IIFT Quantitative Ability

Sample Paper – 10

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 contractor employs 8 skilled workers and 6 unskilled workers. A skilled worker is paid Rs. 450 per day and an unskilled worker is paid Rs. 300 per day. The project lasts for 20 days. What fraction of the total wages is paid to the skilled workers?

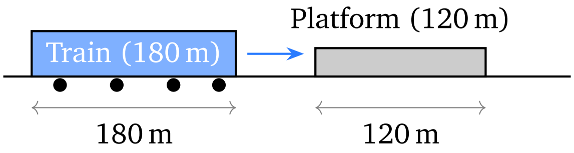
(A) $\frac{2}{5}$

(B) $\frac{3}{7}$

(C) $\frac{2}{3}$

(D) $\frac{3}{5}$

Q2. A train 180 m long crosses a platform 120 m long in 15 seconds. What is the speed of the train?



(A) 54 km/h

(B) 60 km/h

(C) 66 km/h

(D) 72 km/h

Q3. Rice of variety A costs Rs. 40 per kg and rice of variety B costs Rs. 55 per kg. In what ratio must they be mixed so that the mixture costs Rs. 46 per kg?

(A) $3 : 2$

(B) $2 : 3$

(C) $3 : 1$

(D) $4 : 3$

Q4. A sum of Rs. 6,500 is lent at simple interest. After 4 years, the interest earned is Rs. 1,560. What is the rate of interest per annum?

(A) 5%

(B) 6%

(C) 7%

(D) 8%

Q5. The population of a town is 80,000. It grows at the rate of 5% per annum. What will be the population after 2 years?

(A) 86,400

(B) 87,200

(C) 88,200

(D) 89,000

Q6. Solve the system: $x + y = 9$ and $3x - y = 19$. Find the value of $x \times y$.

(A) 6

(B) 8

(C) 10

(D) 14

Q7. Simplify: $\dfrac{\sqrt{6}+\sqrt{2}}{\sqrt{6}-\sqrt{2}}$

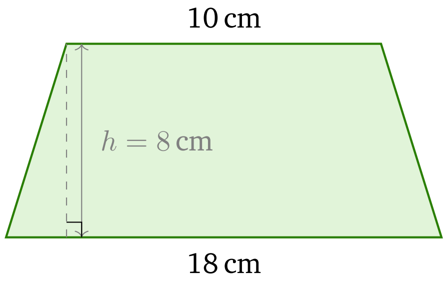
(A) $2+\sqrt{3}$

(B) $2-\sqrt{3}$

(C) $\sqrt{3}+1$

(D) $\sqrt{6}-\sqrt{2}$

Q8. The parallel sides of a trapezoid are 18 cm and 10 cm, and the perpendicular distance between them is 8 cm. Find the area of the trapezoid.



(A) $96\,\text{cm}^2$

(B) $112\,\text{cm}^2$

(C) $120\,\text{cm}^2$

(D) $128\,\text{cm}^2$

Q9. The radius of a sphere is 7 cm. Find its total surface area. (Use $\pi = \frac{22}{7}$)

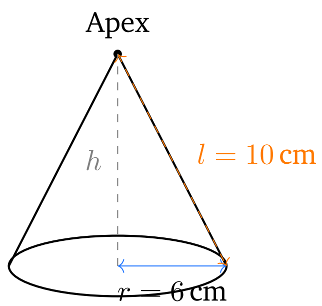
(A) $308\,\text{cm}^2$

(B) $462\,\text{cm}^2$

(C) $616\,\text{cm}^2$

(D) $704\,\text{cm}^2$

Q10. A cone has a base radius of 6 cm and a slant height of 10 cm. Find its curved surface area. (Use $\pi = \frac{22}{7}$)



(A) $\dfrac{1200}{7}\,\text{cm}^2$

(B) $\dfrac{1440}{7}$ cm^2

(C) $\dfrac{1650}{7}$ cm^2

(D) $\dfrac{1320}{7}$ cm^2

Q11. For positive real numbers a and b, it is given that $ab = 36$ and $a + b = 13$. Find the minimum value of $a^2 + b^2$.

