.

Step 2 — Determine position of 2^{50}:

$$50 = 3 \times 16 + 2 \implies 2^{50} \equiv 2^2 \equiv \mathbf{4} \pmod 7$$

Why other options are wrong:

- Option A (1): 2^{3k} gives remainder 1; $50 = 3k + 2$, not $3k$.
- Option B (2): 2^{3k+1} gives remainder 2; $50 = 3k + 2$.
- Option C (3): 3 never appears in the cycle $\{2, 4, 1\}$ for powers of 2 mod 7.

Final Answer: Remainder $= \mathbf{4} \Rightarrow \boxed{D}$

Answer: (D) Go Back to Q3

Q4.

Solution

Quick Solution: Concept: Dividing a Sum in a Given Ratio. **Chapter:** Ratio & Proportion. . **Answer:** A.

Concept — Dividing a Sum in a Given Ratio:

$$\text{A's share} = \frac{3}{3+4+7} \times 5040 = \frac{3}{14} \times 5040$$

Step 1 — Compute:

$$\frac{3}{14} \times 5040 = 3 \times 360 = \textbf{Rs. 1,080}$$

Check: B $= \frac{4}{14} \times 5040 = 1440$; C $= \frac{7}{14} \times 5040 = 2520$. Total $= 1080 + 1440 + 2520 = 5040$ ✓

Why other options are wrong:

- Option B (Rs. 1,440): B's share, not A's.
- Option C (Rs. 2,520): C's share, not A's.
- Option D (Rs. 720): $\frac{2}{14} \times 5040 = 720$ — uses wrong ratio part.

Final Answer: A's share $=$ **Rs. 1,080** $\Rightarrow \boxed{A}$

Answer: (A) Go Back to Q4

Q5.

Solution

Quick Solution: Concept: Percentage Discount. **Chapter:** Percentage. . **Answer:** B.

Concept — Percentage Discount:

$$\text{Discount\%} = \frac{\text{Marked Price} - \text{Selling Price}}{\text{Marked Price}} \times 100$$

Step 1 — Compute:

$$\text{Discount} = 2000 - 1600 = 400$$

$$\text{Discount\%} = \frac{400}{2000} \times 100 = \textbf{20}\%$$

Why other options are wrong:

- Option A (15%): $15\% \times 2000 = 300 \neq 400$.
- Option C (25%): $25\% \times 2000 = 500 \neq 400$.
- Option D (10%): $10\% \times 2000 = 200 \neq 400$.

Final Answer: Discount $= \mathbf{20}\% \Rightarrow \boxed{B}$

Answer: (B) Go Back to Q5

Q6.

Solution

Quick Solution: Concept: Profit% on Multiple-Item Transaction. **Chapter:** Profit & Loss. . **Answer:** C.

Concept — Profit% on Multiple-Item Transaction:

$$\text{Profit\%} = \frac{\text{Total SP} - \text{Total CP}}{\text{Total CP}} \times 100$$

Step 1 — Total cost price:

$$\text{Total CP} = 10 \times 80 = \text{Rs. } 800$$

Step 2 — Total selling price:

$$\text{Total SP} = 8 \times 100 + 2 \times 80 = 800 + 160 = \text{Rs. } 960$$

Step 3 — Profit percentage:

$$\text{Profit\%} = \frac{960 - 800}{800} \times 100 = \frac{160}{800} \times 100 = \mathbf{20}\%$$

Why other options are wrong:

- Option A (10%): Profit of Rs. 80 out of Rs. 800 gives 10% — but profit here is Rs. 160.
- Option B (15%): Would require profit of Rs. 120; actual is Rs. 160.
- Option D (25%): Would require profit of Rs. 200; actual is Rs. 160.

Final Answer: Profit $= \mathbf{20}\% \Rightarrow \boxed{C}$

Answer: (C) Go Back to Q6

Q7.

Solution

Quick Solution: Concept: Partial Work Done. **Chapter:** Time & Work. Compute combined work done in the first phase, then find remaining work. **Answer:** D.

Concept — Partial Work Done: Compute combined work done in the first phase, then find remaining work.

