Mock Test 4

Quantitative Aptitude Set-4

Question 1/22

There are four billiard balls randomly located on a pool table. Each ball is of a distinct colour from among Red, Blue, Green and Yellow. The balls are all struck simultaneously, and it is observed that there are a total of 57 collisions between the balls before they all come to rest. If it is known that each collision involved exactly two balls, then which of the following statements are definitely false?

I. No ball was involved in 29 collisions or more.
II. No ball collided ten or more times with the same ball.
III. No ball was involved in more than 54 collisions.
IV. Exactly one ball collided exactly 53 times with the same ball.

Select the correct alternative from the given choices.

Options:
(a) Only I, III and IV
(b) Only I, II and IV
(c) Only II and IV
(d) Only I and II

Question 2/22

The LCM of the fractions $\frac{21}{35}$ and $\frac{3}{6}$ is how many times their HCF?

Select the correct alternative from the given choices.

Options:
(a) 4410
(b) 1470
(c) 120
(d) 30

Question 3/22

If each of A, B and C, working independently, takes 9 days, 14 days and 14 days more respectively to complete a certain job when compared to the time taken by A, B and C working together, in how much time will B and C together complete the same job?

Options:
(a) 6 days
(b) 10 days
(c) 12 days
(d) 20 days

Mock Test 4

Question 4/22

Consider the sequence $\sqrt{3}, \sqrt[3]{4}, \sqrt[4]{5} \ldots \sqrt[n-1]{n}$ and the following statements:

I. The sequence is convergent.

II. is the greatest term of the sequence.

Which of the following can be concluded about the above statements?

Options:
(a) Only I is true
(b) Only II is true
(c) Both I and II are true
(d) Neither I and II are true

Question 5/22

An expression E is defined as
$E = 2x^2 + 3y^2 - 6x + 9y + 15$
What is the least integral value of E?

(Type in your answer in the input box provided below the question.)

Question 6/22

If *n* is a natural number, then
$1! [1^2 + 3(1) + 1] + 2! [2^2 + 3(2) + 1] + \ldots\ldots\ldots + n! [n^2 + 3(n) + 1] = ?$

Options:
(a) (n + 1)! (n + 3)
(b) (n + 2)!
(c) (n + 1)! (n + 3) – 3
(d) (n + 2)! – 3

Question 7/22

If 1036 marbles are divided among four boys such that the shares of all the boys form a geometric progression, the common ratio of which is a natural number, such that each boy receives a distinct number of marbles, then find the number of marbles with the boy having the second least number of marbles.

Options:
(a) 24
(b) 16
(c) 32
(d) Cannot be uniquely determined

Question 8/22

Mock Test 4

How many non-negative roots does the equation 3^y – (2^y + 1) = 0 have?

Options:
(a) 0
(b) 1
(c) 3
(d) 2

Question 9/22

On a board, the words **'TRIUMPHANT INSTITUTE OF MANAGEMENT EDUCATION'** are flashed with neon lamps. All the five words are first switched on simultaneously and continue to flash indefinitely. While flashing, each of the five words is switched off for a period of exactly *x* seconds respectively before it is switched on again. If each of the five words is switched off exactly one second after it is switched on, how many times do all the five words flash together (for an entire second) in the first hour?

Options:
(a) 22
(b) 27
(c) 28
(d) 23

Question 10/22

A trader mixes two varieties of rice, the cost prices of which differ by ₹7 per kg, in a certain ratio, and the effective cost price of the resultant mixture is ₹11 per kg. If he instead mixes the varieties in the inverse ratio, the effective cost price will be ₹14 per kg. Find the cost price (in ₹ per kg) of the less expensive variety of rice.

Options:
(a) 7
(b) 8
(c) 10
(d) 9

Question 11/22

In a right-angled triangle, the length of the median drawn from the vertex including the right angle is *m*. If the lengths of the other two medians are 3 and 5 respectively, find the value of m^2.

(Type in your answer in the input box provided below the question.)

Question 12/22

If the quadratic equation
$x^2 – (a^2 + 2)x + (a^2 – 5a + 5) = 1$
has roots of opposite signs, find the range of *a*.

Options:
(a) (–5, 9)
(b) (2, 8)

(c) R – (–3, 2)
(d) (1, 4)

Question 13/22

Ravi wrote two numbers, M and N, where M is a two-digit number, with non-zero digits, in base 8, while N is another two-digit number, also in base 8, obtained by reversing the order of the digits in M. If $M^2 - N^2 = P^2$, where P is a natural number, in base 10, find the sum of the digits of P.

