BOARD QUESTION PAPER: MARCH 2022

Mathematics - I

Time: 2 Hours **Max. Marks: 40**

Notes:

i. *All* questions are compulsory.
ii. Use of calculator is not allowed.
iii. The numbers to the right of the questions indicate full marks.
iv. In case of MCQ's [Q. No. 1(A)] only the first attempt will be evaluated and will be given credit.
v. For every MCQ, the correct alternative (A), (B), (C) or (D) with subquestion number is to be written as an answer.

Q.1. (A) Four alternative answers are given for every subquestion. Choose the *correct* alternative and write its alphabet with subquestion number. **[4]**

i. Which one is the quadratic equation?

(A) $\frac{5}{3} - 3 = x^2$ (B) $x(x + 5) = 2$

(C) $n - 1 = 2n$ (D) $\frac{1}{x^2}(x + 2) = x$

ii. First four terms of an A.P. are _____, whose first term is –2 and common difference is –2.

(A) –2, 0, 2, 4 (B) –2, 4, –8, 16

(C) –2, –4, –6, –8 (D) –2, –4, –8, –16

iii. For simultaneous equations in variables x and y, $D_x = 49$, $D_y = -63$, $D = 7$, then what is the value of y?

(A) 9 (B) 7

(C) –7 (D) –9

iv. Which number cannot represent a probability?

(A) 1.5 (B) $\frac{2}{3}$

(C) 15% (D) 0.7

(B) Solve the following subquestions: **[4]**

i. To draw a graph of $4x + 5y = 19$, find y when $x = 1$.

ii. Determine whether 2 is a root of quadratic equation $2m^2 - 5m = 0$.

iii. Write second and third term of an A.P. whose first term is 6 and common difference is –3.

iv. Two coins are tossed simultaneously. Write the sample space 'S'.

Q.2. (A) Complete the following activities and rewrite it (any *two*): **[4]**

i. Complete the activity to find the value of the determinant.

Activity:

$$\begin{vmatrix} 2\sqrt{3} & 9 \\ 2 & 3\sqrt{3} \end{vmatrix} = 2\sqrt{3} \times \square - 9 \times \square$$

$$= \square - 18$$

$$= \square$$

ii. Complete the following activity to find the 19th term of an A.P., 7, 13, 19, 25, ……. :

Activity:

Given A.P. : 7, 13, 19, 25, ……

Here first term a = 7; t_{19} = ?

$t_n = a + (\square)\, d$ ……. (formula)

$\therefore \quad t_{19} = 7 + (19 - 1)\ \square$

$\therefore \quad t_{19} = 7 + \square$

$\therefore \quad t_{19} = \square$

iii. If one die is rolled, then to find the probability of an event to get prime number on upper face, complete the following activity.

Activity:

One die is rolled.

'S' is sample space.

$S = \{\square\}$

$\therefore \quad n(S) = 6$

Event A: Prime number on the upper face.

$A = \{\square\}$

$\therefore \quad n(A) = 3$

$\therefore \quad P(A) = \frac{\square}{n(S)}$ …….. (formula)

$\therefore \quad P(A) = \square$

(B) Solve the following subquestions (any *four*): **[8]**

i. To solve the following simultaneous equations by Cramer's rule, find the value of D_x and D_y.

$3x + 5y = 26$

$x + 5y = 22$

ii. A box contains 5 red, 8 blue and 3 green pens. Rutuja wants to pick a pen at random. What is the probability that the pen is blue?

iii. Find the sum of first 'n' even natural numbers.

iv. Solve the following quadratic equations by factorisation method:

$x^2 + x - 20 = 0$

v. Find the values of $(x + y)$ and $(x - y)$ of the following simultaneous equations:

$49x - 57y = 172$

$57x - 49y = 252$

Q.3. (A) Complete the following activity and rewrite it (any *one*): **[3]**

i. One of the roots of equation $kx^2 - 10x + 3 = 0$ is 3. Complete the following activity to find the value of k.

Activity:

One of the roots of equation

$kx^2 - 10x + 3 = 0$ is 3

Putting $x = \square$ in the above equation

$\therefore \quad k(\square)^2 - 10 \times \square + 3 = 0$

$\therefore \quad \square - 30 + 3 = 0$

$\therefore \quad 9k = \square$

$\therefore \quad k = \square$

ii. A card is drawn at random from a pack of well shuffled 52 playing cards. Complete the following activity to find the probability that the card drawn is –
Event A: The card drawn is an ace.
Event B: The card drawn is a spade.
Activity:
'S' is the sample space.
$\therefore$ n(S) = 52
Event A: The card drawn is an ace.
$\therefore$ n(A) = $\square$
$\therefore$ P(A) = $\square$ ……..(formula)
$\therefore$ P(A) = $\frac{\square}{52}$
$\therefore$ P(A) = $\frac{\square}{13}$

Event B: The card drawn is a spade.
$\therefore$ n(B) = $\square$
$P(B) = \frac{n(B)}{n(S)}$
$\therefore$ P(B) = $\frac{\square}{4}$

(B) Solve the following subquestions (any *two*): **[6]**

i. Solve the simultaneous equations by using graphical method:
$x + 3y = 7$
$2x + y = -1$

ii. There is an auditorium with 27 rows of seats. There are 20 seats in the first row, 22 seats in the second row, 24 seats in the third row and so on. Find how many total seats are there in the auditorium?

iii. Sum of the present ages of Manish and Savita is 31 years. Manish's age 3 years ago was 4 times the age of Savita at that time. Find their present ages.

iv. Solve the following quadratic equation using formula:
$x^2 + 10x + 2 = 0$

Q.4. Solve the following subquestions (any *two*): **[8]**

i. If 460 is divided by a natural number, then quotient is 2 more than nine times the divisor and remainder is 5. Find the quotient and divisor.

ii. If the 9^{th} term of an A.P. is zero, then prove that the 29^{th} term is double the 19^{th} term.

iii. The perimeter of an isosceles triangle is 24 cm. The length of its congruent sides is 13 cm less than twice the length of its base. Find the lengths of all sides of the triangle.

Q.5. Solve the following subquestions (any *one*): **[3]**

i. A bag contains 8 red and some Blue balls. One ball is drawn at random from the bag. If ratio of probability of getting red ball and blue ball is 2 : 5, then find the number of blue balls.

ii. Measures of angles of a triangle are in A.P. the measure of smallest angle is five times of common difference. Find the measures of all angles of a triangle.
(Assume the measures of angles as a, a + d, a + 2d)