Step 1 — Combined rate of A and B:

$$\frac{1}{20}+\frac{1}{30}=\frac{3+2}{60}=\frac{1}{12}\ \text{(job per day)}$$

Step 2 — Work done in 6 days:

$$\frac{1}{12}\times 6=\frac{1}{2}$$

Step 3 — Remaining work and B's time:

$$\text{Remaining}=1-\frac{1}{2}=\frac{1}{2};\qquad \text{B's rate}=\frac{1}{30}$$

$$t=\frac{1/2}{1/30}=\frac{30}{2}=\mathbf{15}\ \text{days}$$

Why other options are wrong:

- Option A (10 days): $\frac{1}{2}\div\frac{1}{30}=15$, not 10.
- Option B (12 days): Requires remaining work of $\frac{12}{30}=\frac{2}{5}$, but remaining is $\frac{1}{2}$.
- Option C (20 days): B alone takes 30 days for the whole job; only $\frac{1}{2}$ remains.

Final Answer: B takes **15** more days $\Rightarrow \boxed{D}$

Answer: (D) Go Back to Q7

Q8.

Solution

Quick Solution: Concept: Net Emptying Rate. **Chapter:** Pipes & Cisterns. When the filling pipe is open and the emptying pipe is also open, compute the net rate. **Answer:** A.

Concept — Net Emptying Rate: When the filling pipe is open and the emptying pipe is also open, compute the net rate.

Step 1 — Net rate:

$$\text{Rate of filling (A)} = \frac{1}{15} \text{ tank/min}; \quad \text{Rate of emptying (B)} = \frac{1}{20} \text{ tank/min}$$

$$\text{Net rate} = \frac{1}{20} - \frac{1}{15} = \frac{3-4}{60} = -\frac{1}{60} \text{ tank/min (net emptying)}$$

Step 2 — Time to empty $\frac{3}{4}$ of the tank:

$$t = \frac{3/4}{1/60} = \frac{3}{4} \times 60 = \mathbf{45} \text{ minutes}$$

Why other options are wrong:

- Option B (30 min): $\frac{1}{2} \times 60 = 30$ — corresponds to half the tank being emptied.
- Option C (60 min): Would be for a full tank; only $\frac{3}{4}$ needs emptying.
- Option D (20 min): Time for pipe B alone to empty $\frac{1}{3}$ of tank at rate $\frac{1}{20}$.

Final Answer: Tank empties in **45** minutes $\Rightarrow \boxed{A}$

Answer: (A) Go Back to Q8

Q9.

Solution

Quick Solution: Concept: Relative Speed (Same Direction). **Chapter:** Time & Distance. When two objects move in the same direction, the relative speed is the *difference* of their individual speeds. **Answer:** B.

Concept — Relative Speed (Same Direction): When two objects move in the same direction, the relative speed is the *difference* of their individual speeds.

Step 1 — Relative speed:

$$v_{\text{rel}} = 50 - 30 = 20 \text{ km/h}$$

Step 2 — Time to be 40 km apart:

$$t = \frac{40}{20} = \mathbf{2} \text{ hours}$$

Why other options are wrong:

- Option A (1 hour): $20 \times 1 = 20$ km apart, not 40 km.
- Option C (3 hours): $20 \times 3 = 60$ km apart, not 40 km.
- Option D (4 hours): $20 \times 4 = 80$ km apart, not 40 km.

Final Answer: They are 40 km apart after **2** hours $\Rightarrow \boxed{B}$

Answer: (B) Go Back to Q9

Q10.

Solution

Quick Solution: Concept: Meeting on a Circular Track (Same Direction). **Chapter:** Time & Distance. A gains on B at a relative speed of $(v_A - v_B)$ m/s. **Answer:** C.

Concept — Meeting on a Circular Track (Same Direction): A gains on B at a relative speed of $(v_A - v_B)$ m/s. They meet when A has gained exactly one full lap (400 m) on B.

Step 1 — Relative speed:

$$v_{\text{rel}} = 5 - 3 = 2 \text{ m/s}$$

Step 2 — Time to gain one full lap:

$$t = \frac{400}{2} = \mathbf{200} \text{ s}$$

Why other options are wrong:

- Option A (100 s): $2 \times 100 = 200$ m gained — only half a lap.
- Option B (150 s): $2 \times 150 = 300$ m gained — three-quarters of a lap.

- Option D (250 s): $2 \times 250 = 500$ m — over one full lap (first meeting is at 200 s).

Final Answer: They first meet again at **200** s $\Rightarrow \boxed{C}$

Answer: (C) Go Back to Q10

Q11.

Solution

Quick Solution: Concept: Simple Interest: Finding Time. **Chapter:** Simple Interest. . **Answer:** D.

