MT

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

MT - MATHEMATICS (71) ALGEBRA - SEMI PRELIM - II - PAPER - 6 (E)

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

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

(i) Is the following list of numbers an Arithmetic Progression? Justify. 4, 3, 2, 1, ...

(ii) Find the values of a, b, c for following quadratic equations by comparing with standard form : $x^2 - 7x + 4 = 0$.

(iii) Find the value of the following determinant :

$$\begin{vmatrix} 5 & 2 \\ 7 & 4 \end{vmatrix}$$

(iv) Write the first five terms of the following Arithmetic Progression where, the common difference 'd' and the first term 'a' are given : a = 6, d = 6.

(v) Determine whether the given value of 'x' is a root of given quadratic equation : $x^2 - 4x + 1 = 0$, x = 1.

(vi) If $D_y = -15$ and $D = -5$ are the values of the determinants for certain simultaneous equations in x and y, find y.

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

(i) Find the sum of first 11 positive numbers which are multiples of 6.

(ii) Solve the following quadratic equation by factorization method : $x^2 - x - 132 = 0$.

(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 :
$y = \frac{5x - 10}{2}$; $4x + 5 = -y$.

(v) Find the value of k if x = 4 is the solution of the equation :
$3x^2 + kx - 2 = 0$

(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 : a number greater then 2.

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

(i) Given the following sequence, determine whether it is arithmetic or not. If it is an Arithmetic Progression, find its general term :
– 5, 2, 9, 16, 23, 30, ...

(ii) Solve the following quadratic equation by completing square
$m^2 = 4 + 5m$.

(iii) Seg AB is the diameter of a circle. C is the point on the circumference such that in ΔABC, $\angle B$ is the less by 10° than $\angle A$. Find the measures of all the angles of ΔABC.

(iv) In the following experiments 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.
There are 3 red, 3 white and 3 green balls in a bag. One ball is drawn at random from a bag :
P is the event that ball is red.
Q is the event that ball is not green.
R is the event that ball is red or white.

(v) Solve the following quadratic equation by using formula :
$2x^2 - x - 4 = 0$.

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

(i) Neela saves in a 'Mahila Bachat gat' Rs. 2 on the first day, Rs.4 on the second day, Rs. 6 on the third day and so on. What will be her saving in the month of February 2010 ?

(ii) Solve the following simultaneous equations using graphical method : $4x = y - 5$; $y = 2x + 1$.

(iii) (a) A card is drawn at random from a well shuffled pack of 52 cards. Find the probability that the card drawn is
(1) bears a number between 4 and 7 both inclusive.
(2) bears a number between 3 and 8 both inclusive.

(b) A card is drawn at random from well shuffled pack of 52 cards. Find the probability that the card drawn is :
(1) a spade
(2) not of diamond

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

(i) Solve the following simultaneous equations :
$\frac{27}{x-2} + \frac{31}{y+3} = 85$; $\frac{31}{x-2} + \frac{27}{y+3} = 89$

(ii) The 11^{th} term and the 21^{st} term of an A.P. are 16 and 29 respectively, find :
(a) the 1^{st} term and the common difference.
(b) the 34^{th} term
(c) 'n' such that $t_n = 55$.

(iii) Monthly hostel charges in a college comprises of two parts, one fixed part for the stay in the hostel and the varying part depending on the number of days one has taken food in the mess. Ram takes food for 20 days and pays Rs.1700 as hostel charges and Rahim takes food for 24 days and pays Rs.1900 as hostel charges. Find the fixed charges and the cost of the food per day.

Best Of Luck