

MT

2017 ____ 1100

Seat No.

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MT - MATHEMATICS (71) ALGEBRA - SEMI PRELIM - II - PAPER - 4 (E)

Time : 2 Hours

(Pages 3)

Max. Marks : 40

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

5

- (i) State whether the following list of numbers are Arithmetic Progression ? Justify. 3, 5, 7, 9, 11,
- (ii) Write the quadratic equation in standard form $ax^2 + bx + c = 0$
 $\frac{y^2}{23} - 3 = 0$.
- (iii) Find the value of the following determinant :
$$\begin{vmatrix} 3\sqrt{6} & -4\sqrt{2} \\ 5\sqrt{3} & 2 \end{vmatrix}$$
- (iv) For each sequence, find the next four terms :
1, 3, 7, 15, 31,
- (v) Determine whether the given value of 'x' is a root of given quadratic equation : $x^2 + x - 1 = 0$, $x = 2$.
- (vi) Write D_x for the following simultaneous equations :
 $5x = 10 - 2y$; $y = 3x - 11$

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

8

- (i) Find the eighteenth term of the A. P. : 1, 7, 13, 19,
- (ii) Solve the following quadratic equation by factorization method :
 $x^2 - 17x + 60 = 0$.
- (iii) What is the equation of X - axis? Hence, find the point of intersection of the graph of the equation $x + y = 3$ with the X - axis.

- (iv) Solve the following simultaneous equations using Cramer's rule :
 $x + 18 = 2y$; $y = 2x - 9$
- (v) If one root of the quadratic equation $kx^2 - 7x + 12 = 0$ is 3, 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 8.

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

- (i) The sum of the first 55 terms of an A. P. is 3300. Find the 28th term.
- (ii) Solve the following quadratic equation by completing square :
 $p^2 - 12p + 32 = 0$.
- (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 digit number are formed from the digits 0, 1, 2, 3, 4 where digits are not repeated. Find the probability of the events that :
- the number formed is an even number.
 - the number formed is greater than 40.
 - the number formed is prime number.
- (v) Solve the following quadratic equation using formula :
 $2x^2 + 5x - 2 = 0$

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

- (i) Find four consecutive terms in an A.P. whose sum is 12 and the sum of 3rd and 4th term is 14.
- (ii) Solve the following simultaneous equations using graphical method :
 $4x = y - 5$; $y = 2x + 1$

- (iii) In the following experiment, write the sample space S, number of sample point n (S), event A, B, C and n (A), n (B), n (C). Also find complementary events, mutually exclusive events :
- Two dies are thrown, A is the event that the sum of the numbers on their upper face is at least nine, B is the event that the sum of the number on their upper face is divisible by 8, C is the event that the same number on the upper faces of both dice.

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

- (i) Solve the following simultaneous equations :
- $$\frac{2}{x} + \frac{6}{y} = 13, \quad \frac{3}{x} + \frac{4}{y} = 12$$
- (ii) In the A.P. 7, 14, 21, How many terms are have to consider for getting sum 5740.
- (iii) A boat takes 6 hours to travel 8 km upstream and 32 km downstream, and it takes 7 hours to travel 20 km upstream and 16 km downstream. Find the speed of the boat in still water and the speed of the stream.