(Type in your answer in the input box provided below the question.)

Question 14/22

Chris and his wife invited a total of ten families on their marriage anniversary. While the host family had just the two members, each family invited consisted of four members. If every person in the party shook hands exactly once with every other person belonging to a different family, then find the total number of handshakes that took place in the party.

(Type in your answer in the input box provided below the question.)

Question 15/22

In a cyclic quadrilateral ABCD, the sides AB, BC and CD measure 7 cm, 24 cm and 20 cm respectively. If the diagonal AC passes through the centre of the circle, find the area of the quadrilateral (in sq. cm).

(Type in your answer in the input box provided below the question.)

Question 16/22

Ankush wanted to buy 15 shirts of a specific brand. He went to a shopping mall where there were four shops, A, B, C and D, all selling shirts of the brand he was looking for. Each shirt was priced at ₹850 at each of these shops but there were some discount schemes on offer in each shop as given below:

- **Shop A**: Buy 3, get 2 free
- **Shop B**: Two successive discounts of 10% and 30%
- **Shop C**: Flat 45% discount
- **Shop D**: Buy 2, get 1 free

Which shop was offering the best deal for Ankush?

Options:
(a) Shop A
(b) Shop B
(c) Shop C
(d) Shop D

Question 17/22

Mock Test 4

Vineet cut out two identical triangular pieces of cardboard, each of area 300 sq.cm, and placed both of them flatly upon the surface of a table, one on top of the other, such that the triangles perfectly overlap each other. Now, if he rotated one of the two triangles by 180°, about a vertical axis passing through its centroid, find the area that is common to both the triangles.

Options:
(a) 200 sq.cm
(b) 150 sq.cm
(c) 100 sq.cm
(d) 133 sq.cm

Question 18/22

If x is real and greater than 1, then what is the value of the following expression?

$$\frac{x^2-x-6}{x^2+x-2}+\frac{x^2+2x-8}{x^2+3x-4}+\frac{2x^2-x-1}{x^2-2x+1}$$

Options:
(a) 3
(b) 4
(c) 1
(d) None of the above

Question 19/22

Ram bought a few mangoes and apples spending an amount of at most ₹2000. If each mango costs ₹4 and each apple costs ₹6, and Ram bought at least one fruit of each type, how many different possible amounts could he have spent in purchasing the fruits?

(Type in your answer in the input box provided below the question.)

Question 20/22

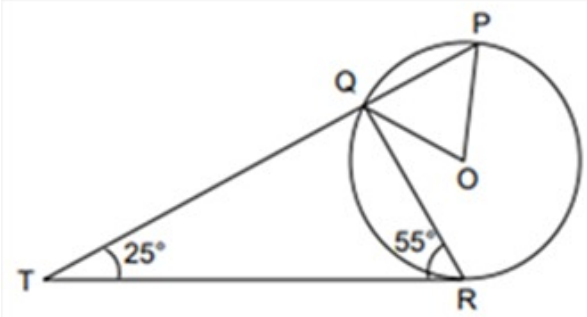
In the relation $y = \frac{Bx^2 + Cx}{Dx^2}$, B, x and D are positive, whereas C is negative. If x is decreased, while B, C and D are kept constant, then y

Options:
(a) remains constant
(b) increases
(c) decreases
(d) decreases and then increases

Mock Test 4

Question 21/22

In the figure below, P, Q and R are points on a circle with centre O. The tangent to the circle at R intersects the secant PQ at T. If QRT = 55° and QTR = 25°, find POQ.



Options:
(a) 110°
(b) 100°
(c) 90°
(d) 50°

Question 22/22

Manga, Ranga and Banga have some marbles with each of them. Five times the number of marbles with Ranga equals seven times the number of marbles with Manga, while five times the number of marbles with Manga equals seven times the number of marbles with Banga. What is the minimum number of marbles that can be there with all three of them put together?

Options:
(a) 113
(b) 109
(c) 93
(d) 97

Mock Test 4

Answer Key

1. **(b) Only I, II and IV**
2. **(d) 30**
3. **(b) 10 days**
4. **(c) Both I and II are true**
5. **4**
6. **(a) (n + 1)! (n + 3)**
7. **(a) 24**
8. **(d) 2**
9. **(d) 23**
10. **(d) 9**
11. **25**
12. **(d) (1, 4)**
13. **(c) 3**
14. **800**
15. **234**
16. **(c) Shop C**
17. **(a) 200 sq.cm**
18. **(b) 4**
19. **995**
20. **(c) decreases.**
21. **(c) 90°**
22. **(b) 109**