

MT

2017 ____ 1100

Seat No.

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

Time : 2 Hours

(Pages 4)

Max. Marks : 40

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

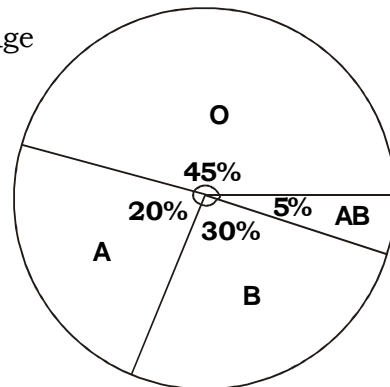
5

- (i) Form an equation for the following example :
The length of a rectangle (x) is greater than its breadth by 3 cm.
The area of a rectangle is 70 sq.cm.
- (ii) Form the quadratic equation if its roots are - 5 and 9.
- (iii) Find the sum and product of the roots if one root of the quadratic equation is $\sqrt{5} - \sqrt{3}$.
- (iv) If $df_i u_i = - 28$ and $df_i = 100$, $A = 25$, $h = 4$ then the value mean is ?
- (v) The following table shows ages of 300 patients getting medical treatment in a hospital on a particular day.

Age (in years)	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
No. of patients	60	42	55	70	53	20

Locate the median class and find L, N, c, f, f, h

- (vi) The following pie diagram shows percentage of persons according to blood group.
Find total number of persons if there are 600 persons of blood group B.



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

- (i) Determine the nature of roots of the following equation from discriminant : $2y^2 + 11y - 7 = 0$.

- (ii) Following table gives age distribution of people suffering from 'Asthama due to air pollution in certain city.

Age in years	7-11	11-15	15-19	19-23	23-27	27-31	31-35	35-39
No. of people	5	9	13	21	16	15	12	9

Find mean age of person suffering from 'Asthama' by 'Direct Method'.

- (iii) Form the quadratic equation if its one of the root is $2 + \sqrt{5}$.

- (iv) Below is given frequency distribution of driving speed (in kms/hour) of a vehicle of 400 college students.

Speed (in km/hr)	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
No. of students	6	80	156	98	60

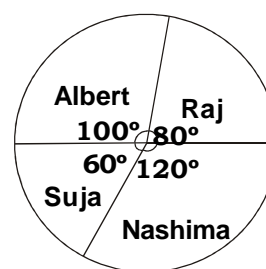
Find modal driving speed of a college student.

- (v) The following is the frequency distribution of blood pressure measured for 100 patients.

Blood pressure (in suitable units)	110-115	115-120	120-125	125-130	130-135
No. of patients	2	35	52	8	3

Draw the histogram.

- (vi) The following pie diagram represent the number of valid votes obtained by four students who contested for school captain. The total of valid votes polled was 720. By how many votes did the winner defeat the nearest contestant ?



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

- (i) Find m , if the roots of the quadratic equation $(m - 1)x^2 - 2(m - 1)x + 1 = 0$ has real and equal roots.
- (ii) Below is given frequency distribution of marks (out of 100) obtained by the students.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of students	3	5	7	10	12	15	12	6	2	8

Calculate mean marks scored by a student by 'Assumed mean method'.

- (iii) Solve the following equation :

$$x^2 + \frac{12}{x^2} = 7$$

- (iv) The following table gives information about the monetary investment by some residents in a city :

Mode of investment	Shares	Mutual funds	Real estate	Gold	Government bonds
Percentage of residents	10	20	35	30	5

Draw pie diagram to represent the data.

- (v) If the sum of the roots of the quadratic is 3 and sum of their cubes is 63, find the quadratic equation.

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

- (i) A natural number is greater than the other by 5. The sum of their squares is 73. Find those numbers.
- (ii) Following table shows frequency distribution of no. of rooms occupied in a hotel per day.

No. of rooms occupied	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
No. of days	5	27	17	11	9	1

Find median number of rooms occupied per day in hotel.

- (iii) The marks scored by students in mathematics in a certain examination are given below :

Marks scored	1 - 20	21 - 40	41 - 60	61 - 80	81 - 100
Number of students	3	8	19	18	6

Draw histogram.

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

10

- (i) A car covers a distance of 240km with some speed if its speed is increased by 20 km/hr, it will cover the same distance in 2 hours less. find the speed of the car.
- (ii) Frequency distribution of duration of 500 telephone calls received at a telephone exchange on a certain day is given below :

Duration of call (in sec.)	15-29	30-44	45-59	60-74	75-89	90-104	105-119	120-134
No. of calls	8	12	61	153	190	57	10	9

Find mean duration of telephone call received at the telephone exchange by 'Step deviation method'.

- (iii) Represent the following data using frequency curve :

Electricity bill in a month (in Rs.)	200 - 400	400-600	600 - 800	800 - 1000
No. of families	362	490	185	63

Draw histogram and hence draw frequency curve too given information.

Best Of Luck 