Concept — Simple Interest: Finding Time:

$$T = \frac{\text{SI} \times 100}{P \times R}$$

Step 1 — Simple interest accrued:

$$\text{SI} = 8000 - 6400 = 1600$$

Step 2 — Compute time:

$$T = \frac{1600 \times 100}{6400 \times 5} = \frac{160000}{32000} = \mathbf{5} \text{ years}$$

Verification: SI $= \frac{6400 \times 5 \times 5}{100} = 1600$ ✓; Amount $= 6400 + 1600 = 8000$ ✓

Why other options are wrong:

- Option A (3 years): $\frac{6400 \times 5 \times 3}{100} = 960 \neq 1600$.
- Option B (4 years): $\frac{6400 \times 5 \times 4}{100} = 1280 \neq 1600$.
- Option C (6 years): $\frac{6400 \times 5 \times 6}{100} = 1920 \neq 1600$.

Final Answer: $T = \mathbf{5}$ years $\Rightarrow \boxed{D}$

Answer: (D) Go Back to Q11

Q12.

Solution

Quick Solution: Concept: CI minus SI for 2 years. **Chapter:** Compound Interest. . **Answer:** A.

Concept — CI minus SI for 2 years:

$$\text{CI} - \text{SI} = P \times \left(\frac{r}{100}\right)^2$$

Step 1 — Apply formula:

$$\text{Difference} = 1000 \times \left(\frac{10}{100}\right)^2 = 1000 \times 0.01 = \textbf{Rs. 10}$$

Verification from first principles:

$$\text{SI} = \frac{1000 \times 10 \times 2}{100} = 200; \quad \text{CI} = 1000 \times (1.1)^2 - 1000 = 1210 - 1000 = 210$$

$$\text{Difference} = 210 - 200 = 10 \checkmark$$

Why other options are wrong:

- Option B (Rs. 20): The total CI for 2 years is Rs. 210, not the *difference*.
- Option C (Rs. 5): Arises from using $P \times (r/100)^2/2$ — incorrect halving.
- Option D (Rs. 100): Would result from a rate of 100% — far too high.

Final Answer: Difference = **Rs. 10** $\Rightarrow \boxed{A}$

Answer: (A) Go Back to Q12

Q13.

Solution

Quick Solution: Concept: Side of Rhombus from Diagonals. **Chapter:** Mensuration 2D. The diagonals of a rhombus bisect each other at right angles. **Answer:** B.

Concept — Side of Rhombus from Diagonals: The diagonals of a rhombus bisect each other at right angles. Each side is the hypotenuse of a right triangle with half-diagonals as legs.

Step 1 — Half-diagonals:

$$d_1/2 = 24/2 = 12 \text{ cm}; \quad d_2/2 = 10/2 = 5 \text{ cm}$$

Step 2 — Side length:

$$\text{Side} = \sqrt{12^2 + 5^2} = \sqrt{144 + 25} = \sqrt{169} = 13 \text{ cm}$$

Step 3 — Perimeter:

$$P = 4 \times 13 = \mathbf{52} \text{ cm}$$

Why other options are wrong:

- Option A (26 cm): $= 2 \times 13$ — the perimeter of a triangle, not a rhombus.
- Option C (60 cm): $= 4 \times 15$; side of 15 cm would imply $\sqrt{12^2 + 9^2} = 15$, wrong diagonals.
- Option D (48 cm): $= 4 \times 12$; uses half the longer diagonal as the side.

Final Answer: Perimeter $= \mathbf{52}$ cm $\Rightarrow \boxed{B}$

Answer: (B) Go Back to Q13

Q14.

Solution

Quick Solution: Concept: Area of Regular Hexagon. **Chapter:** Mensuration 2D. A regular hexagon with side s is divided into 6 equilateral triangles, each with area $\frac{\sqrt{3}}{4}s^2$. **Answer:** C.

Concept — Area of Regular Hexagon: A regular hexagon with side s is divided into 6 equilateral triangles, each with area $\frac{\sqrt{3}}{4}s^2$.

$$\text{Area} = 6 \times \frac{\sqrt{3}}{4}s^2 = \frac{3\sqrt{3}}{2}s^2$$

Step 1 — Substitute $s = 6$:

$$\text{Area} = \frac{3\sqrt{3}}{2} \times 6^2 = \frac{3\sqrt{3}}{2} \times 36 = 3\sqrt{3} \times 18 = \mathbf{54\sqrt{3}} \text{ cm}^2$$

Numerical check: $54 \times 1.73 \approx 93.42$ cm^2.

