Rewarding Career   **Test Code: MTNCL – IV**   **Questions: 25**   **Max. Time: 1 Hr.**

1. Which of the following is false if A, B, C, D are sets.
   (a) $(A \times B) \cap (C \times D) = (A \cap C) \times (B \cap D)$
   (b) $A \times B = B \times A \Leftrightarrow A = B$
   (c) $A \times (B - C) = (A \times B) - (A \times C)$
   (d) none of these

2. Find the third term of the series, if sum of n terms of it is $5n^2 + 2n$.
   (a) 27   (b) 30
   (c) 24   (d) 17

3. If the AM and GM of two numbers are in the ratio m:n then numbers are in the ratio
   (a) $m + \sqrt{n^2 + m^2} : m - \sqrt{m^2 - n^2}$
   (b) $m + \sqrt{m^2 - n^2} : m - \sqrt{m^2 - n^2}$
   (c) $m + \sqrt{n^2 - m^2} : m - \sqrt{n^2 - m^2}$
   (d) none of these

4. How many terms are common in the two series 13, 17, 21, 25, 29,....417 and 16, 21, 26, 31, ...466
   (a) 21   (b) 19   (c) 20   (d) none

5. The line AB is 6m in length and is tangent to the inner one of the two concentric circles at point C. It is known that radii of the two circles are integers. Find radius of the outer circle.

   (a) 5m
   (b) 4m
   (c) 6m
   (d) 3m

6. Out of 100 families in the neighbourhood, 50 own radios, 75 have TV's, 25 have VCR's. Only 10 families have all the three, and each VCR owner also have a TV. If 25 families have radio only, how many have only TV?
   (a) 30   (b) 35
   (c) 40   (d) 45

7. If $x = (1 + 0.0001)^{10000}$, then the value of $[x]$ is
   (a) 10,000   (b) 1
   (c) 2   (d) 3

8. A horse and a carriage together cost Rs. 8000. If by selling the horse at a profit of 10% and the carriage at a loss of 10% a total profit of 2.5% is made, then what is the cost price of the horse?
   (a) Rs. 3,000   (b) Rs. 3,500
   (c) Rs. 4,000   (d) Rs. 5,000

9. The difference between the sum of two numbers and their product is 20. Find the difference between these two numbers.
   (a) 10   (b) 15
   (c) 30   (d) data inadequate

10. If $P(n,r) = n!/(n - r)!$ and $C(n,r) = P(n,r)/r!$, then which of the following statements are true?
    (a) $P(n,r) = P(n - 1,r) + r.P(n - 1, r - 1)$
    (b) $1 + 1.P(1,1) + 2.P(2,2) + 3.P(3,3) + .. + n.P(n,n) = (n + 1)!$
    (c) If n is even then the greatest value of C (n, r) (r = 0, 1, 2, ...n) is C(n, n/2)
    (d) All of these

11. Three circles, of diameter 10, 8, 6 respectively are touching each other. What is the are of the triangle formed by joining the centres of the three circles by straight lines?
    (a) $12\sqrt{5}$ (b) $6\sqrt{5}$ (c) $24\sqrt{5}$ (d) $60\sqrt{5}$

12. A hollow rectangular vessel without lid is available for storing water. The outer dimensions are length 22, breadth 12, and height 11. The wall thickness of the material is one. What is the capacity of the vessel.
    (a) 2904   (b) 2310   (c) 2000   (d) 2200

13. Nishu buys some mangoes for Rs. 1.20. But because they are small in size, she makes the shopkeeper throw 2 extra mangoes at the same price. This deal has made the shopkeeper lose 10 paise a dozen over the
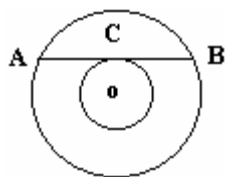
price initially settled. How many mangoes does Nishu buy?

(a) 16 (b) 18 (c) 19 (d) 15

14. Find the perimeter of ABDC.
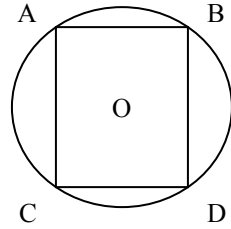
Given CD = 6 and AB, AC and CD subtends 60°, 120° and 60° angles at the center.

(a) $12\left(1+\sqrt{3}\right)$ (b) $12\left(1+\sqrt{3}/2\right)$

(c) 12 (d) none of these

15. PAPER is coded as KZKVI, code for PENCIL will be

(a) KVLMTO (b) KVMXRO

(c) KVDCON (d) None

16. Sunil can make a table is 2/3rd of the day while Abhishek can do it in 2/5th of a day. How many tables could both of them make in a day?

(a) 1.07 (b) 4 (c) 3 (d) None

17. In a race, the speed of an athlete at the end of each lap is 2/3rd of its speed at the beginning of the lap. If the speed at the end of 4th lap was 16m/s, the initial speed of the athlete was

(a) 80 m/s (b) 81 m/s

(c) 79 m/s (d) None

18. x is a prime number. $x^2 + 5$ is also a prime number. How many different values can x have?

(a) 2 (b) 1 (c) 3 (d) None

19. What is the difference between the radii of circumcircle and incircle of an equilateral triangle of side $2\sqrt{3}$ cm.

(a) $2\sqrt{3}$ (b) $\sqrt{3}$ (c) 1 (d) 2

20. The figure $A_1B_1C_1D_1$ is formed by joining the midpoints of the sides of square ABCD. The figure $A_2B_2C_2D_2$ is derived by the same way as $A_1B_1C_1D_1$ from $A_1B_1C_1D_1$ and so on. What is the ratio of areas of ABCD and $A_{10}B_{10}C_{10}D_{10}$.

(a) 32 (b) 100 (c) 1024 (d) 64

21. The maximum value of $\sin\alpha\cos\alpha$ is

(a) 1 (d) 1/2 (c) $1/\sqrt{2}$ (d) $\dfrac{\sqrt{3}}{2}$

22. On the level ground, the angle of elevation of the top of the twer is 30 degree, on moving 20 m nearer, the angle became 60 degree, height of the tower is

(a) $20\sqrt{3}$ (b) $10\sqrt{3}$ (c) $10\left(\sqrt{3}-1\right)$ (d) None

23. Out of 18 points in a plane, no three are collinear except five points, which are collinear. The number of straight lines that can be formed by joining them is

(a) 113 (b) 144 (c) 153 (d) None

24. If $(100)! = 3^k.m.m, k \in N,$ then maximum value of k is

(a) 45 (b) 48 (c) 49 (d) None

25. How many values of x satisfy the equation

$$\log(2x) = (1/4)\log(x-15)^4$$

(a) 1 (b) 2 (c) 0 (d) more than 2