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 :

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

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(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 ∪ B

(2) A ∩ 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

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(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) $\dfrac{1}{3}$

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

   (C)   1

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

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(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 :

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

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 + $\boxed{}$ = $\boxed{}$ + 2 = 12

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

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

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(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	$\frac{\boxed{}}{\boxed{}} \times 360 = 144°$
Shops	6	$\frac{6}{30} \times 360 = \boxed{}$
Houses	8	$\frac{\boxed{}}{\boxed{}} \times 360 = \boxed{}$
Total ⇒	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.

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Activity : If two coins are tossed simultaneously

$$\therefore S = \left\{ \boxed{}, HT, TH, \boxed{} \right\}$$

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

$$\therefore A = \left\{ HH, \boxed{}, TH \right\}.$$

(ii)   Event B : to get no head.

$$\therefore B = \left\{ \boxed{} \right\}.$$

(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.

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(*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 :

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

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 ?

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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 ?