MT

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

MT - MATHEMATICS (71) ALGEBRA - SEMI PRELIM - II - PAPER - 1 (E)

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

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

(i) For the given sequence, find the next four terms :
3, 9, 27, 81, ...

(ii) State whether the following equation is quadratic or not :
$(y - 2)(y + 2) = 0$.

(iii) Find the value of the following determinant :

$$\begin{vmatrix} 1.2 & 0.03 \\ 0.57 & -0.23 \end{vmatrix}$$

(iv) Is the following list of numbers an Arithmetic Progression ? Justify.
3, 6, 12, 24, ...

(v) Determine whether the given value of 'x' is a root of given quadratic equation.
$x^2 - 2x + 1 = 0$, $x = 1$

(vi) If $D_x = -18$ and $D = 3$ are the values of the determinants for certain simultaneous equations in x and y, find x.

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

(i) Find the first three terms of the sequence for which S_n is given below : $S_n = n^2(n + 1)$

(ii) Solve the following quadratic equation by factorization method :
$x^2 + 10x + 24 = 0$.

(iii) Examine whether the point (2, 5) lies on the graph of the equation :
$3x - y = 1$.

(iv) Solve the following simultaneous equations using Cramer's rule :
$3x - y = 7$; $x + 4y = 11$.

(v) State whether k is the root of the given equation $y^2 - (k - 4)y - 4k = 0$.

(vi) Two coins are tossed. Find the probability of the event.
Head appears on both the coins.

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

(i) For an A. P. if $t_4 = 12$, and $d = -10$, then find its general term.

(ii) Solve the following quadratic equation by completing square :
$x^2 + 8x + 9 = 0$.

(iii) If the sum of two numbers is divided by 15, the quotient is 2 and the remainder is 10. If the difference of the same numbers is divided by 3 then the quotient is 4 and the remainder is 2. Find the number.

(iv) 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.
Form two digit numbers using the digits 0, 1, 2, 3, 4, 5 without repeating the digits.
P is the event that the number so formed is even.
Q is the event that the number so formed is divisible by 3.
R is the event that the number so formed is greater than 50.

(v) Solve the following quadratic equation using formula :
$x^2 + 3x - 10 = 0$

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

(i) Find the sum of all odd natural numbers from 1 to 150.

(ii) Solve the following simultaneous equations using graphical method :

$2x + y = 6$; $\frac{4 - 3x}{4} = y$

(iii) Two dice are thrown, find the probability of getting :
(a) The sum of the numbers on their upper faces is divisible by 9.
(b) The sum of the numbers on their upper faces is at the most 3.
(c) The number on the upper face of the first die is less than the number on the upper face of the second die.

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

(i) Solve the following simultaneous equations :
$\frac{16}{x+y} + \frac{2}{x-y} = 1; \frac{8}{x+y} - \frac{12}{x-y} = 7$

(ii) A village has 4000 literate people in the year 2010 and this number increases by 400 per year. How many literate people will be there till the year 2020 ? Find a formula to know the number of literate people after n years ?

(iii) Students of a school were made to stand in rows for drill. If 3 students less were standing in each row, 10 more rows were required and if 5 students more were standing in each row then the number of rows was reduced by 10. Find the number of students participating in the drill.

Best Of Luck