

IIFT Quantitative Ability

Sample Paper – 6

Duration: 28 Minutes

Maximum Marks: 75

Instructions

- This paper contains **25** Multiple Choice Questions (Single Correct Answer), modelled on the Quantitative Ability portion of IIFT entrance.
- Each correct answer carries **+3 marks**. There is a **penalty of –1 mark** for each incorrect answer.
- Only **one** option is correct per question. Choose carefully.
- Syllabus level: **MBA entrance level — Arithmetic, Algebra, Geometry & Mensuration, Number Systems, and Modern Mathematics.**
- Use of mobile phones, calculators, or any electronic gadgets is strictly prohibited during the test.

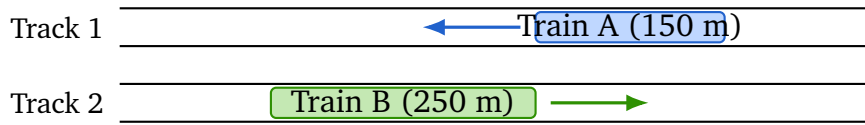
Q1. A person's salary is first increased by 25% and then decreased by 20%. What is the net percentage change in the salary?

- (A) –5%
- (B) 0%
- (C) +5%
- (D) +10%

Q2. Two trains of lengths 150 m and 250 m are running on parallel tracks in **opposite** directions. They cross each other completely in 20 seconds. If the speed of the faster train is



twice the speed of the slower train, find the speed of the faster train.



- (A) 36 km/h
- (B) 40 km/h
- (C) 48 km/h
- (D) 60 km/h

Q3. 10 men can complete a work in 12 days. They start the work but after 6 days, 5 more men join them. In how many more days will the remaining work be completed?

- (A) 2 days
- (B) 3 days
- (C) 5 days
- (D) 4 days

Q4. A certain sum of money lent at simple interest amounts to Rs 1200 in 2 years and to Rs 1500 in 5 years. Find the principal.

- (A) Rs 1000
- (B) Rs 800
- (C) Rs 900
- (D) Rs 1100



Q5. A vessel contains 60 litres of pure milk. 6 litres of milk is removed and replaced with water. This process is repeated once more. What fraction of the vessel now contains milk?

- (A) $\frac{4}{5}$
- (B) $\frac{81}{100}$
- (C) $\frac{9}{10}$
- (D) $\frac{27}{50}$

Q6. The average marks of 30 boys in a class is 55 and the average marks of 20 girls is 45. What is the average marks of the whole class?

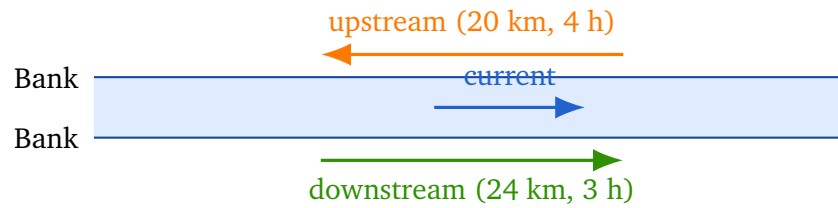
- (A) 48
- (B) 50
- (C) 51
- (D) 53

Q7. A, B, and C invest Rs 5000, Rs 6000, and Rs 4000 respectively in a business. A invests for 12 months, B for 8 months, and C for 6 months. If the total profit at the end is Rs 22000, find C's share of the profit.

- (A) Rs 6000
- (B) Rs 10000
- (C) Rs 8000
- (D) Rs 4000



- Q8.** A boat travels 20 km upstream in 4 hours and 24 km downstream in 3 hours. Find the speed of the current.



- (A) 1.5 km/h
(B) 2 km/h
(C) 2.5 km/h
(D) 3 km/h
- Q9.** Find the number of integer solutions satisfying **both** of the following inequalities simultaneously:

$$2x - 3 \leq 7 \quad \text{and} \quad 3x + 1 > 4$$

- (A) 3
(B) 4
(C) 5
(D) 6
- Q10.** One root of the equation $x^2 + px + 8 = 0$ is 2. The roots of the equation $x^2 + px + q = 0$ are equal. Find the value of q .

- (A) 4
(B) 6
(C) 9
(D) 12



Q11. In an arithmetic progression, the 3rd term is 12 and the 7th term is 24. Find the 15th term.

- (A) 36
- (B) 40
- (C) 44
- (D) 48

Q12. The sum of the first 5 terms of a geometric progression is 31 and the common ratio is 2. Find the first term.

- (A) 1
- (B) 2
- (C) 3
- (D) 4

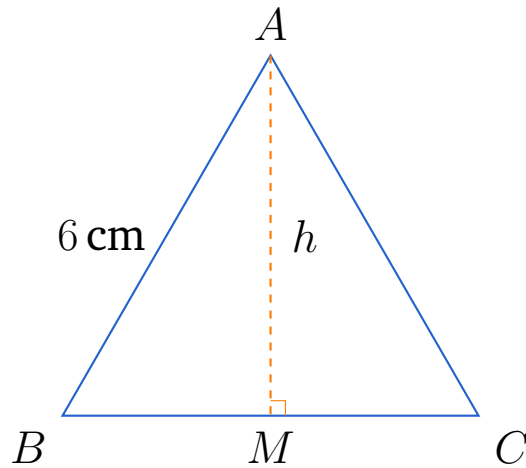
Q13. Simplify:

$$\log_{10}(50) + \log_{10}(2) - \log_{10}(10)$$

- (A) 0
- (B) 1
- (C) 2
- (D) $\log_{10} 5$

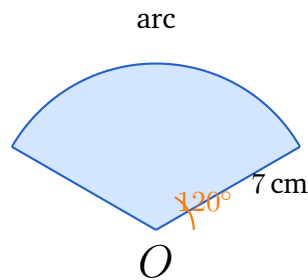
Q14. An equilateral triangle has side 6 cm. Find its area. The altitude h is drawn from vertex A to side BC .





- (A) $6\sqrt{3} \text{ cm}^2$
- (B) $12\sqrt{3} \text{ cm}^2$
- (C) $9\sqrt{3} \text{ cm}^2$
- (D) 18 cm^2

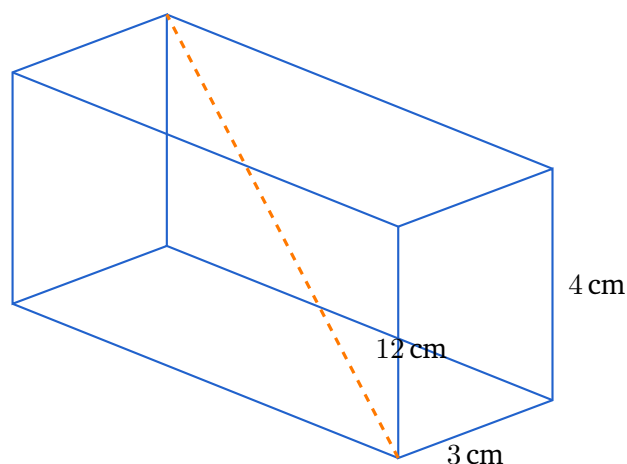
Q15. A sector of a circle has radius 7 cm and a central angle of 120° . Find the area of the sector. (Use $\pi = \frac{22}{7}$.)



- (A) $\frac{44\pi}{3} \text{ cm}^2$
- (B) $\frac{35\pi}{3} \text{ cm}^2$
- (C) $42\pi \text{ cm}^2$
- (D) $\frac{49\pi}{3} \text{ cm}^2$

Q16. A cuboid has dimensions $3 \text{ cm} \times 4 \text{ cm} \times 12 \text{ cm}$. Find the length of its space diagonal.





- (A) 13 cm
- (B) 11 cm
- (C) 15 cm
- (D) $\sqrt{170}$ cm

Q17. Find the midpoint of the line segment joining $A(-3, 5)$ and $B(7, -1)$. Also verify that the midpoint lies on the perpendicular bisector of AB .

- (A) (1, 3)
- (B) (2, 2)
- (C) (3, 1)
- (D) (4, 0)

Q18. Find the remainder when 2^{100} is divided by 7.

- (A) 1
- (B) 4
- (C) 2
- (D) 6



Q19. How many 4-digit numbers can be formed using the digits 1, 2, 3, 4, 5 (no digit repeated) such that the number is **divisible by 4**?

- (A) 12
- (B) 16
- (C) 20
- (D) 24

Q20. Arrange the following surds in **ascending order**:

$$\sqrt[3]{2}, \quad \sqrt[4]{3}, \quad \sqrt[6]{7}$$

- (A) $\sqrt[3]{2} < \sqrt[4]{3} < \sqrt[6]{7}$
- (B) $\sqrt[4]{3} < \sqrt[3]{2} < \sqrt[6]{7}$
- (C) $\sqrt[6]{7} < \sqrt[3]{2} < \sqrt[4]{3}$
- (D) $\sqrt[3]{2} < \sqrt[6]{7} < \sqrt[4]{3}$

Q21. In how many ways can 6 different coloured beads be arranged on a **necklace**? (A necklace can be flipped, so clockwise and anti-clockwise arrangements are considered identical.)

- (A) 120
- (B) 60
- (C) 720
- (D) 30



Q22. A fair coin is tossed 4 times. Find the probability of getting **exactly 2 heads**.

- (A) $\frac{1}{4}$
- (B) $\frac{1}{2}$
- (C) $\frac{3}{8}$
- (D) $\frac{5}{16}$

Q23. A team of 4 people is to be selected from 7 men and 5 women such that the team contains **at least 2 women**. In how many ways can this be done?

- (A) 200
- (B) 240
- (C) 265
- (D) 285

Q24. Given $\log_{10} 2 = 0.3010$ and $\log_{10} 3 = 0.4771$, find the value of $\log_{10} 12$.

- (A) 1.0791
- (B) 1.1461
- (C) 0.9542
- (D) 1.2330

Q25. Simplify the expression:

$$\left(\frac{x^a}{x^b}\right)^{a+b} \times \left(\frac{x^b}{x^c}\right)^{b+c} \times \left(\frac{x^c}{x^a}\right)^{c+a}$$



(A) x^{a+b+c}

(B) 1

(C) x^{abc}

(D) $x^{a^2+b^2+c^2}$



Detailed Solutions

Q1.

Solution

Topic: Arithmetic – Percentage (salary increase then decrease)

Let the original salary be Rs 100.

Step 1: After a 25% increase:

$$\text{New salary} = 100 \times \frac{125}{100} = \text{Rs } 125$$

Step 2: After a 20% decrease on Rs 125:

$$\text{Final salary} = 125 \times \frac{80}{100} = \text{Rs } 100$$

Net change = $100 - 100 = 0$.

This is a classic trap: +25% followed by –20% exactly cancels out because $1.25 \times 0.80 = 1.00$.

Net percentage change = 0%.

Answer: (B)

Q2.

Solution

Topic: Arithmetic – TSD (trains crossing in opposite directions)

Length of Train A = 150 m, Length of Train B = 250 m.

Time to cross = 20 s, moving in **opposite** directions.

Step 1: When trains move in opposite directions, relative speed = sum of their speeds.

$$\text{Relative speed} = \frac{\text{Sum of lengths}}{\text{Time}} = \frac{150 + 250}{20} = \frac{400}{20} = 20 \text{ m/s}$$

Step 2: Let the speed of the slower train = v m/s.