(A) 97

(B) 108

(C) 121

(D) 144

Q12. How many trailing zeros does $30!$ have?

(A) 5

(B) 7

(C) 9

(D) 11

Q13. In a group of 60 students, 35 play cricket, 28 play football, and 15 play both. How many students play at least one of the two sports?

(A) 42

(B) 45

(C) 48

(D) 50

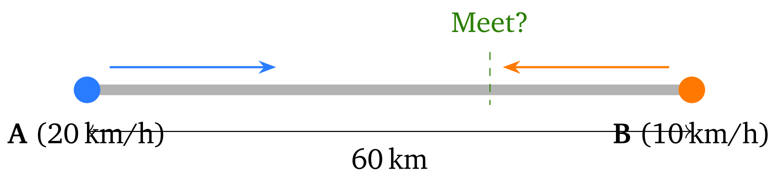
Q14. A card is drawn at random from a well-shuffled deck of 52 cards. What is the probability that the card is a king or a queen?

(A) $\frac{1}{13}$
(B) $\frac{3}{26}$
(C) $\frac{1}{7}$
(D) $\frac{2}{13}$

Q15. Find the value of k for which the equation $kx^2 - 6x + 4 = 0$ has real and equal roots.

(A) $\frac{9}{4}$
(B) $\frac{4}{9}$
(C) $\frac{3}{2}$
(D) $\frac{2}{3}$

Q16. Two cyclists, A and B, start simultaneously from opposite ends of a 60 km road and ride towards each other. A's speed is 20 km/h and B's speed is 10 km/h. At what distance from A's starting point do they meet?



(A) 30 km

(B) 40 km

(C) 45 km

(D) 50 km

Q17. Find the remainder when 7^{100} is divided by 8.

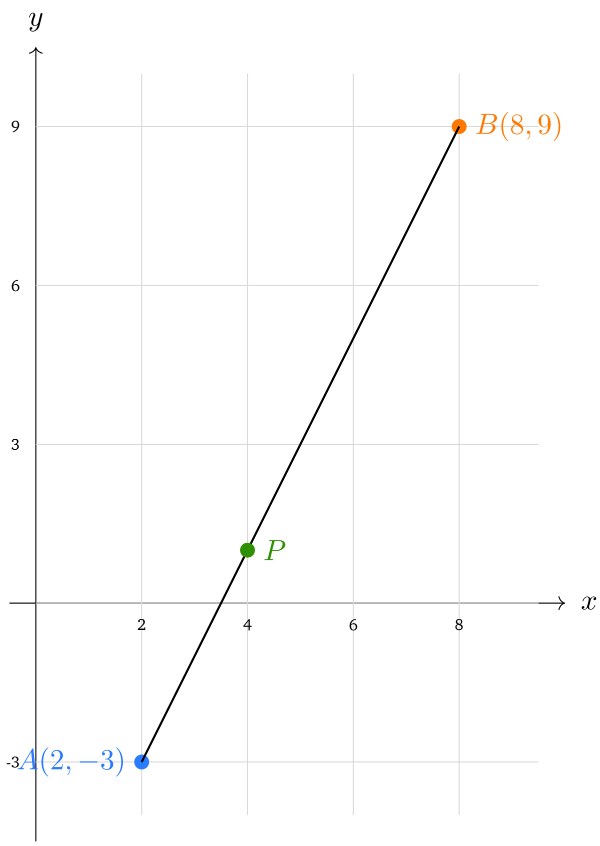
(A) 0

(B) 3

(C) 1

(D) 7

Q18. Point P divides the line segment joining $A(2, -3)$ and $B(8, 9)$ in the ratio $1 : 2$ internally. Find the coordinates of P.



(A) $(3,\ 1)$

(B) $(5, 3)$

(C) $(4, 3)$

(D) $(4, 1)$

Q19. In how many distinct ways can the letters of the word **BALLOON** be arranged?

(A) 1,260

(B) 2,520

(C) 5,040

(D) 720

Q20. Consider the sequence: $2, 6, 12, 20, 30, \ldots$ Find the nth term of this sequence.