Why other options are wrong:

- Option A ($108\sqrt{3}$): Uses $3\sqrt{3} \times 36$ — double counts (omits the $\frac{1}{2}$).
- Option B ($27\sqrt{3}$): Uses half of the correct formula value.
- Option D ($81\sqrt{3}$): Uses $s = 7$ or applies a wrong formula.

Final Answer: Area $= \mathbf{54\sqrt{3}}$ cm^2 $\Rightarrow \boxed{C}$

Answer: (C) Go Back to Q14

Q15.

Solution

Quick Solution: Concept: Surface Area of a Sphere. **Chapter:** Mensuration 3D. . **Answer:** D.

Concept — Surface Area of a Sphere:

$$\text{SA} = 4\pi r^2$$

Step 1 — Substitute values ($r = 7$ cm, $\pi = \frac{22}{7}$):

$$\text{SA} = 4 \times \frac{22}{7} \times 7^2 = 4 \times \frac{22}{7} \times 49 = 4 \times 22 \times 7 = \mathbf{616}\ \text{cm}^2$$

Why other options are wrong:

- Option A (154 cm^2): $= \pi r^2$ — area of a great circle, only $\frac{1}{4}$ of the sphere's SA.
- Option B (308 cm^2): $= 2\pi r^2$ — area of two great circles, half the sphere's SA.
- Option C (1,232 cm^2): $= 8\pi r^2$ — doubles the correct formula.

Final Answer: SA $= \mathbf{616}$ cm^2 $\Rightarrow \boxed{D}$

Answer: (D) Go Back to Q15

Q16.

Solution

Quick Solution: Concept: Volume of a Frustum. **Chapter:** Mensuration 3D. . **Answer:** A.

Concept — Volume of a Frustum:

$$V = \frac{\pi h}{3}\left(R^2 + r^2 + Rr\right)$$

Step 1 — Substitute values ($R = 6$, $r = 3$, $h = 7$, $\pi = \frac{22}{7}$):

$$V = \frac{(22/7) \times 7}{3}(36 + 9 + 18) = \frac{22}{3} \times 63$$

Step 2 — Compute:

$$V = 22 \times 21 = \mathbf{462}\ \text{cm}^3$$

Why other options are wrong:

- Option B (924 cm^3): Omits the $\frac{1}{3}$ factor — uses $\pi h(R^2 + r^2 + Rr)$.
- Option C (231 cm^3): Uses $\frac{1}{6}$ instead of $\frac{1}{3}$, halving the volume.
- Option D (616 cm^3): Arithmetic error — likely uses $h = 7$ differently in the formula.

Final Answer: Volume $= \mathbf{462}$ cm^3 $\Rightarrow \boxed{A}$

Answer: (A) Go Back to Q16

Q17.

Solution

Quick Solution: Concept: Probability with Two Dice. **Chapter:** Probability. Total outcomes $= 6 \times 6 = 36$. **Answer:** B.

Concept — Probability with Two Dice: Total outcomes $= 6 \times 6 = 36$.

Step 1 — List favourable outcomes (sum > 9):

$$\text{Sum} = 10: \ (4,6), (5,5), (6,4) \rightarrow 3 \text{ ways}$$

$$\text{Sum} = 11: \ (5,6), (6,5) \rightarrow 2 \text{ ways}$$

$$\text{Sum} = 12: \ (6,6) \rightarrow 1 \text{ way}$$

Total favourable $= 3 + 2 + 1 = 6$.

Step 2 — Probability:

$$P = \frac{6}{36} = \mathbf{\frac{1}{6}}$$

Why other options are wrong:

- Option A ($\frac{5}{36}$): Counts only 5 outcomes — misses one case in sum $= 10$.
- Option C ($\frac{1}{4}$): Would need 9 favourable outcomes; actual is 6.
- Option D ($\frac{7}{36}$): Overcounts by one — perhaps mistakenly includes (3,7) which is impossible on a standard die.

Final Answer: $P = \frac{1}{6} \Rightarrow \boxed{B}$

Answer: (B) Go Back to Q17

Q18.

Solution

Quick Solution: Concept: Probability (Union of Events). **Chapter:** Probability. . **Answer:** C.