Speed of the faster train = $2v$ m/s.

$$v + 2v = 20 \implies 3v = 20 \implies v = \frac{20}{3} \text{ m/s}$$



Step 3: Faster train speed $= 2v = \frac{40}{3}$ m/s.

Convert to km/h:

$$\frac{40}{3} \times \frac{18}{5} = \frac{40 \times 18}{15} = \frac{720}{15} = 48 \text{ km/h}$$

Speed of the faster train = 48 km/h.

Answer: (C)

Q3.

Solution

Topic: Arithmetic – Time & Work (men joining midway)

10 men complete the work in 12 days.

Total work $= 10 \times 12 = 120$ man-days.

Step 1: Work done in the first 6 days by 10 men:

$$W_1 = 10 \times 6 = 60 \text{ man-days}$$

Step 2: Remaining work:

$$W_{\text{rem}} = 120 - 60 = 60 \text{ man-days}$$

Step 3: After 6 days, 5 more men join, so total men $= 10 + 5 = 15$.

Time to complete remaining work:

$$t = \frac{60}{15} = 4 \text{ days}$$

The remaining work is completed in 4 more days.

Answer: (D)



Q4.

Solution**Topic: Arithmetic – Simple Interest (find principal)**

Amount after 2 years = Rs 1200.

Amount after 5 years = Rs 1500.

Step 1: SI for $(5 - 2) = 3$ years:

$$SI_{3\text{yr}} = 1500 - 1200 = \text{Rs } 300$$

Step 2: SI per year:

$$SI \text{ per year} = \frac{300}{3} = \text{Rs } 100$$

Step 3: SI for 2 years = $2 \times 100 = \text{Rs } 200$.

Principal:

$$P = 1200 - 200 = \text{Rs } 1000$$

Verification: Rate = $\frac{100}{1000} \times 100 = 10\% \text{ p.a.}$ Amount in 5 years = $1000 + 1000 \times 0.10 \times 5 = 1000 + 500 = 1500 \checkmark$ **Answer: (A)**

Q5.

Solution**Topic: Arithmetic – Mixtures (repeated replacement)**

Initial milk = 60 litres. Each time, 6 litres is removed and replaced with water.

Formula for fraction of original liquid remaining after n replacements:

$$\text{Fraction of milk} = \left(1 - \frac{k}{V}\right)^n$$

where $k = 6$ litres removed, $V = 60$ litres total, $n = 2$ times.

$$\text{Fraction} = \left(1 - \frac{6}{60}\right)^2 = \left(\frac{54}{60}\right)^2 = \left(\frac{9}{10}\right)^2 = \frac{81}{100}$$

Step-by-step verification:

- After 1st replacement: Milk = $60 \times \frac{9}{10} = 54$ litres.
- After 2nd replacement: Milk = $54 \times \frac{9}{10} = 48.6$ litres.



- Fraction = $\frac{48.6}{60} = \frac{81}{100}$.

Fraction of vessel containing milk = $\frac{81}{100}$.

Answer: (B)

Q6.

Solution

Topic: Arithmetic – Averages (weighted average of two groups)

Number of boys = 30, average marks = 55.

Number of girls = 20, average marks = 45.

Total students = $30 + 20 = 50$.

Total marks:

$$\text{Boys' total} = 30 \times 55 = 1650$$

$$\text{Girls' total} = 20 \times 45 = 900$$

$$\text{Grand total} = 1650 + 900 = 2550$$

Class average:

$$\bar{x} = \frac{2550}{50} = 51$$

Answer: (C)

Q7.

Solution

Topic: Arithmetic – Partnership (time-weighted ratio)

Investments and durations:

A: Rs 5000 for 12 months $\rightarrow 5000 \times 12 = 60000$

B: Rs 6000 for 8 months $\rightarrow 6000 \times 8 = 48000$

C: Rs 4000 for 6 months $\rightarrow 4000 \times 6 = 24000$

Step 1: Profit-sharing ratio:

$$60000 : 48000 : 24000 = 5 : 4 : 2$$

(Divide each by 12000.)



