FIRST TERM EXAM - 2023-2024

STD: X **TIME: 2 HR**

SUB: Algebra **MARKS: 40**

Q.1A. Choose the correct alternative and write the alphabet of it. (4 marks)

1) To solve $4x + 3y - 4 = 0$; $6x = 8 - 5y$
by determinant method find D.
A) -38 B) 2 C) 38 D) -2

2) 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) $2x + x^2 = x^2 + 5$

3) For a given A.P , $t_7 = 4$, $d = -4$ then a = ___
A) 28 B) 20 C) 7 D) 6

4) Cumulative frequencies in grouped frequency table are useful to find....
A) Mean B) Median C) Mode D) All of these

B) Solve the following sub questions: (4 marks)

1) If $ax + by = c$ and $mx + ny = d$ and $an \neq bm$ then what type of solution will these simultaneous equations have.

2) Find the values of a , b and c from the given quadratic equation
$x^2 - 8x + 15 = 0$

3) If $\sum xifi = 218$ and $\sum fi = 50$ then find the mean.

4) Write second and third terms of an A.P. whose first term is 6 and common difference is – 3.

Q.2.A. Complete the following activity and rewrite them : (any 2) (4 marks)

1) Complete the activity to find the value of the determinant.

Activity : $\begin{vmatrix} \frac{2\sqrt{3}}{2} & \frac{9}{3\sqrt{3}} \end{vmatrix}$ $= 2\sqrt{3} \times \square - 9 \times \square$

$= \square - 18$

$= \square$

2) One of the roots of quadratic equation . $5m^2 + 2m + k = 0$ is $-\frac{7}{5}$
Complete the activity to find the value of k
Activity:
$-\frac{7}{5}$ is a root of Quadratic equation
$5m^2 + 2m + k = 0$

Put m = ☐ in the equation

$\therefore 5 \times \left(\frac{-7}{5}\right)^2 + 2 \times \square + k = 0$

$\therefore \square + \left(\frac{-14}{5}\right) + k = 0$

$\therefore \quad k = \square$

3) Complete the activity to prepare a table showing the co – ordinates which are necessary to draw a frequency polygon.

Class	18 – 19	19 – 20	20 – 21	☐
Class Mark	18.5	19.5	☐	21.5
Frequency	4	☐	15	19
Co – ordinates of point	(☐ ,)	(19.5 , 13)	(20.5 , 15)	(21.5 , 19)

Q.2.B. Solve the following sub questions : (any four) (8 marks)

1. Sum of two numbers is 7 and their difference is 5 . Find the numbers.
2. