MT

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

MT - MATHEMATICS (71) ALGEBRA - SEMI PRELIM - I - PAPER - 2 (E)

Time : 2 Hours **(Pages 4)** **Max. Marks : 40**

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

(i) From an equation for the following example :
The product of two numbers 'y' and $y - 3$ is 42.

(ii) Form the quadratic equation if its roots are – 3 and – 11.

(iii) Find the sum and product of the roots if one root of the quadratic equation is $4 - 3\sqrt{2}$.

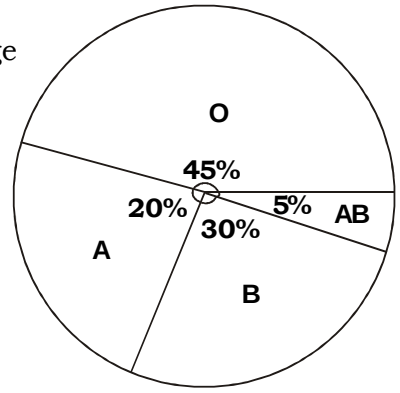
(iv) If $\sum f_i u_i = 761$ and $\sum f_i = 500$, A = 52, h = 15 then the value mean is ?

(v) 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

Locate the modal class and find L, f_m, f_1, f_2 and 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 : $y^2 + 6y + 9 = 0$

(ii) A study related to the time (in months) taken to settle a dispute in a lower court resulted the following data.

Time (in months)	0 – 2	2 – 4	4 – 6	6 – 8	8 – 10	10 – 12
No. of disputes	15	90	120	75	70	50

Find mean time taken to settle a dispute in a lower court.
(Use direct method)

(iii) Form the quadratic equation if its one of the root is $\sqrt{5} - \sqrt{3}$.

(iv) The maximum bowling speed (kms/hour) of 33 players at a cricket coaching centre is given below :

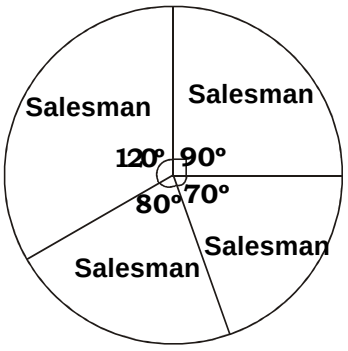
Bowling speed (kms / hr)	85 - 100	100 -115	115 - 130	130 - 145
No. of players	9	11	8	5

Find the modal bowling speed of a player.

(v) Draw the histogram the following frequency distribution.

House - Rent (in ₹ per month)	4000 - 6000	6000 - 8000	8000 - 10000	10000 - 12000
Number of families	200	240	300	50

(vi) The sales due to salesmen in week are given below by the pie diagram.
If the total sale due to salesman A is Rs. 18000.
Find the sales due to each salesman.



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

(i) Find the value of k for which given equation has real and equal roots : $k^2x^2 - 2(k - 1)x + 4 = 0$

(ii) Frequency distribution of daily commission received by 100 salesmen is given below.

Daily commission (in Rs.)	100 – 120	120 – 140	140 – 160	160 – 180	180 – 200
No. of salesman	20	45	22	9	4

Find mean daily commission received by a salesman.
(Use Assumed mean method)

(iii) Solve the following equations :
$x^4 - 29x^2 + 100 = 0$

(iv) Following is the componentwise expenditure per article. Draw a pie chart :

Component	Expenditure (in Rs.)
Raw material	800
Labour	300
Transportation	100
Packing	100
Taxes	140

(v) If $\alpha + \beta = 5$ and $\alpha^3 + \beta^3 = 35$, find a quadratic equation whose roots are α and β.

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

(i) The sum of the squares of two consecutive even natural numbers is 100. Find the numbers.

(ii) Following table shows distribution of monthly expenditure (in Rs.) done by households in a certain village on electricity :

Monthly expenditure	150 - 225	225 - 300	300 - 375	375 - 450	450 - 525	525 - 600	600 and above
No. of households	65	171	196	75	53	26	14

Find median expenditure done by a household on electricity per month.

(iii) Draw frequency polygon for the following data on land holding :

Area in hecters	11 - 20	21 - 30	31 - 40	41 - 50	51 - 60	61 - 70	71 - 80
No. of farmers	58	103	208	392	112	34	12

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

(i) Tinu takes 9 days more than his father to do a certain piece of work. Together they can do the work in 6 days. How many days will tinu take to do that work.

(ii) Following table gives age distribution of people suffering from 'Asthama due to air pollution in certain city. Find mean by age of persons suffering from 'Asthama' by step deviation method.

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

(iii) Represent the following data using, histogram and hence draw frequency polygon :

No. of words typed per minute	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79
No. of typists	2	8	15	12	3

Best Of Luck