

MT

2017 ____ ____ 1100

Seat No.

MT - MATHEMATICS (71) ALGEBRA - SEMI PRELIM - I - PAPER - 1 (E)

Time : 2 Hours

(Pages 4)

Max. Marks : 40

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

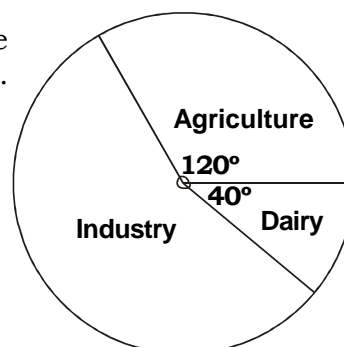
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- (i) From an equation for the following example :
The sum of a natural number 'x' and its square is 30.
- (ii) Form the quadratic equation if its roots are 5 and - 7.
- (iii) Find the sum and product of the roots if one root of the quadratic equation is $3 - 2\sqrt{5}$.
- (iv) If $df_i d_i = 6$ and $df_i = 50$, $A = 57$, then the value mean is ?
- (v) 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

Locate the modal class and find L , f_m , f_1 , f_2 , h .

- (vi) The following diagram represents the sectorwise loan amount in crores of Rs. distributed by a bank.
If the dairy sector received Rs. 20 crores, then find the total loan disbursed.



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

- (i) Determine the nature of roots of the following equation from its discriminant : $y^2 - 5y + 11 = 0$.
- (ii) Record of no. of days of medical leave enjoyed by 30 employees within a year is given below.

No. of days	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
No. of employees	5	7	11	4	3

Find mean number of days of medical leave enjoyed by an employee in a year. (Use direct method)

- (iii) Form the quadratic equation if its one of the root is $\sqrt{2} + \sqrt{3}$.
- (iv) The weight of coffee (in gms) in 70 packets is given below :

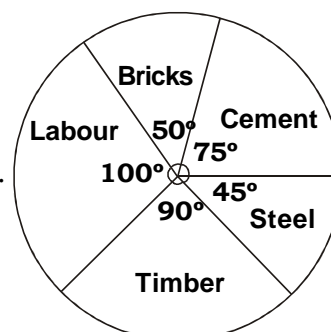
Weight (in gms)	200 - 201	201 - 202	202 - 203	203 - 204	204 - 205	205 - 206
No. of packets	12	26	20	9	2	1

Determine the modal weight of coffee in a packet.

- (v) Draw the histogram to represent the following data.

Daily sales of a store in (₹)	0-1000	1000-2000	2000-3000	3000-4000	4000-5000	Total
Number of days in a month	2	12	10	4	2	30

- (vi) The following pie diagram represents expenditure on different items in constructing a building. Find the expenditure of each of the items if the total construction cost is Rs. 5,40,000.



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) Frequency distribution of distance travelled in kms. per liter of a petrol by different mopeds is given below.

Distance travelled (in km)	62 - 65	65 - 68	68 - 71	71 - 74	74 - 77	77 - 80	80 - 83
No. of mopeds	5	8	12	28	35	10	2

Find mean distance travelled per litre of petrol by a moped.
(Use Assumed mean method)

- (iii) Solve the following equation :
 $x^4 - 3x^2 + 2 = 0$

- (iv) The following data gives the number of students using different modes of transport :

Mode of transport	Bicycle	Bus	Walk	Train	Car
Number of students	140	100	70	40	10

Represent the above data using pie diagram.

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

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

- (i) Three consecutive odd natural numbers are such that the product of the first and third is greater than four times the middle by 1. Find the numbers.
- (ii) Following is the distribution of the size of certain farms from a taluka (tehasil) :

Size of farm (in acres)	5 - 15	15 - 25	25 - 35	35 - 45	45 - 55	55 - 65	65 - 75
No. of farms	7	12	17	25	31	5	3

Find median size of a farm.

- (iii) Represent the following data using histogram.

Height of students (cm.)	140-144	145-149	150-154	155-159
Number of students	2	12	10	4

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

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- (i) One tank can be filled up by two taps in 6 hours. The smaller tap alone takes 5 hours more than the bigger tap alone. Find the time required by each tap to fill the tank separately.
- (ii) Following table gives frequency distribution of trees planted by different housing societies in a particular locality.

No. of trees	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40
No. of societies	2	7	9	8	6	4

Find the number of trees planted by housing society by using 'step deviation method'.

- (iii) Draw histogram and frequency polygon for the following frequency distribution :

Class	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30
Frequency	20	30	50	40	10

Best Of Luck 