CODE : A-M616112-M	**I Semester Exam 2025-26**	3 x 680
Std. : XI - Sci	Sub. : MATHEMATICS AND STATISTICS	Marks : 50
Date :	Roll No. _____	Time : 2.30 hrs.

Instructions :

Question paper consists of 13 questions divided into 4 sections namely A, B, C and D.

1) ***Section A*** - *Q. No 1 contains 5 MCQ carrying 2 marks each.*
   Q. No. 2 contains 4 Very short answer type carrying 1 mark each.
2) ***Section B*** - *Q. No. 3 to Q. No. 13 contains **11** questions carrying 2 marks each out of which 8 are to be attempted.*
3) ***Section C*** - *Q. No. 14 to Q. No. 19 contains **6** question carrying 3 marks each out of which 4 are to be attempted.*
4) ***Section D*** - *Q. No. 20 to Q. No. 23 are of **4** marks each out of which 2 are to be attempted.*

- *Figures to the right indicate full marks.*
- *Start each section with new page.*

SECTION - A

Q. 1 ***Select and write the most appropriate answer from the given alternatives for each sub-questions.*** **10**

i) *If the vertices of a triangle are (5 , 8), (5 , 0) and (1 , 0) then Area of triangle is _____*

a) 16 sq. units b) – 16 sq. units c) 32 sq. units d) – 32 sq. units

ii) *If A and B are subsets of the universal set X and n(X) = 50, n(A) = 35, n(B) = 20, n(A' ∩ B') = 5 then n(A ∪ B) = _____*

a) 50 b) 45 c) 30 d) 25

iii) *If* $\left(x + \frac{1}{3} , \frac{y}{3} - 1\right) = \left(\frac{1}{2} , \frac{3}{2}\right)$, *then the value of x = _____ and y = _____.*

a) $x = 6 , y = 15$ b) $x = 9 , y = 4$

c) $x = \frac{1}{6}, y = \frac{15}{2}$ d) $x = \frac{1}{9}, y = \frac{4}{3}$

iv) *If* $r = \frac{1}{3}$, $a = 9$ *then* $t_7 =$ _____

a) 81 b) $\frac{1}{18}$ c) 18 d) $\frac{1}{81}$

v) *If G.M. = 4 and H.M.* $= \frac{16}{5}$ *then A.M. =* _____

a) $\frac{5}{4}$ b) $\frac{4}{5}$ c) $\sqrt{5}$ d) 5

Q. 2 ***Answer the following questions.*** **4**

i) *Without expanding evaluate the following determinant.*

$$\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix}$$

ii) $\sum_{r=1}^{n} r^3$

iii) Describe the following set in Roster form.
$A = \{ x \mid x \text{ is a letter of the word 'MOVEMENT'} \}$

iv) If $A = \{a, b, c\}$, $B = \{x, y\}$, find $A \times B$.

SECTION - B

Attempt Any Eight of the following questions. **16**

Q. 3 Examine the consistency of the following equation.

$2x - y + 3 = 0$

$3x + y - 2 = 0$

$11x + 2y - 3 = 0$

Q. 4 Write the relation in the Roster form
$R = \{ (a, a^2) \mid a \text{ is a prime number less than } 15. \}$

Q. 5 Describe the following set in Set-Builder form.
$A = \{0\}$

Q. 6 If $P = \{1, 2, 3\}$ and $Q = \{1, 4\}$, find $P \times Q$ and $Q \times P$.

Q. 7 Write down the power set of $A = \{1, 2, 3\}$

Q. 8 Find the value of x.

If $\begin{vmatrix} x^2 - x + 1 & x + 1 \\ x + 1 & x + 1 \end{vmatrix}$.

Q. 9 For what values of x, the terms $\frac{4}{3}, x, \frac{4}{27}$ are in G.P. ?

Q. 10 Examine the collinearity of the following set of points.
$A(3, -1)$, $B(0, -3)$, $C(12, 5)$

Q. 11 If the common ratio of a G.P. is $\frac{2}{3}$ and sum to infinity is 12. Find the first term.

Q. 12 Find the value of determinant. $\begin{vmatrix} 3 & -4 & 5 \\ 1 & 1 & -2 \\ 2 & 3 & 1 \end{vmatrix}$

Q. 13 Verify whether the following sequence are in H.P .

$\frac{1}{3}, \frac{1}{5}, \frac{1}{7}, \frac{1}{9}, \ldots\ldots$

SECTION - C

Attempt Any Four of the following questions. 12

Q. 14 Find the sum $\sum_{r=1}^{n} (r+1).(2r-1)$

Q. 15 Write the following intervals in Set-Builder form.

i) $(-3, 0)$

ii) $[6, 12]$

iii) $(2, 5]$

Q. 16 Find the sum of n terms.

$8 + 88 + 888 + 8888 + \ldots\ldots\ldots\ldots$

Q. 17 Find the area of quadrilateral whose vertices are $A(-3, 1)$, $B(-2, -2)$, $C = (3, -1)$ & $D = (1, 4)$.

Q. 18 If $A = \{1, 2, 3, 4\}$

$B = \{3, 4, 5, 6\}$

$C = \{4, 5, 6, 7, 8\}$ and universal set

$X = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

then verify $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$

Q. 19 If $\begin{vmatrix} 4+x & 4-x & 4-x \\ 4-x & 4+x & 4-x \\ 4-x & 4-x & 4+x \end{vmatrix} = 0$ then find the values of x.

SECTION - D

Attempt Any Two of the following questions. 8

Q. 20 Find minor and cofactor of elements of determinant $D = \begin{vmatrix} 2 & -1 & 3 \\ 1 & 2 & -1 \\ 5 & 7 & 2 \end{vmatrix}$

Q. 21 There are 260 persons with a skin disorder. If 150 had been exposed to the-chemical A, 74 to the chemical B and 36 to both chemical A and B, find the number of person exposed to -

i) Chemical A but not Chemical B

ii) Chemical B but not Chemical A

iii) Chemical A or Chemical B.

Q. 22 If $\frac{1\times2 + 2\times3 + 3\times4 + 4\times5 + \ldots\ldots \text{ up to n terms}}{1 + 2 + 3 + 4 \ldots\ldots \text{ up to n terms}} = \frac{100}{3}$ find n.

Q. 23 For a sequence if $Sn = 2.(3^n - 1)$. Find the n^{th} term hence show that the sequence is a G.P