Concept — Probability (Union of Events):

$$P(F \cup H) = P(F) + P(H) - P(F \cap H)$$

Step 1 — Count the cards:

- Face cards (F): 12 (Jack, Queen, King of each suit)
- Hearts (H): 13
- Face cards that are Hearts ($F \cap H$): 3 (J♡, Q♡, K♡)

Step 2 — Favourable outcomes:

$$|F \cup H| = 12 + 13 - 3 = 22$$

Step 3 — Probability:

$$P = \frac{22}{52} = \frac{11}{26}$$

Why other options are wrong:

- Option A ($\frac{1}{4} = \frac{13}{52}$): Only hearts; ignores non-heart face cards.

- Option B ($\frac{3}{13} = \frac{12}{52}$): Only face cards; ignores non-face hearts.
- Option D ($\frac{9}{26} = \frac{18}{52}$): Would arise from $12+13-7=18$ — wrong intersection count.

Final Answer: $P = \dfrac{11}{26} \Rightarrow \boxed{C}$

Answer: (C) Go Back to Q18

Q19.

Solution

Quick Solution: Concept: Mean from Frequency Distribution. **Chapter:** Statistics. . **Answer:** D.

Concept — Mean from Frequency Distribution:

$$\bar{x} = \frac{\sum f_i x_i}{\sum f_i}$$

Step 1 — Read the frequency table from the bar chart:

Marks (x_i)	Frequency (f_i)	$f_i x_i$
10	2	20
20	3	60
30	3	90
40	2	80
Total	10	250

Step 2 — Compute mean:

$$\bar{x} = \frac{250}{10} = \mathbf{25}$$

Why other options are wrong:

- Option A (20): Simple arithmetic mean of the four mark values $\frac{10+20+30+40}{4} = 25 \neq 20$ — but 20 is not derivable at all.
- Option B (22): Uses wrong frequency weights.
- Option C (28): Incorrect summation of $f_i x_i$.

Final Answer: Mean $= \mathbf{25} \Rightarrow \boxed{D}$

Answer: (D) Go Back to Q19

Q20.

Solution

Quick Solution: Concept: Range of a Data Set. **Chapter:** Statistics. . **Answer:** A.

Concept — Range of a Data Set:

$$\text{Range} = \text{Maximum value} - \text{Minimum value}$$

Step 1 — Identify maximum and minimum:

$$\text{Data: } 60,\ 75,\ 50,\ 85,\ 40; \qquad \text{Max} = 85, \quad \text{Min} = 40$$

Step 2 — Compute range:

$$\text{Range} = 85 - 40 = \mathbf{45}$$

Why other options are wrong:

- Option B (35): $75 - 40 = 35$ — uses the second-largest instead of the maximum.
- Option C (40): $85 - 45 = 40$ — uses an incorrect minimum (45 is not in the data).
- Option D (50): $90 - 40$ — uses a value not present in the data.

Final Answer: Range $= \mathbf{45} \Rightarrow \boxed{A}$

Answer: (A) Go Back to Q20

Q21.

Solution

Quick Solution: Concept: Letter Series (Positional Values). **Chapter:** Analytical — Letter Series. Convert letters to their positions in the alphabet (A $= 1$, B $= 2$, $\ldots$) and find the pattern. **Answer:** B.

Concept — Letter Series (Positional Values): Convert letters to their positions in the alphabet (A $= 1$, B $= 2$, $\ldots$) and find the pattern.

Step 1 — Positions:

$$B = 2, \quad D = 4, \quad G = 7, \quad K = 11, \quad P = 16$$

Step 2 — Differences between successive positions:

$$4-2=2, \quad 7-4=3, \quad 11-7=4, \quad 16-11=5$$

Differences: $2, 3, 4, 5, \ldots$ (increasing by 1 each time). Next difference $= 6$.

Step 3 — Next position and letter:

$$16+6=22 \implies \text{22nd letter} = \mathbf{V}$$

Why other options are wrong:

- Option A (T): T $= 20$; $P+4=20$ — uses difference 4, repeating instead of incrementing.
- Option C (U): U $= 21$; $P+5=21$ — repeats the previous difference.
- Option D (W): W $= 23$; $P+7$ — skips a step.

Final Answer: Next letter is **V** $\Rightarrow \boxed{B}$

Answer: (B) Go Back to Q21

Q22.

Solution

Quick Solution: Concept: Logical Seating Arrangement. **Chapter:** Analytical — Arrangement. Use given constraints to determine the unique ordering. **Answer:** C.

