MT

2017 ____ ____ 1100 **Seat No.** | | | | | | | |

MT - MATHEMATICS (71) ALGEBRA - SEMI PRELIM - II - PAPER - 5 (E)

Time : 2 Hours **(Pages 3)** **Max. Marks : 40**

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

(i) Write the first five terms of the following Arithmetic Progression where, the common difference 'd' and the first term 'a' are given : a = 5, d = 2

(ii) Find the values of a, b, c for following quadratic equation by comparing with standard form : $2x^2 - x + 3 = 0$

(iii) Find the value of the following determinant :

$$\begin{vmatrix} -3 & 8 \\ 6 & 0 \end{vmatrix}$$

(iv) Find the first five terms of the following sequence, whose 'n^{th}' term is given : $t_n = n^3$.

(v) Determine whether the given value of 'x' is a root of given quadratic equation : $x^2 - 4x + 4 = 0$, x = 0.

(vi) If 12x + 13y = 29 and 13x +12y = 21, Find x + y.

Q.2. Solve the following : (Any 4) **8**

(i) Find the first three terms of the sequence for which S_n is given below : $\frac{n(n+1)(2n+1)}{6}$

(ii) Solve the following quadratic equation by factorization method : $21x = 196 - x^2$.

(iii) What is the equation of Y - axis? Hence, find the point of intersection of Y - axis. and the line $y = 3x + 2$.

(iv) Solve the following simultaneous equations using Cramer's rule : $3x + y = 1$; $2x = 11y + 3$.

(v) If one root of the quadratic equation $x^2 - 7x + k = 0$ is 4, then find the value of k.

(vi) A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 and these are equally likely outcomes. What is the probability that it will point at : an odd number

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

(i) How many three digit natural numbers are divisible by 4 ?

(ii) Solve the following quadratic equation by completing square : $z^2 + 4z - 7 = 0$.

(iii) In a right angled triangle, one of the acute angle exceeds the other by 20°. Find the measure of both the acute angles in the right angled triangle.

(iv) Two coins are tossed. Find the probability of the events.
(a) head appears on both the coins.
(b) head does not appear.

(v) Solve the following quadratic equation by using formula : $7x + 1 = 6x^2$

Q.4. Solve the following : (Any 2) **8**

(i) Find three consecutive terms in an A.P. whose sum is – 3 and the product of their cubes is 512.

(ii) Solve the following simultaneous equations using graphical method : $x + 2y = 5$; $y = -2x - 2$.

(iii) In the following experiment write the sample space S, number of sample points n (S), events P, Q, R using set and n (P), n (Q) and n (R). Find the events among the events defined above which are : complementary events, mutually exclusive events and exhaustive events.
Three coins are tossed simultaneously :
P is the event of getting at least two heads.
Q is the event of getting no head.
R is the event of getting head on second coin.

Q.5. Solve the following : (Any 2) **10**

(i) Solve the following simultaneous equations :

$\frac{1}{x} + \frac{1}{y} = 8, \frac{4}{x} - \frac{2}{y} = 2$

(ii) For an A.P. given below find t_{20} and S_{10}. $\frac{1}{6}, \frac{1}{4}, \frac{1}{3}, ...$

(iii) Durga's mother gave some 10 rupee notes and some 5 rupee notes to her, which amounts to Rs. 190. Durga said, 'if the number of 10 rupee notes and 5 rupee notes would have been interchanged, I would have Rs. 185 in my hand.' So how many notes of rupee 10 and rupee 5 were given to Durga ?

Best Of Luck