SUBJECT: ALGEBRA PAPER NO.: 001

Time : 2 Hours 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 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 sub question number.

Question 1

A. Choose the correct answer and write the alphabet of it in front of the sub-question number:

(i) To draw the graph of $4x + 5y = 19$, find y when $x = 1$: **[4]**

(A) 4

(B) 3

(C) 2

(D) -3

(ii) Out of the following equations, which one is not a quadratic equation?

(A) $x^2 + 4x = 11 + x^2$

(B) $x^2 = 4x$

(C) $5x^2 = 90$

(D) $2x - x^2 = x^2 + 5$

(iii) For the given A.P. $a = 3.5$, $d = 0$, then t_n =

(A) 0

(B) 3.5

(C) 103.5

(D) 104.5

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

(A) 10

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

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

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

[4]

B. Solve the following sub question:

(i) Find the value of the following determinant:

$$\begin{vmatrix} 4 & 3 \\ 2 & 7 \end{vmatrix}$$

(ii) Find the common difference of the following AP: 2, 4, 6, 8, ...

(iii) On certain article if rate of CGST is 9%, then what is the rate of SGST ?

(iv) If one coin is tossed, write the sample space 'S'.

Question 2 **[4]**

A. Complete any two given activities and rewrite it:

(i) Complete the following activity, find the value of x:

$5x + 3y = 9$ ..... (I)

$2x - 3y = 12$ ..... (II)

Add equations (I) and (II)

$5x + 3y = 9$

$+ \ 2x - 3y = 12$

$7x =$ ☐

$x =$ ☐/☐

$x =$ ☐

(ii) Complete the following activity to determine the nature of the roots of the quadratic equation $x^2 + 2x - 9 = 0$

solution:

Compare $x^2 + 2x - 9 = 0$ with $ax^2 + bx + c = 0$

$a = 1, b = 2, c =$ ☐

$\therefore \quad b^2 - 4ac = (2)^2 - 4 \times$ ☐ $\times$ ☐

$\Delta = 4 +$ ☐ $= 40$

$\therefore \quad b^2 - 4ac > 0$

$\therefore$ The roots of the equation are real and unequal.

(iii) Complete the following table using given information :

Sr. No.	FV	Share is at	MV
1	₹100	Par	☐
2	☐	Premium ₹500	₹575
3	₹10	☐	☐
4	₹200	Discount ₹ 50	₹50

(B) Solve the following sub questions (any four) : **[8]**

(i) Solve the following simultaneous equations

X + y = 4; 2x - y = 2

(ii)Write the following equation in the form $ax^2 + bx + c = 0$, then write the values of a, b, c

$2y = 10 - y^2$

(iii) Write an A.P. whose first term is a= 10 and common differenced = 5.

(iv) Courier service agent charged total ₹590 to courier a parcel from Nashik to Nagpur. In the tax invoice taxable value is ₹500 on which CGST is ₹45 and SGST is ₹45. Find the rate of GST charged for this service.

(v) Observe the following table and find Mean : Assumed mean A = 300

Class	Class mark x_i	$d_i=x_i-a$ $d_i=x_i-300$	Frequency f_i	Frequency × Deviation f_id_i
200-240	220	-80	5	-400
240-280	260	-40	10	-400
280-320	300→A	0	15	0
320-360	340	40	12	480
360-400	380	80	8	640
Total			$\Sigma f_i = 50$	$\Sigma f_i d_i = 320$

Question 3. **[3]**

A. Complete any one activity and rewrite it:

(i) Form a 'Road Safety Committee' of two, from 2 boys(B_1,B_2)and 2 girls (G_1,G_2)

Complete the following activity to write the sample space:

(a) Committee of 2 boys = {☐}

(b) Committee of 2 girls = {☐}

(c) Committee of one boy and one girl = { B_1G_1, B_1G_2, ☐ , ☐ }

(d) ∴Sample space (S) = {(B_1 B_2),(B_1G_1), ☐ , ☐ ,(B_2G_2),(G_1G_2.)}

(ii) Fill in the boxes with the help of given information :

Tax invoice of services provided (Sample)								
Food Junction, Khed-Shivapur, Pune Invoice No. 58 Mob. No. 7588580000, email-ahar.khed@yahoo.com GSTIN : 27AAAAA5555B1ZA Invoice Date 25 Feb., 2020								
SAC	FOOD ITEM	Qty	Rate (in ₹)	Taxable amount	CGST		SGST	
9963	Coffee	1	20	20	2.5%	₹0.50	2.5%	☐
9963	Masala Tea	1	10	10	☐	₹0.25	2.5%	☐
9963	Masala Dosa	2	60	☐	2.5%	☐	2.5%	₹3.00
			Total	150		☐		₹3.75
						Grand Total	= ₹157.50	

(B) Solve the following sub-questions (any two) : **[6]**

(i) Solve the following simultaneous equations using Cramer's rule : 4m+6n=64; 3m+2n=28

(ii) Solve the following quadratic equation by formula method : $x^2 + 10x + 2 = 0$

(iii) A two-digit number is formed with digits 2, 3, 5, 7, 9 without repetition. What is the probability of the following events ?

Event A: The number formed is an odd number.

Event B : The number formed is a multiple of 5.

(iv) The frequency distribution table shows the number of mango trees in a grove and their yield of mangoes. Find the median of data:

No. of Mangoes	No. of Trees.
50-100	33
100-150	30
150-200	90
200-250	80
250-300	17

4. Solve the following sub questions (any two) : **[8]**

(i) If the first term of an A.P. is p, second term is q and last term is r, then show that sum of all terms is

$$(\mathrm{q} + \mathrm{r} - 2\mathrm{p}) \times \frac{(p+r)}{2(q-p)}$$

(ii) Show the following data by a frequency polygon ;

Electricity bill (₹)	Families
200-400	240
400-600	300
600-800	450
800-1000	350
1000-1200	160

(iii) The sum of the squares of five consecutive natural numbers is 1455. Find the numbers.

5.Solve the following sub questions (any one) **[3]**

(i) Draw the graph of the equation $x + 2y = 4$. Find the area of the triangle formed by the line intersecting to X-axis and Y-axis.

(ii) A survey was conducted for 180 people in a city. 70 ate Pizza, 60 ate burgers and 50 ate chips. Draw a pie diagram for the given information