Concept — Logical Seating Arrangement: Use given constraints to determine the unique ordering.

Step 1 — Fixed positions: D is at position 1 (leftmost); E is at position 5 (rightmost).

Step 2 — Apply "B is between A and D": Since D is at position 1, the order must be D–B–A (B between D and A, to D's right).

Step 3 — Apply "C is between B and E": B is at position 2 and E is at position 5. C must be between them: B(2)–?–C–E(5).

Step 4 — Place remaining person (A): Only position 3 is left for A.

$$\underbrace{D}_{1}, \quad \underbrace{B}_{2}, \quad \underbrace{\mathbf{A}}_{3}, \quad \underbrace{C}_{4}, \quad \underbrace{E}_{5}$$

Verification: B(2) is between D(1) and A(3) ✓; C(4) is between B(2) and E(5) ✓.

Why other options are wrong:

- Option A (B): B is at position 2, not the middle (3rd).
- Option B (D): D is at position 1, the leftmost.
- Option D (C): C is at position 4, not 3.

Final Answer: The person in the middle is **A** $\Rightarrow \boxed{C}$

Answer: (C) Go Back to Q22

Q23.

Solution

Quick Solution: Concept: Letter-to-Number Positional Sum. **Chapter:** Coding-Decoding. Assign each letter its position (A= 1, B= 2, . . . , Z= 26) and sum them. **Answer:** D.

Concept — Letter-to-Number Positional Sum: Assign each letter its position (A= 1, B= 2, . . . , Z= 26) and sum them.

Step 1 — Verify given codes:

$$\text{CAT:} \quad C = 3,\ A = 1,\ T = 20; \qquad 3 + 1 + 20 = 24 \checkmark$$

$$\text{DOG:} \quad D = 4,\ O = 15,\ G = 7; \qquad 4 + 15 + 7 = 26 \checkmark$$

Step 2 — Compute RAT:

$$R = 18, \quad A = 1, \quad T = 20; \qquad 18 + 1 + 20 = \mathbf{39}$$

Why other options are wrong:

- Option A (38): Off by 1; perhaps assigns A= 0 instead of A= 1.
- Option B (40): Off by 1; perhaps assigns T= 21.
- Option C (36): Uses R= 17 (position of Q) or T= 18 (position of R).

Final Answer: RAT = **39** $\Rightarrow \boxed{D}$

Answer: (D) Go Back to Q23

Q24.

Solution

Quick Solution: Concept: Collection Analogy. **Chapter:** Analogy. A library is a place that houses a curated collection of books. **Answer:** A.

Concept — Collection Analogy: A library is a place that houses a curated collection of books. Similarly, a gallery is a place that houses a curated collection of artworks (paintings, sculptures).

Step 1 — Identify the relationship:

$$\text{Library} \xrightarrow{\text{houses a collection of}} \text{Books}; \qquad \text{Gallery} \xrightarrow{\text{houses a collection of}} \textbf{Paintings}$$

Why other options are wrong:

- Option B (Coins): A collection of coins is housed in a numismatic *museum*, not a gallery.
- Option C (Stamps): Stamps are displayed in a philatelic collection/album, not a gallery.
- Option D (Plants): Plants are housed in a garden, nursery, or botanical garden.

Final Answer: Gallery : **Paintings** $\Rightarrow \boxed{A}$

Answer: (A) Go Back to Q24

Q25.

Solution

Quick Solution: Concept: Data Sufficiency. **Chapter:** Data Sufficiency. Determine the *minimum* data needed to compute the average. **Answer:** B.

Concept — Data Sufficiency: Determine the *minimum* data needed to compute the average.

Statement I — Sum = 120:

$$\text{Average} = \frac{\text{Sum}}{\text{Count}} = \frac{120}{3} = 40$$

This alone gives us the answer: **Statement I is sufficient by itself.**

Statement II — Numbers in ratio 1:2:3: Without knowing the total, we only know the relative proportions. The numbers could be $(k, 2k, 3k)$ for any $k > 0$.

The average $= 2k$ cannot be determined without knowing k. **Statement II alone is not sufficient.**

Why other options are wrong:

- Option A (Statement II alone): Statement II gives no unique average without the sum.
- Option C (Both needed): Statement I alone is sufficient; no need for Statement II.
- Option D (Neither): Statement I is clearly sufficient.

Final Answer: Statement I alone is sufficient $\Rightarrow \boxed{B}$

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