N 362

Seat No. | | | | | | | |

2020 III 12 1100 -N 362- MATHEMATICS (71) ALGEBRA—PART I (E)

Time : 2 Hours (Pages 10) Max. Marks : 40

Note :— (*i*) *All* questions are compulsory.

(*ii*) Use of a calculator is not allowed.

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

(*iv*) In case of MCQ's Q. No. 1(A) only the first attempt will be evaluated and will be given credit.

(*v*) For every MCQ, the correct alternative (A), (B), (C) or (D) of answers with subquestion number is to be written as an answer.

1. (A) For every subquestion 4 alternative answers are given. Choose the correct answer and write the alphabet of it : 4

(*i*) In the format of GSTIN there are ..... alpha-numerals.

(A) 15

(B) 10

(C) 16

(D) 9

P.T.O.

(*ii*) From the following equations, which one is the quadratic equation ?

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

(B) $x(x + 5) = 4$

(C) $n - 1 = 2n$

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

(*iii*) For simultaneous equations in variables x and y, if $D_x = 49$, $D_y = -63$, $D = 7$, then what is the value of x ?

(A) 7

(B) -7

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

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

(*iv*) If $n(A) = 2$, $P(A) = \frac{1}{5}$, then $n(S) = ?$

(A) $\frac{2}{5}$

(B) $\frac{5}{2}$

(C) 10

(D) $\frac{1}{3}$

(B) Solve the following subquestions : 4

(*i*) Find second and third term of an A.P. whose first term is –2 and common difference is –2.

(*ii*) 'Pawan Medicals' supplies medicines. On some medicines the rate of GST is 12%, then what is the rate of CGST and SGST ?

(*iii*) Find the values of a and b from the quadratic equation $2x^2 - 5x + 7 = 0$.

(*iv*) If $15x + 17y = 21$ and $17x + 15y = 11$, then find the value of $x + y$.

2. (A) Complete and write any *two* activities from the following : 4

(*i*) Complete the following table to draw the graph of $2x - 6y = 3$:

x	–5	
y		0
(x, y)		

P.T.O.

(*ii*) First term and common difference of an A.P. are 6 and 3 respectively. Find S_{27}.

Solution :

First term = a = 6, common difference = d = 3, S_{27} = ?

$$S_n = \frac{n}{2}\left[\square + (n-1)d\right] \text{ — formula}$$

$$S_{27} = \frac{27}{2}\left[12 + (27-1)\square\right]$$

$$= \frac{27}{2} \times \square$$

$$= 27 \times 45$$

$$\therefore S_{27} = \square$$

(*iii*) A card is drawn from a well shuffled pack of 52 playing cards. Find the probability of the event, the card drawn is a red card.

Solution :

Suppose 'S' is sample space.

$\therefore$ $n(S) = 52$

Event A : Card drawn is a red card.

$\therefore$ Total red cards = $\square$ hearts + 13 diamonds.

$\therefore$ $n(A) = \square$

$\therefore$ $p(A) = \dfrac{\square}{n(S)}$ — formula

$\therefore$ $p(A) = \dfrac{26}{52}$

$\therefore$ $p(A) = \square$

(B) Solve any *four* subquestions from the following : 8

(*i*) Find the value of the determinant :

$$\begin{vmatrix} \frac{7}{3} & \frac{5}{3} \\ \frac{3}{2} & \frac{1}{2} \end{vmatrix}$$

(*ii*) Solve the quadratic equation by factorisation method :

$x^2 - 15x + 54 = 0.$

(*iii*) Decide whether the following sequence is an A.P.; if so, find the 20th term of the progression :

$-12, -5, 2, 9, 16, 23, 30, \ldots\ldots .$

(*iv*) A two digit number is formed with digits 2, 3, 5, 7, 9 without repetition. What is the probability that the number formed is an odd number ?

(*v*) If L = 10, $f_1 = 70$, $f_0 = 58$, $f_2 = 42$, $h = 2$, then find the mode by using formula.

P.T.O.

3. (A) **Complete and write any *one* activity from the following :** 3

(*i*)

Age group (in years)	No. of Persons	Measure of central angle
20—25	80	$\frac{\square}{200} \times 360 = \square$
25—30	60	$\frac{60}{200} \times 360 = \square$
30—35	35	$\frac{35}{200} \times \square = 63°$
35—40	25	$\frac{25}{200} \times 360 = \square$
Total	200	$\square$

(*ii*) Shri Shantilal has purchased 150 shares of FV ₹ 100, for MV of ₹ 120. Company has paid dividend at 7%, then to find the rate of return on his investment, complete the following activity :

Solution : FV = ₹ 100; Number of shares = 150

Market value = ₹ 120

(1) ∴ Sum investment = MV × No. of Shares

= $\square \times \square$

∴ Sum investment = ₹ 18,000

(2) Dividend per share = FV × Rate of dividend

$$= \square \times \frac{\square}{100}$$

$$= ₹\ 7$$

$\therefore$ Total dividend received = 150 × 7

$$= \square$$

(3) Rate of return = $\frac{\text{Dividend income}}{\text{Sum invested}} \times 100$

$$= \frac{1050}{18000} \times 100$$

$$= \square$$

(B) Attempt any *two* subquestions from the following : **6**

(*i*) A balloon vendor has 2 red, 3 blue and 4 green balloons. He wants to choose one of them at random to give it to Pranali. What is the probability of the event that Pranali gets :

(1) a red balloon

(2) a blue balloon.

(*ii*) The denominator of a fraction is 4 more than twice its numerator. Denominator becomes 12 times the numerator, if both the numerator and the denominator are reduced by 6, find the fraction.

(*iii*) A milk centre sold milk to 50 customers. The table below gives the number of customers and the milk they purchased. Find the mean of the milk sold by direct method :

Milk Sold (litre)	**No. of Customers**
1—2	17
2—3	13
3—4	10
4—5	7
5—6	3

(*iv*) In an A.P. sum of three consecutive terms is 27 and their products is 504. Find the terms.

(Assume that three consecutive terms in an A.P. are $a - d$, a, $a + d$.)

4. **Attempt any *two* subquestions from the following :** 8

(*i*) Represent the following data by histogram :

Price of Sugar (per kg in ₹)	Number of Weeks
18—20	4
20—22	8
22—24	22
24—26	12
26—28	6
28—30	8

(*ii*) One person borrows ₹ 4,000 and agrees to repay with a total interest of ₹ 500 in 10 instalments. Each instalment being less than the preceding instalment by ₹ 10. What should be the first and the last instalments ?

(*iii*) The sum of the areas of two squares is 400 sq.m. If the difference between their perimeters is 16 m, find the sides of two squares.

P.T.O.

5. Attempt any *one* subquestion from the following : **3**

(*i*) Convert the following equations into simultaneous equations and solve :

$$\sqrt{\frac{x}{y}} = 4, \quad \frac{1}{x} + \frac{1}{y} = \frac{1}{xy}$$

(*ii*) A dealer sells a toy for ₹ 24 and gains as much percent as the cost price of the toy. Find the cost price of the toy.