

MT

2017 ____ 1100

Seat No.

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

Time : 2 Hours

(Pages 4)

Max. Marks : 40

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

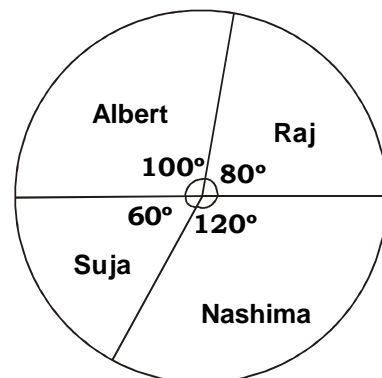
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- (i) From an equation for the following example :
The product of two numbers 'y' and $y - 3$ is 42.
- (ii) From the quadratic equation whose roots are 3 and 10.
- (iii) Find the sum and product of the roots of the quadratic equation is $2 + \sqrt{5}$.
- (iv) If $\sum f_i u_i = 36$, $\sum f_i = 100$, $A = 41$ and $h = 3$ then the value of mean is ?
- (v) 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

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

- (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.
What is the minimum number of votes?
Who got it?



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

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(i) Determine the nature of roots of the following equation from discriminant : $2y^2 - 7y - 3 = 0$.

(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 $\sqrt{7} - \sqrt{2}$.

(iv) Following table gives frequency distribution of electricity consumption of a household in certain area in a month.

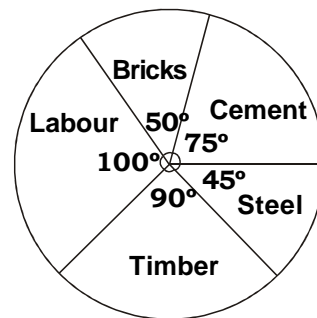
No. of units of electricity	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
No. of households	4	16	41	65	8

Find modal no. of units of electricity consumed by a household in a month.

(v) Draw histogram for given frequency distribution table.

Class intervals	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30
Frequency	4	6	3	2	1

(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 c , if the roots of the quadratic equation $x^2 - 2(c + 1)x + c^2 = 0$ has real and equal roots.

(ii) Following table gives frequency distribution of trees planted by different housing societies in a particular locality. Find mean by assumed mean method.

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

(iii) Solve the following equation :
 $3x^4 - 13x^2 + 10 = 0$

(iv) Electricity used by farmers during different parts of a day for irrigation is as follows. Draw pie diagram :

Part of day	Morning	Afternoon	Evening	Night
Percentage of electricity used	30	40	20	10

(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 four times a number and three times its reciprocal is 7. Find that number.

(ii) Below is given frequency distribution of I.Q. (Intelligent Quotient) of 80 candidates.

I.Q.	70-80	80-90	90-100	100-110	110 - 120	120-130	130 - 140
No. of candidates	7	16	20	17	11	7	2

Find median I.Q. of a candidate.

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

Area in hectares	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) An express train takes 30 min less for a journey of 440 km, if its usual speed is increased by 8 km/hr. find its usual speed.

- (ii) Following table shows frequency distribution of duration (in seconds) of advertisements on T.V.

Duration (in sec.) occupied	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 65
No. of advertisements	10	32	15	9	7	2

Obtain mean duration of advertisement on T.V. by shift of origin and scale method.

(iii) 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.