N 610

Seat No. | | | | | | | |

2019 III 11 1100 -N 610- MATHEMATICS (71) ALGEBRA—PART I (E)

(NEW COURSE)

Time : 2 Hours (Pages 8) Max. Marks : 40

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

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

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

1. (A) Solve the following questions (Any *four*) : 4

(*i*) Find the median of :

66, 98, 54, 92, 87, 63, 72.

(*ii*) Multiply and write the answer in the simplest form :

$5\sqrt{7} \times 2\sqrt{7}$

(*iii*) If $3x + 5y = 9$ and $5x + 3y = 7$, then find the value of $x + y$.

(*iv*) Write the ratio of second quantity to first quantity in the reduced form :

5 dozen pens, 120 pens.

(*v*) Write the following polynomial in coefficient form :

$2x^3 + x^2 - 3x + 4$.

P.T.O.

(*vi*) For computation of income tax which is the assessment year of financial year 01-04-2016 to 31-03-2017 ?

(B) Solve the following questions (Any *two*) : 4

(*i*) Find the value of the polynomial $2x^3 + 2x$, when $x = -1$.

(*ii*) If A = {11, 21, 31, 41}, B = {12, 22, 31, 32}, then find :

(1) $A \cup B$

(2) $A \cap B$.

(*iii*) Sangeeta's monthly income is ₹ 25,000. She spent 90% of her income and donated 3% for socially useful causes. How much money did she save ?

2. (A) Choose the correct alternative : 4

(*i*) In the A.P. 2, –2, –6, –10, ... common difference (d) is :

(A) –4

(B) 2

(C) –2

(D) 4

(*ii*) For the quadratic equation $x^2 + 10x - 7 = 0$, the values of a, b, c are :

(A) $a = -1, b = 10, c = 7$

(B) $a = 1, b = -10, c = -7$

(C) $a = 1, b = 10, c = -7$

(D) $a = 1, b = 10, c = 7$

(*iii*) The tax levied by Central Government for trading within a state is :

(A) IGST

(B) CGST

(C) SGST

(D) UTGST

(*iv*) If a die is rolled, what is the probability that number appearing on upper face is less than 2 ?

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

(B) $\frac{1}{2}$

(C) 1

(D) $\frac{1}{6}$

(B) Solve the following questions (Any *two*) : 4

(*i*) First term and common difference of an A.P. are 12 and 4 respectively. If $t_n = 96$, find n.

(*ii*) If $\begin{vmatrix} 4 & 5 \\ m & 3 \end{vmatrix} = 22$, then find the value of m.

(*iii*) Solve the following quadratic equation :

$$x^2 + 8x + 15 = 0.$$

3. (A) Complete the following activities (Any *two*) : 4

(*i*) Smita has invested ₹ 12,000 to purchase shares of FV ₹ 10 at a premium of ₹ 2. Find the number of shares she purchased. Complete the given activity to get the answer.

Activity : FV = ₹ 10, Premium = ₹ 2

$\therefore$ MV = FV + $\square$ = $\square$ + 2 = 12

$\therefore$ No. of shares = $\dfrac{\text{Total investment}}{\text{MV}}$

= $\dfrac{\square}{12}$ = $\square$ shares

(*ii*) The following table shows the daily supply of electricity to different places in a town. To show the information by a pie diagram, measures of central angles of sectors are to be decided. Complete the following activity to find the measures :

Places	**Supply of electricity (Thousand units)**	**Measure of central angle**
Roads	4	$\frac{4}{30} \times 360 = 48°$
Factories	12	$\frac{\square}{\square} \times 360 = 144°$
Shops	6	$\frac{6}{30} \times 360 = \square$
Houses	8	$\frac{\square}{\square} \times 360 = \square$
Total $\Rightarrow$	30	

(*iii*) Two coins are tossed simultaneously. Complete the following activity of writing the sample space (S) and expected outcomes of the events :

(*i*) Event A : to get at least one head.

(*ii*) Event B : to get no head.

Activity : If two coins are tossed simultaneously

$\therefore$ S = {☐, HT, TH, ☐}

(*i*) Event A : at least getting one head.

$\therefore$ A = {HH, ☐, TH}.

(*ii*) Event B : to get no head.

$\therefore$ B = {☐}.

(B) Solve the following questions (Any *two* **4**

(*i*) Find the 19th term of the A.P. 7, 13, 19, 25, ...

(*ii*) Obtain a quadratic equation whose roots are –3 and –7.

(*iii*) Two numbers differ by 3. The sum of the greater number and twice the smaller number is 15. Find the smaller number.

4. Solve the following questions (Any *three*) : **9**

(*i*) Amit saves certain amount every month in a specific way. In the first month he saves ₹ 200, in the second month ₹ 250, in the third month ₹ 300 and so on. How much will be his total savings in 17 months ?

(*ii*) A two digit number is to be formed using the digits 0, 1, 2, 3. Repetition of the digits is allowed. Find the probability that a number so formed is a prime number.

(*iii*) Smt. Malhotra purchased solar panels for the taxable value of ₹ 85,000. She sold them for ₹ 90,000. The rate of GST is 5%. Find the ITC of Smt. Malhotra. What is the amount of GST payable by her ?

(*iv*) Solve the following simultaneous equations graphically :

$$x + y = 0;\ 2x - y = 9.$$

5. Solve the following questions (Any *one*) : 4

(*i*) The following frequency distribution table shows marks obtained by 180 students in Mathematics examination :

Marks	Number of Students
0—10	25
10—20	x
20—30	30
30—40	$2x$
40—50	65

Find the value of x.

Also draw a histogram representing the above information.

(*ii*) Two taps together can fill a tank completely in $3\frac{1}{13}$ minutes. The smaller tap takes 3 minutes more than the bigger tap to fill the tank. How much time does each tap take to fill the tank completely ?

6. Solve the following questions (Any *one*) : 3

(*i*) The co-ordinates of the point of intersection of lines $ax + by = 9$ and $bx + ay = 5$ is $(3, -1)$. Find the values of a and b.

(*ii*) The following frequency distribution table shows the distances travelled by some rickshaws in a day. Observe the table and answer the following questions :

Class (Daily distance travelled in km)	**Continuous Classes**	**Frequency (Number of rickshaws)**	**Cumulative Frequency less than type**
60—64	59.5—64.5	10	10
65—69	64.5—69.5	34	10 + 34 = 44
70—74	69.5—74.5	58	44 + 58 = 102
75—79	74.5—79.5	82	102 + 82 = 184
80—84	79.5—84.5	10	184 + 10 = 194
85—89	84.5—89.5	6	194 + 6 = 200

(*i*) Which is the modal class ? Why ?

(*ii*) Which is the median class and why ?

(*iii*) Write the cumulative frequency (C.F.) of the class preceding the median class.

(*iv*) What is the class interval (h) to calculate median ?