Step 2: Total parts = $5 + 4 + 2 = 11$.

Step 3: C's share:

$$\text{C's profit} = \frac{2}{11} \times 22000 = \text{Rs } 4000$$

Answer: (D)

Q8.

Solution

Topic: Arithmetic – Boats & Streams (find speed of current)

Let boat speed in still water = b km/h, current speed = c km/h.

Step 1: Upstream speed:

$$b - c = \frac{20}{4} = 5 \text{ km/h}$$

Step 2: Downstream speed:

$$b + c = \frac{24}{3} = 8 \text{ km/h}$$

Step 3: Add and subtract the equations:

$$2b = 5 + 8 = 13 \implies b = 6.5 \text{ km/h}$$

$$2c = 8 - 5 = 3 \implies c = 1.5 \text{ km/h}$$

Speed of the current = 1.5 km/h.

Answer: (A)

Q9.

Solution

Topic: Algebra – Linear Inequalities (count integer solutions)

Inequality 1: $2x - 3 \leq 7$

$$2x \leq 10 \implies x \leq 5$$

Inequality 2: $3x + 1 > 4$

$$3x > 3 \implies x > 1$$

Combined: $1 < x \leq 5$



Integer values of x in this range: $\{2, 3, 4, 5\}$

Number of integer solutions = 4.

Answer: (B)

Q10.

Solution

Topic: Algebra – Quadratic (root given, equal-roots condition)

Step 1: One root of $x^2 + px + 8 = 0$ is $x = 2$. Substituting:

$$(2)^2 + p(2) + 8 = 0 \implies 4 + 2p + 8 = 0 \implies 2p = -12 \implies p = -6$$

Step 2: The equation $x^2 + px + q = 0$ becomes $x^2 - 6x + q = 0$.

For equal roots, the discriminant must be zero:

$$\Delta = p^2 - 4q = 0 \implies (-6)^2 - 4q = 0 \implies 36 = 4q \implies q = 9$$

Verification: $x^2 - 6x + 9 = (x - 3)^2 = 0 \implies x = 3$ (repeated root). ✓

Answer: (C)

Q11.

Solution

Topic: Algebra – Arithmetic Progression (find 15th term)

Let first term = a , common difference = d .

Step 1: $a_3 = a + 2d = 12$... (i)

Step 2: $a_7 = a + 6d = 24$... (ii)

Step 3: Subtract (i) from (ii):

$$4d = 12 \implies d = 3$$

Step 4: From (i): $a = 12 - 2 \times 3 = 6$.

Step 5: 15th term:

$$a_{15} = a + 14d = 6 + 14 \times 3 = 6 + 42 = 48$$



Answer: (D)**Q12.****Solution****Topic: Algebra – Geometric Progression (find first term from sum)**Let first term = a , common ratio $r = 2$.**Sum of first 5 terms of a GP:**

$$S_5 = a \cdot \frac{r^5 - 1}{r - 1} = a \cdot \frac{2^5 - 1}{2 - 1} = a \cdot \frac{32 - 1}{1} = 31a$$

Given $S_5 = 31$:

$$31a = 31 \implies a = 1$$

Verification: The five terms are 1, 2, 4, 8, 16 and their sum = 31. ✓**Answer: (A)****Q13.****Solution****Topic: Logarithm – Properties (simplify log expression)**Using logarithm properties ($\log A + \log B = \log AB$ and $\log A - \log B = \log \frac{A}{B}$):

$$\log_{10}(50) + \log_{10}(2) - \log_{10}(10) = \log_{10}\left(\frac{50 \times 2}{10}\right) = \log_{10}\left(\frac{100}{10}\right) = \log_{10}(10) = 1$$

Answer: (B)

Q14.

Solution**Topic: Geometry – Equilateral Triangle (area and altitude)**

Side of equilateral triangle = 6 cm.