(A) $n(n+1)+1$

(B) $n(n+1)$

(C) n^2+1

(D) n^2+n+1

Q21. A shopkeeper offers successive discounts of 20% and 15% on an article. What is the equivalent single discount?

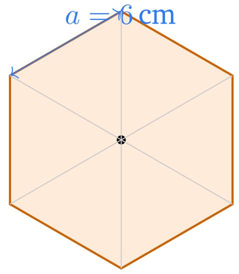
(A) 30%

(B) 31%

(C) 32%

(D) 35%

Q22. Find the area of a regular hexagon whose side length is 6 cm.



(A) $36\sqrt{3}\,\text{cm}^2$

(B) $54\sqrt{2}\,\text{cm}^2$

(C) $27\sqrt{3}\,\text{cm}^2$

(D) $54\sqrt{3}\,\text{cm}^2$

Q23. Evaluate: $\log_4 8 + \log_8 16$

(A) $\dfrac{17}{6}$

(B) $\dfrac{5}{3}$

(C) $\dfrac{7}{4}$

(D) 3

Q24. A box contains 4 red balls, 5 blue balls, and 3 green balls. One ball is drawn at random. Given that the ball drawn is not red, what is the probability that it is green?

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

(B) $\dfrac{3}{8}$

(C) $\dfrac{1}{3}$

(D) $\dfrac{5}{8}$

Q25. The HCF of two numbers is 11 and their LCM is 693. If one of the numbers is 77, find the other number.

(A) 88

(B) 99

(C) 99

(D) 121

Detailed Solutions

Sample Paper – 10 | Quantitative Ability

Q1.

Solution

Given: 8 skilled workers at Rs. 450/day and 6 unskilled workers at Rs. 300/day for 20 days.

Total wages of skilled workers:

$$W_S = 8 \times 450 \times 20 = \text{Rs. } 72{,}000$$

Total wages of unskilled workers:

$$W_U = 6 \times 300 \times 20 = \text{Rs. } 36{,}000$$

Total wages:

$$W_{\text{total}} = 72{,}000 + 36{,}000 = \text{Rs. } 1{,}08{,}000$$

Fraction paid to skilled workers:

$$\text{Fraction} = \frac{72{,}000}{1{,}08{,}000} = \frac{2}{3}$$

Answer: (C)

Q2.

Solution

Given: Train length $= 180\,\text{m}$; Platform length $= 120\,\text{m}$; Time $= 15\,\text{s}$.

When a train crosses a platform, the total distance covered equals the sum of the lengths of the train and the platform.

$$\text{Total distance} = 180 + 120 = 300\,\text{m}$$

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{300}{15} = 20\,\text{m/s}$$

Convert to km/h:

$$20\,\text{m/s} \times \frac{18}{5} = 72\,\text{km/h}$$

$\boxed{\textbf{Answer: (D)}}$

Q3.

Solution

Given: Rice A costs Rs. 40/kg; Rice B costs Rs. 55/kg; Target price = Rs. 46/kg.

Alligation method:

$$\begin{array}{ccc} 40 & & 55 \\ & 46 & \\ 55-46=9 & & 46-40=6 \end{array}$$

$$\text{Ratio A : B} = 9:6 = \mathbf{3:2}$$

Verification: $\dfrac{3\times 40+2\times 55}{5} = \dfrac{120+110}{5} = \dfrac{230}{5} = 46\,\checkmark$

$\boxed{\textbf{Answer: (A)}}$

Q4.

Solution

Given: Principal $P =$ Rs. $6{,}500$; Time $T = 4$ years; SI = Rs. $1{,}560$.

Using the Simple Interest formula:

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

$$1{,}560 = \frac{6{,}500\times R\times 4}{100}$$

$$1{,}560 = 260\,R$$

$$R = \frac{1{,}560}{260} = \mathbf{6}\%$$

$\boxed{\textbf{Answer: (B)}}$

Q5.

Solution

Given: Initial population $P_0 = 80{,}000$; Rate $r = 5\%$ per annum; $n = 2$ years.

