

N 384

Seat No.

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2024 VII 23 1100 -N 384- MATHEMATICS (71) ALGEBRA—PART I (E)
(REVISED COURSE)

Time : 2 Hours

(Pages 11)

Max. Marks : 40

Note :— (i) All questions are compulsory.

(ii) Use of calculator is not allowed.

(iii) The numbers to the right of the questions indicate full marks.

(iv) In case of MCQs [Q. No. 1(A)] only the first attempt will be evaluated and will be given credit.

(v) For every MCQ, four alternatives (A), (B), (C), (D) of answers are given. Alternative of correct answer is to be written in front of the subquestion number.

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1. (A) Choose the correct answer and write the alphabet of it in front of the subquestion number : 4

(i) For simultaneous equations in variables x and y , $D_x = 49$,

$D_y = -63$, $D = 7$, then what is the value of x ?

(A) 7

(B) -7

(C) $\frac{1}{7}$

(D) $-\frac{1}{7}$

(ii) Which equation from the following is quadratic equation ?

(A) $\frac{5}{x} - 3 = x^2$

(B) $x(x + 5) = 2$

(C) $n - 1 = 2n$

(D) $\frac{1}{x^2}(x + 2) = x$

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(iii) The sequence $-10, -6, -2, 2, \dots$.

(A) is an A.P., Reason $d = -16$

(B) is an A.P., Reason $d = 4$

(C) is an A.P., Reason $d = -4$

(D) is not an A.P.

(iv) Which number from the following cannot represent probability ?

(A) $\frac{2}{3}$

(B) 1.5

(C) 15%

(D) 0.7

(B) Solve the following subquestions :

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(i) Find the value of the following determinant :

$$\begin{vmatrix} 5 & -2 \\ -3 & 1 \end{vmatrix}.$$

(ii) Find the first term and common difference for the following A.P. :

$5, 1, -3, -7, \dots$

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- (iii) Face value of a share is Rs. 100 and premium is Rs. 65, then what is market value of that share ?
- (iv) Write sample space if one die is thrown.

2. (A) Complete any *two* activities and rewrite it : 4

- (i) Complete the following table for drawing the graph of the equation :

$$x + 2y = 4$$

x	-2	0	<input type="text"/>
y	<input type="text"/>	2	1
(x, y)	<input type="text"/>	(0, 2)	<input type="text"/>

- (ii) Determine the nature of roots of the following quadratic equation.

Activity :

$$m^2 + 2m + 9 = 0$$

$$a = \boxed{}, b = 2, c = 9$$

$$b^2 - 4ac = 2^2 - 4 \times 1 \times \boxed{}$$

$$= \boxed{} - 36$$

$$\therefore b^2 - 4ac = \boxed{}$$

$$\therefore b^2 - 4ac < 0$$

$\therefore$ Roots of quadratic equation are not real.

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- (iii) Smita has invested Rs. 12,000 and purchased share of FV Rs. 10 at a premium of Rs. 2. Find the number of shares she purchased. Complete the given activity to get the answer.

Activity :

$$\text{FV} = 10 \quad \text{Premium} = \text{Rs. } 2$$

$$\begin{aligned} \therefore \text{MV} &= \text{FV} + \boxed{} = \boxed{} + 2 \\ &= \text{Rs. } 12 \end{aligned}$$

$$\begin{aligned} \therefore \text{Number of shares} &= \frac{\text{Total investment}}{\text{MV}} \\ &= \frac{12,000}{\boxed{}} \\ &= \boxed{} \text{ shares.} \end{aligned}$$

(B) Solve the following subquestions (any *four*) :

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- (i) Solve the following simultaneous equations :