Area:

$$\text{Area} = \frac{\sqrt{3}}{4} \times s^2 = \frac{\sqrt{3}}{4} \times 36 = 9\sqrt{3} \text{ cm}^2$$

Altitude (from vertex A to midpoint M of BC):In an equilateral triangle, the altitude h bisects the base.Using Pythagoras in $\triangle ABM$ where $AB = 6$, $BM = 3$:

$$h = AM = \sqrt{AB^2 - BM^2} = \sqrt{36 - 9} = \sqrt{27} = 3\sqrt{3} \text{ cm}$$

Area using base and height:

$$\text{Area} = \frac{1}{2} \times 6 \times 3\sqrt{3} = 9\sqrt{3} \text{ cm}^2 \checkmark$$

$$\text{Area} = 9\sqrt{3} \text{ cm}^2.$$

Answer: (C)

Q15.

Solution**Topic: Geometry – Sector (area and perimeter)**Radius $r = 7$ cm, central angle $\theta = 120^\circ$.**Area of sector:**

$$\text{Area} = \frac{\theta}{360^\circ} \times \pi r^2 = \frac{120}{360} \times \pi \times 49 = \frac{1}{3} \times 49\pi = \frac{49\pi}{3} \text{ cm}^2$$

Using $\pi = \frac{22}{7}$:

$$\text{Area} = \frac{49}{3} \times \frac{22}{7} = \frac{7 \times 22}{3} = \frac{154}{3} \approx 51.33 \text{ cm}^2$$

Perimeter of sector = arc length + $2r$:

$$\text{Arc length} = \frac{120}{360} \times 2\pi r = \frac{1}{3} \times 2 \times \frac{22}{7} \times 7 = \frac{1}{3} \times 44 = \frac{44}{3} \text{ cm}$$



$$\text{Perimeter} = \frac{44}{3} + 14 = \frac{44 + 42}{3} = \frac{86}{3} \approx 28.67 \text{ cm}$$

$$\text{Area} = \frac{49\pi}{3} \text{ cm}^2.$$

Answer: (D)

Q16.

Solution

Topic: Geometry – Cuboid (space diagonal)

Dimensions: $l = 3 \text{ cm}$, $b = 4 \text{ cm}$, $h = 12 \text{ cm}$.

Space diagonal formula:

$$d = \sqrt{l^2 + b^2 + h^2} = \sqrt{3^2 + 4^2 + 12^2} = \sqrt{9 + 16 + 144} = \sqrt{169} = 13 \text{ cm}$$

Note: $9 + 16 = 25$ and $25 + 144 = 169 = 13^2$. This is a Pythagorean triplet (5, 12, 13) combined with (3, 4, 5).

Answer: (A)

Q17.

Solution

Topic: Geometry – Coordinate (midpoint and perpendicular bisector)

Points: $A(-3, 5)$ and $B(7, -1)$.

Step 1: Midpoint M :

$$M = \left(\frac{-3 + 7}{2}, \frac{5 + (-1)}{2} \right) = \left(\frac{4}{2}, \frac{4}{2} \right) = (2, 2)$$

Step 2: Verify M lies on the perpendicular bisector of AB .

Slope of AB :

$$m_{AB} = \frac{-1 - 5}{7 - (-3)} = \frac{-6}{10} = -\frac{3}{5}$$

Slope of perpendicular bisector = $\frac{5}{3}$ (negative reciprocal).



Equation of perpendicular bisector through $M(2, 2)$:

$$y - 2 = \frac{5}{3}(x - 2) \implies 3y - 6 = 5x - 10 \implies 5x - 3y = 4$$

Check if $M(2, 2)$ satisfies: $5(2) - 3(2) = 10 - 6 = 4 \checkmark$

Every point on the perpendicular bisector is equidistant from A and B , and M is the midpoint, so it trivially satisfies this.

Midpoint = $(2, 2)$.

Answer: (B)

Q18.

