

MT

2017 ____ 1100

Seat No.

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

Time : 2 Hours

(Pages 4)

Max. Marks : 40

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

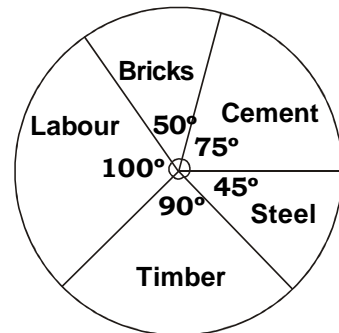
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- (i) Form an equation for the following example :
The sum of a natural number and its reciprocal is $\frac{10}{3}$.
- (ii) From the quadratic equation whose roots are 0 and -6 .
- (iii) Find the sum and product of the roots if one root of the quadratic equation is $3 - 2\sqrt{3}$.
- (iv) $df_i x_i = 595$ and $df_i = 25$. Find the value of mean.
- (v) 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

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

- (vi) The following pie diagram represents expenditure on different items in constructing a building. Answer the following questions :
- (a) Which is the item with the maximum expenditure ?
- (b) Which is the item with the minimum expenditure ?



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

8

(i) Determine the nature of roots of the following equation from discriminant : $x^2 + 3\sqrt{2}x - 8 = 0$.

(ii) Below is given distribution of money (in Rs.) collected by students for flood relief fund.

Money (in Rs.)	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
No. of students	5	7	5	2	6

Find mean of money (in Rs.) collected by a student by 'Direct Method'.

(iii) Form the quadratic equation if its one of the root is $\sqrt{2} + \sqrt{3}$.

(iv) Below is given frequency distribution of no. of packages received at a post office per day.

No. of packages	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
No. of days	2	8	16	24	30	20

Find modal number of packages received by the post office per day.

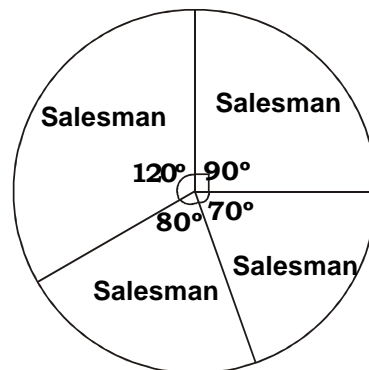
(v) Draw the histogram for the following frequency distribution.

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 : $(k - 12)x^2 + 2(k - 12)x + 2 = 0$.
- (ii) The measurements (in mm) of the diameters of the head of screws are given below :

Diameter (in mm)	33 - 35	36 - 38	39 - 41	42 - 44	45 - 47
No. of screws	10	19	23	21	27

Calculate mean diameter of head of a screw of 'Assumed Mean Method'.

- (iii) Solve the following equations :

$$6m^2 + \frac{2}{m^2} = 7$$

- (iv) The number of hours, spent by a school boy in different activities in a day is given below.

Activity	Sleep	School	Play	Home work	Other	Total
No. of hours	8	7	2	4	3	24

Represent the above information using pie diagram.

- (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 length of the rectangle is greater than its breadth by 2 cm. The area of the rectangle is 24 sq.cm, find its length and breadth.
- (ii) Number of calories (in' 00) consumed daily by a sample of 15 years old boys are given below.

Calories	1000 - 1500	1500 - 2000	2000 - 2500	2500 - 3000	3000 - 3500	3500 - 4000	4000 - 4500
No. of boys	5	13	16	18	27	10	4

Find median calories consumed daily by a boy.

- (iii) The following data summarises the result of a certain examination.

Class marks	5	15	25	35	45	55	65	75
No. of students	0	2	16	36	27	11	8	0

- (a) Prepare usual classification
 (b) Draw histogram

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

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- (i) Exterior angle of a regular polygon having n -sides is more than that of the polygon having n^2 sides by 50° . Find the number of the sides of each polygon.
- (ii) Below is given frequency distribution of dividend in percentage declared by 120 companies.

Dividened (in %)	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79
No. of companies	5	15	28	42	15	12	3

Obtain mean dividend declared by a company by step deviation method.

- (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