Formula for population after n years:

$$P = P_0 \left(1 + \frac{r}{100}\right)^n$$

$$P = 80{,}000 \times \left(1 + \frac{5}{100}\right)^2 = 80{,}000 \times \left(\frac{21}{20}\right)^2$$

$$P = 80{,}000 \times \frac{441}{400} = 200 \times 441 = \mathbf{88{,}200}$$

Answer: (C)

Q6.

Solution

Given: $x + y = 9 \quad \ldots\text{(i)}$

$3x - y = 19 \quad \ldots\text{(ii)}$

Add equations (i) and (ii):

$$(x + y) + (3x - y) = 9 + 19 \implies 4x = 28 \implies x = 7$$

Substitute into (i):

$$7 + y = 9 \implies y = 2$$

Verification: $x + y = 7 + 2 = 9\,\checkmark$; $3(7) - 2 = 21 - 2 = 19\,\checkmark$

Therefore:

$$x \times y = 7 \times 2 = \mathbf{14}$$

Answer: (D)

Q7.

Solution

Evaluate: $\dfrac{\sqrt{6} + \sqrt{2}}{\sqrt{6} - \sqrt{2}}$

Multiply numerator and denominator by the conjugate $(\sqrt{6} + \sqrt{2})$**:**

$$\frac{(\sqrt{6}+\sqrt{2})^2}{(\sqrt{6})^2-(\sqrt{2})^2} = \frac{6+2\sqrt{12}+2}{6-2} = \frac{8+2\sqrt{12}}{4}$$

$$= \frac{8+4\sqrt{3}}{4} = 2+\sqrt{3}$$

$$\therefore \quad \frac{\sqrt{6}+\sqrt{2}}{\sqrt{6}-\sqrt{2}} = \mathbf{2+\sqrt{3}}$$

Answer: (A)

Q8.

Solution

Given: Parallel sides $a = 18\,\text{cm}$, $b = 10\,\text{cm}$; Height $h = 8\,\text{cm}$.

Formula for area of trapezoid:

$$\text{Area} = \frac{1}{2}(a+b)\times h = \frac{1}{2}(18+10)\times 8$$

$$= \frac{1}{2}\times 28\times 8 = \frac{224}{2} = \mathbf{112\,cm^2}$$

Answer: (B)

Q9.

Solution

Given: Radius $r = 7\,\text{cm}$; $\pi = \dfrac{22}{7}$.

Total surface area of a sphere:

$$\text{TSA} = 4\pi r^2 = 4\times\frac{22}{7}\times 7^2 = 4\times\frac{22}{7}\times 49 = 4\times 22\times 7 = 4\times 154 = \mathbf{616\,cm^2}$$

Answer: (C)

Q10.

Solution

Given: Base radius $r = 6\,\text{cm}$; Slant height $l = 10\,\text{cm}$; $\pi = \dfrac{22}{7}$.

Curved Surface Area (CSA) of cone:

$$\text{CSA} = \pi r l = \frac{22}{7} \times 6 \times 10 = \frac{22 \times 60}{7} = \frac{1320}{7}\,\text{cm}^2$$

$$\approx 188.57\,\text{cm}^2$$

Answer: (D)

Q11.

Solution

Given: $ab = 36$ and $a + b = 13$.

Use the identity:

$$a^2 + b^2 = (a+b)^2 - 2ab = 13^2 - 2(36) = 169 - 72 = \mathbf{97}$$

Note: The values a and b are determined uniquely by $a + b = 13$ and $ab = 36$. These are roots of $t^2 - 13t + 36 = 0$, i.e. $(t-9)(t-4) = 0$, so $a = 9, b = 4$ (or vice versa). Then $a^2 + b^2 = 81 + 16 = 97$. ✓

Answer: (A)

Q12.

Solution

Trailing zeros in $n!$ come from factors of 10, which require pairs of 2 and 5. Since factors of 2 are more abundant, we count factors of 5 in $30!$.

Using Legendre's formula:

$$\left\lfloor \frac{30}{5} \right\rfloor + \left\lfloor \frac{30}{25} \right\rfloor + \left\lfloor \frac{30}{125} \right\rfloor + \cdots = 6 + 1 + 0 = \mathbf{7}$$

Therefore, $30!$ has **7** trailing zeros.