Solution

Topic: Number System – Remainder ($2^{100} \pmod{7}$)

Find the pattern of remainders of powers of 2 when divided by 7:

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

The remainders cycle with period 3: 2, 4, 1, 2, 4, 1, ...

Step 1: Find $100 \pmod{3}$:

$$100 = 33 \times 3 + 1 \implies 100 \equiv 1 \pmod{3}$$

Step 2: Since $100 \equiv 1 \pmod{3}$, we have:

$$2^{100} \equiv 2^1 \equiv 2 \pmod{7}$$

Remainder = 2.

Answer: (C)



Q19.

Solution**Topic: Number System – Digit Formation (4-digit, divisible by 4)**A number is divisible by 4 if its **last two digits** form a number divisible by 4.Available digits: $\{1, 2, 3, 4, 5\}$, no repetition.**Step 1:** Find all 2-digit combinations from $\{1, 2, 3, 4, 5\}$ (ordered, no repeat) divisible by 4:

- 12 ($12 \div 4 = 3$) ✓
- 24 ($24 \div 4 = 6$) ✓
- 32 ($32 \div 4 = 8$) ✓
- 52 ($52 \div 4 = 13$) ✓

Other combinations: 13, 14, 15, 21, 23, 25, 31, 34, 35, 41, 42, 43, 45, 51, 53, 54 — none divisible by 4.

Total valid last-two-digit pairs = 4.

Step 2: For each valid last-two-digit pair, the remaining 2 positions are filled from the remaining 3 digits (no repetition):

$${}^3P_2 = 3 \times 2 = 6 \text{ ways}$$

Step 3: Total 4-digit numbers:

$$4 \times 6 = 24$$

Answer: (D)

Q20.

Solution**Topic: Number System – Surd Comparison (ascending order)**

Express each surd as a power with a rational exponent:

$$\sqrt[3]{2} = 2^{1/3}, \quad \sqrt[4]{3} = 3^{1/4}, \quad \sqrt[6]{7} = 7^{1/6}$$

Step 1: Find LCM of denominators 3, 4, 6: LCM = 12.

Convert all exponents to denominator 12:

$$2^{1/3} = 2^{4/12} = (2^4)^{1/12} = 16^{1/12}$$

$$3^{1/4} = 3^{3/12} = (3^3)^{1/12} = 27^{1/12}$$

$$7^{1/6} = 7^{2/12} = (7^2)^{1/12} = 49^{1/12}$$

Step 2: Compare the bases (all under the same root $^{12}\sqrt{}$):

$$16 < 27 < 49$$

Step 3: Ascending order:

$$16^{1/12} < 27^{1/12} < 49^{1/12} \implies \sqrt[3]{2} < \sqrt[4]{3} < \sqrt[6]{7}$$

Answer: (A)

Q21.

Solution

Topic: Modern Mathematics – Circular Arrangement (necklace)

For n objects arranged on a **necklace** (i.e., a closed loop where flipping is also considered the same):

$$\text{Number of arrangements} = \frac{(n-1)!}{2}$$

For $n = 6$ coloured beads:

$$\text{Number of arrangements} = \frac{(6-1)!}{2} = \frac{5!}{2} = \frac{120}{2} = 60$$

Note:

- Circular arrangements (chair): $(n-1)! = 120$ (clockwise $\neq$ anticlockwise).
- Necklace: divide by 2 since flipping gives the same arrangement.

Answer: (B)



Q22.

Solution**Topic: Modern Mathematics – Probability (exactly 2 heads in 4 tosses)**A fair coin is tossed $n = 4$ times. Each toss: $P(H) = P(T) = \frac{1}{2}$.**Using Binomial distribution:**

$$P(X = 2) = \binom{4}{2} \left(\frac{1}{2}\right)^2 \left(\frac{1}{2}\right)^2 = 6 \times \frac{1}{4} \times \frac{1}{4} = \frac{6}{16} = \frac{3}{8}$$

Verification: Total outcomes $= 2^4 = 16$.Favourable outcomes (exactly 2 H): $\binom{4}{2} = 6$ (HHTT, HTHT, HTTH, THHT, THTH, TTHH).

$$P = \frac{6}{16} = \frac{3}{8}$$

Answer: (C)

Q23.

