MT

2018 ____ ____ 1100 **Seat No.** | | | | | | | |

MT - MATHEMATICS (71) Algebra - SEMI PRELIM - II - PAPER - II

Time : 2 Hours **(Pages 5)** **Max. Marks : 40**

Q.1. (A) Solve the following : (Any 4) **4**

1. Write the set in Roster form : Seven basic sounds of a sargam (sur).
2. Check whether the given rational number has terminating or recurring type of decimal form : $\frac{2}{11}$
3. Write the polynomial in index form.
   (1, 2, 3)
4. By using variables x and y form any five linear equations in two variables.
5. Solve: $|7| \times |-4|$
6. Write any three rational numbers between the two numbers given below.
   –2.3 and –2.33

Q.1. (B) Solve the following : (Any 2) **4**

1. Solve the following simultaneous equations.
   $x + y = 4$; $2x - 5y = 1$
2. Simplify: $\sqrt{125} \div \sqrt{50}$
3. If $P \subseteq M$, then the value of $P \cap (P \cup M)$?

Q.2. (A) Solve the following : **4**

1. The roots of $x^2 + kx + k = 0$ are real and equal, then value of k is ?
   (A) 0 (B)4 (C) 0 or 4 (D)2
2. To solve $x + y = 3$; $3x - 2y - 4 = 0$ by determinant method, then value of D is ?
   (A) 5 (B) 1 (C) – 5 (D) – 1

3. Which number cannot represent a probability?
   (A) $\frac{2}{3}$ (B) 1.5 (C) 15% (D) 0.7

4. For $\sqrt{2}\,x^2 - 5x + \sqrt{2} = 0$, find the value of the discriminant.
   (A) –5 (B) 17 (C) $\sqrt{2}$ (D) $2\sqrt{2} - 5$

Q.2. (B) Solve the following : (Any 2) **4**

1. If two coins are tossed, find the probability of the following events :
   (i) Getting atleast one head
   (ii) Getting no head

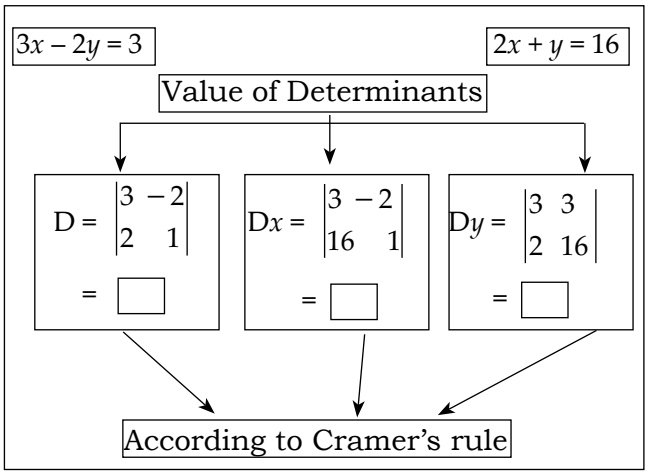
2. Find the value of D_x and D_y for the following equations.
   $4x + 3y - 4 = 0$; $6x = 8 - 5y$

3. Determine the nature of roots from the following quadratic equations.
   $3x^2 - 5x + 7 = 0$

Q.3. (A) Solve the following activity : (Any 2) **4**

1. Complete the following activity.

Solution:



$x = \frac{\square}{\square}$

$\therefore\ x = \square$

$y = \frac{\square}{\square}$

$\therefore y = \square$

$\therefore$ **$(x, y) = (\square, \square)$ is the solution.**

2. $x^2 + 6x + 5 = 0$

Solution:

$x^2 + 6x + 5 = 0$

Comparing with $ax^2 + bx + c = 0$, we get,

$a = 1,\ b = 6,\ c = 5$

$\therefore\ b^2 - 4ac = (6)^2 - 4 \times 1 \times 5$

$= \square - \square$

$= \square$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$\therefore\ x = \frac{-6 \pm \square}{2 \times 1}$

$\therefore\ x = \frac{-6 \pm \square}{2}$

$\therefore\ x = \frac{-6 + \square}{2}$ *or* $x = \frac{-6 - \square}{2}$

$\therefore\ x = \frac{-2}{2}$ *or* $x = \frac{-10}{2}$

$\therefore\ x = -1$ *or* $x = -5$

$\therefore$ **The roots of given quadratic equation are $\square$ and $\square$**

3. **Form a 'Road safety committee' of two, from 2 boys (B_1, B_2) and 2 girls(G_1, G_2). Complete the following activity to write the sample space.**

Solution:

(1) Committee with 2 boys = $\square$

(2) Committee with 2 girls = $\square$

(3) Committee of one boy and one girl = $\square$, $\square$, $\square$, $\square$

$\therefore$ Sample space = $\{B_1B_2, B_1G_1, B_1G_2, B_2G_1, B_2G_2, G_1G_2\}$

Q.3. (B) Solve the following activity : (Any 2) **4**

1. Solve using Elimination by substitution method.
   $2x - 3y = 9$; $2x + y = 13$

2. Form the quadratic equation from the roots given below :
   3 and –10

3. A bag contains 3 red, 3 white and 3 green balls. One ball is taken out of the bag at random. What is the probability that the ball drawn is -
   (i) red (ii) not red

Q.4. Solve the following : (Any 3) **9**

1. The denominator of a fraction is 4 more than twice the numerator. Denominator becomes 12 times the numerator, if both the numerator and denominator are reduced by 6. Find the fraction.

2. Solve the following quadratic equation by completing the square method.
   $x^2 + 2x - 5 = 0$

3. Write sample space 'S' and number of sample points $n(S)$ for the following experiment. Also write events A,B,C in the set form and write $n(A), n(B), n(C)$.
   One die is rolled,
   Event A : Even number on the upper face.
   Event B : Odd number on the upper face.
   Event C : Prime number on the upper face.

4. Solve the following simultaneous equations.
   $\frac{2}{x} + \frac{3}{3y} = \frac{1}{6}$; $\frac{3}{x} + \frac{2}{y} = 0$

Q.5 Solve the following : (Any 1) **4**

1. Solve the following simultaneous equations graphically.
   $3x - 4y = -7$; $5x - 2y = 0$

2. Mr. Kasam runs a small business of making earthen pots. He makes certain number of pots on daily basis. Production cost of each pot is ₹ 40 more than 10 times total number of pots, he makes in one day. If production cost of all pots per day is ₹ 600, find production cost of one pot and number of pots he makes per day.

Q.6 Solve the following : (Any 1) **3**

1. Sum of the roots of a quadratic equation is double their product. Find k if equation is $x^2 - 4kx + k + 3 = 0$.

2. If two dice are rolled simultaneously, find the probability of the following events.
   (i) The sum of the digits on the upper faces is at least 10.
   (ii) The sum of the digits on the upper faces is 33.
   (iii) The digit on the first die is greater than the digit on second die.

Best of Luck