$$x + y = 5; \quad x - y = 3$$

- (ii) Find 'k' if $x = 3$ is a root of quadratic equation

$$kx^2 - 10x + 3 = 0.$$

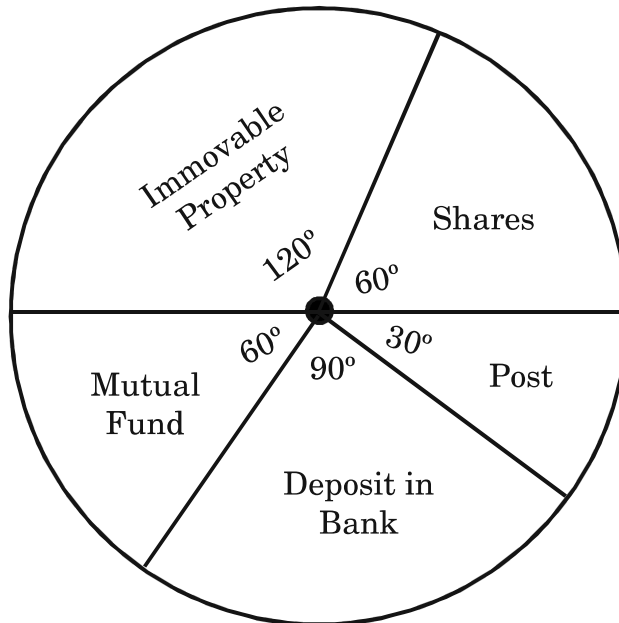
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- (iii) Find the 19th term of the following A.P. :

7, 13, 19, 25,

- (iv) The taxable value of a wrist watch belt is Rs. 586. Rate of GST is 18%, then what is the price of the belt for the customer ?
- (v) The annual investments of a family are shown in the following pie diagram. Answer the following questions based on it.



- (a) If the investment in the shares is Rs. 2,000, find the total investment.
- (b) How much amount is invested in the Post ?

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3. (A) Complete any *one* activity of the following and rewrite it : 3

- (i) A share is sold for the market value of Rs. 1,000. Brokerage is paid at the rate of 0.1%. Find the amount received after sale by completing the activity.

Activity :

$$\text{Brokerage} = \boxed{} \times \text{rate of brokerage}$$

$$= 1000 \times \frac{0.1}{\boxed{}}$$

$$= 10 \times 0.1$$

$$= \boxed{}$$

$$\text{Amount received after sale} = \text{MV} - \boxed{}$$

$$= \boxed{} - 1$$

$$= \text{Rs. } \boxed{}.$$

- (ii) The numbers 2, 4, 6, 8, 10, 12 are on the surface of one die. If this die is rolled once, then complete the activity to find probability of getting a number on upper face is a perfect square.

Activity :

$$S = \{ \boxed{} \}$$

$$n(S) = \boxed{}$$

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Condition for event B : getting a perfect square on the upper surface of that die.

$$\therefore B = \{\boxed{}\} \quad \therefore n(B) = \boxed{}$$

$$P(B) = \frac{n(B)}{n(S)} = \frac{\boxed{}}{6}$$
$$= \boxed{}$$

(B) Solve the following subquestions (any *two*) : **6**

(i) Solve the following simultaneous equation by Cramer's method :

$$4m - 2n = -4; 4m + 3n = 16.$$

(ii) Solve the following quadratic equation by formula method :

$$y^2 + \frac{1}{3}y = 2$$

(iii) Two dice are rolled. Write the sample space 'S' and number of sample points $n(S)$. Also write the events in the set form and number of sample points in the event according to the given condition.

(a) Condition for event A : Sum of the digits on upper face is a multiple of 5.

(b) Condition for event B : Sum of the digits on upper face is 25.

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- (iv) In the following table, the toll (in Rs.) paid from 6 am to 6 pm by drivers and the number of vehicles is shown. Find the mean of the toll by 'assumed mean' method.

Toll (Rs.)	No. of Vehicles
300—400	80
400—500	110
500—600	120
600—700	70
700—800	40

4. Solve the following subquestions (any *two*) :

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- (i) Manisha wants to distribute 540 bananas among some students. If 30 students were more, each would get 3 bananas less. Find the number of students.
- (ii) ₹ 2,000 is invested at 10 percent simple interest. Check at the end of the every year whether the interest amount is in A.P. or not. If this is an A.P., then find interest amount after 10 years.

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(iii) In one group of students; 10% students got 0 to 20 marks; 20% students got 20 to 40 marks; 35% students got 40 to 60 marks; 20% students got 60 to 80 marks and remaining 30 students got 80 to 100 marks, then :

- (a) Prepare a grouped frequency distribution table.
- (b) Find the mode of the marks scored.

5. Solve any *one* subquestion of the following :

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(i) Draw histogram of the following data :

Students I.Q.	Number of Students
60—80	4
80—100	12
100—120	16
120—140	8

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- (ii) Using information given in the following figure, find the length and breadth of this rectangle in cm.