Solution**Topic: Modern Mathematics – Combination (at least 2 women)**7 men, 5 women, select 4 people with **at least 2 women**.**Cases:****Case 1: Exactly 2 women + 2 men:**

$$\binom{5}{2} \times \binom{7}{2} = 10 \times 21 = 210$$

Case 2: Exactly 3 women + 1 man:

$$\binom{5}{3} \times \binom{7}{1} = 10 \times 7 = 70$$

Case 3: Exactly 4 women + 0 men:

$$\binom{5}{4} \times \binom{7}{0} = 5 \times 1 = 5$$

Total:

$$210 + 70 + 5 = 285$$



Answer: (D)

Q24.

Solution

Topic: Logarithm – Characteristic and Mantissa ($\log_{10} 12$)

Given: $\log_{10} 2 = 0.3010$, $\log_{10} 3 = 0.4771$.

Express 12 in terms of 2 and 3:

$$12 = 4 \times 3 = 2^2 \times 3$$

Using logarithm properties:

$$\log_{10} 12 = \log_{10}(2^2 \times 3) = 2 \log_{10} 2 + \log_{10} 3 = 2 \times 0.3010 + 0.4771 = 0.6020 + 0.4771 = 1.0791$$

Interpretation: Characteristic = 1 (since $10 \leq 12 < 100$), Mantissa = 0.0791.

Answer: (A)

Q25.

Solution

Topic: Indices – Simplification (exponent identity)

$$E = \left(\frac{x^a}{x^b}\right)^{a+b} \times \left(\frac{x^b}{x^c}\right)^{b+c} \times \left(\frac{x^c}{x^a}\right)^{c+a}$$

Step 1: Simplify each factor using $\frac{x^m}{x^n} = x^{m-n}$:

$$(x^{a-b})^{a+b} \times (x^{b-c})^{b+c} \times (x^{c-a})^{c+a}$$

Step 2: Apply $(x^m)^n = x^{mn}$:

$$= x^{(a-b)(a+b)} \times x^{(b-c)(b+c)} \times x^{(c-a)(c+a)}$$

Step 3: Use difference of squares $(a-b)(a+b) = a^2 - b^2$:

$$= x^{a^2-b^2} \times x^{b^2-c^2} \times x^{c^2-a^2}$$



Step 4: Add exponents:

$$= x^{(a^2-b^2)+(b^2-c^2)+(c^2-a^2)} = x^0 = \mathbf{1}$$

The expression simplifies to 1, for all values of x, a, b, c .

Answer: (B)



Answer Key

IIFT Quantitative Ability – Sample Paper 6

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

Topic	Questions
Arithmetic	Q1 (Percentage), Q2 (TSD), Q3 (Time & Work), Q4 (SI), Q5 (Mixtures), Q6 (Averages), Q7 (Partnership), Q8 (Boats & Streams)
Algebra	Q9 (Inequalities), Q10 (Quadratic), Q11 (AP), Q12 (GP), Q13 (Logarithm)
Geometry & Mensuration	Q14 (Equilateral Triangle), Q15 (Sector), Q16 (Cuboid), Q17 (Coordinates)
Number Systems	Q18 (Remainder), Q19 (Digit Formation), Q20 (Surd Comparison)
Modern Mathematics	Q21 (Circular – Necklace), Q22 (Probability), Q23 (Combination)
Logarithm	Q24 (Characteristic & Mantissa)
Indices	Q25 (Indices Simplification)

Marking Scheme: +3 for correct answer, –1 for incorrect answer, 0 for unattempted.

Maximum Marks: 75

Duration: 28 Minutes