Check: Numbers 5, 10, 15, 20, 25 ($= 5^2$), 30 contribute: 1+1+1+1+2+1 = 7 ✓

Answer: (B)

Q13.

Solution

Given: Total students $= 60$; Play cricket $|C| = 35$; Play football $|F| = 28$; Play both $|C \cap F| = 15$.

By the Inclusion-Exclusion Principle:

$$|C \cup F| = |C| + |F| - |C \cap F| = 35 + 28 - 15 = \mathbf{48}$$

Therefore, **48 students** play at least one sport.

Answer: (C)

Q14.

Solution

Given: Standard deck of 52 cards.

Event: Card is a king OR a queen.

$$P(\text{King}) = \frac{4}{52}, \quad P(\text{Queen}) = \frac{4}{52}$$

Since these are mutually exclusive events (a card cannot be both a king and a queen):

$$P(\text{King or Queen}) = \frac{4}{52} + \frac{4}{52} = \frac{8}{52} = \frac{2}{13}$$

Answer: (D)

Q15.

Solution

Given: $kx^2 - 6x + 4 = 0$ has real and equal roots.

Condition for equal roots: Discriminant $\Delta = 0$.

$$\Delta = b^2 - 4ac = (-6)^2 - 4(k)(4) = 36 - 16k = 0$$

$$16k = 36 \implies k = \frac{36}{16} = \frac{9}{4}$$

Verification: With $k = \frac{9}{4}$: $\Delta = 36 - 16 \times \frac{9}{4} = 36 - 36 = 0$ ✓

Answer: (A)

Q16.

Solution

Given: Total road length $= 60\,\text{km}$; Speed of A $= 20\,\text{km/h}$; Speed of B $= 10\,\text{km/h}$.

They travel towards each other, so their relative speed $= 20 + 10 = 30\,\text{km/h}$.

Time to meet:

$$t = \frac{\text{Total distance}}{\text{Relative speed}} = \frac{60}{30} = 2\,\text{h}$$

Distance covered by A in 2 h:

$$d_A = 20 \times 2 = \mathbf{40}\,\text{km from A's starting point}$$

Check: B covers $10 \times 2 = 20\,\text{km}$; $40 + 20 = 60\,\text{km}$ ✓

Answer: (B)

Q17.

Solution

Find the pattern of $7^n \pmod 8$:

$$7^1 = 7 \equiv 7 \pmod 8$$
$$7^2 = 49 \equiv 1 \pmod 8$$
$$7^3 = 343 \equiv 7 \pmod 8$$
$$7^4 \equiv 1 \pmod 8$$

The pattern has period 2: odd powers give remainder 7, even powers give remainder **1**.

Since 100 is even:

$$7^{100} \equiv 1 \pmod 8$$

Remainder = 1.

Alternative: $7 \equiv -1 \pmod 8$, so $7^{100} \equiv (-1)^{100} = 1 \pmod 8$ ✓

Answer: (C)

Q18.

Solution

Given: $A(2, -3)$, $B(8, 9)$; Ratio $m : n = 1 : 2$ (internal division).

Section formula (internal division):

$$P = \left(\frac{m \cdot x_2 + n \cdot x_1}{m+n}, \frac{m \cdot y_2 + n \cdot y_1}{m+n} \right)$$

$$P_x = \frac{1 \times 8 + 2 \times 2}{1+2} = \frac{8+4}{3} = \frac{12}{3} = 4$$

$$P_y = \frac{1 \times 9 + 2 \times (-3)}{1+2} = \frac{9-6}{3} = \frac{3}{3} = 1$$

$$\therefore P = (4, 1)$$

Answer: (D)

Q19.

Solution

Word: BALLOON $\Rightarrow$ Letters: B, A, L, L, O, O, N (7 letters total)

Repeated letters: L appears **2** times; O appears **2** times.

Number of distinct arrangements:

$$= \frac{7!}{2! \times 2!} = \frac{5040}{2 \times 2} = \frac{5040}{4} = \mathbf{1{,}260}$$

Answer: (A)

Q20.

Solution

Sequence: $2, 6, 12, 20, 30, \ldots$

Observe the pattern:

$$T_1 = 2 = 1 \times 2, \quad T_2 = 6 = 2 \times 3, \quad T_3 = 12 = 3 \times 4,$$

$$T_4 = 20 = 4 \times 5, \quad T_5 = 30 = 5 \times 6$$

General term:

$$T_n = n(n+1)$$

Verification: $T_1 = 1 \times 2 = 2\checkmark$; $T_4 = 4 \times 5 = 20\checkmark$

Answer: (B)

Q21.

Solution

Given: First discount $= 20\%$; Second discount $= 15\%$.

Let the marked price $=$ Rs. 100.

After first discount (20%): Price $= 100 \times \dfrac{80}{100} = 80$

After second discount (15%): Price $= 80 \times \dfrac{85}{100} = 68$

Net discount:

$$= 100 - 68 = 32$$

Equivalent single discount $=$ **32**$\%$

Formula method:

$$\text{Single discount} = \left(d_1 + d_2 - \frac{d_1 d_2}{100}\right)\% = \left(20 + 15 - \frac{20 \times 15}{100}\right)\% = (35-3)\% = 32\%$$

Answer: (C)

Q22.

Solution

Given: Side length of regular hexagon $a = 6\,\text{cm}$.

Formula for area of a regular hexagon:

$$\text{Area} = \frac{3\sqrt{3}}{2}a^2$$

$$= \frac{3\sqrt{3}}{2} \times 36 = \frac{108\sqrt{3}}{2} = 54\sqrt{3}\,\text{cm}^2$$

Alternative derivation: A regular hexagon is composed of 6 equilateral triangles each with side $a = 6\,\text{cm}$.

$$\text{Area of one equilateral triangle} = \frac{\sqrt{3}}{4}a^2 = \frac{\sqrt{3}}{4} \times 36 = 9\sqrt{3}$$

$$\text{Total area} = 6 \times 9\sqrt{3} = \mathbf{54\sqrt{3}\,cm^2}$$

Answer: (D)

Q23.

Solution

Evaluate: $\log_4 8 + \log_8 16$

Using change of base formula $\log_b a = \dfrac{\log_2 a}{\log_2 b}$:

$$\log_4 8 = \frac{\log_2 8}{\log_2 4} = \frac{3}{2}$$

$$\log_8 16 = \frac{\log_2 16}{\log_2 8} = \frac{4}{3}$$

Adding:

$$\log_4 8 + \log_8 16 = \frac{3}{2} + \frac{4}{3} = \frac{9}{6} + \frac{8}{6} = \mathbf{\frac{17}{6}}$$

Answer: (A)

Q24.

Solution

Given: Box contains 4 red, 5 blue, 3 green balls. Total $= 12$ balls.

Event A: Ball is green. **Event B:** Ball is not red.

Balls that are not red: $5 + 3 = 8$ balls.

Conditional probability:

$$P(\text{Green} \mid \text{Not Red}) = \frac{P(\text{Green} \cap \text{Not Red})}{P(\text{Not Red})} = \frac{P(\text{Green})}{P(\text{Not Red})} = \frac{3/12}{8/12} = \frac{3}{8}$$

(Green balls are automatically not red, so $P(\text{Green} \cap \text{Not Red}) = P(\text{Green})$.)

Answer: (B)

Q25.

Solution

Given: HCF $= 11$; LCM $= 693$; One number $= 77$.

Using the property: For two numbers a and b,

$$\text{HCF}(a,b) \times \text{LCM}(a,b) = a \times b$$

$$11 \times 693 = 77 \times b$$

$$b = \frac{11 \times 693}{77} = \frac{7{,}623}{77} = 99$$

Verification: $\text{HCF}(77, 99) = 11\checkmark$; $\text{LCM}(77, 99) = \dfrac{77 \times 99}{11} = 7 \times 99 = 693\checkmark$

Answer: (C)

Answer Key

Sample Paper – 10 | Quantitative Ability

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

Answer Balance: A – 6 | B – 6 | C – 7 | D – 6

All questions are original and modelled on IIFT MBA entrance examination pattern.

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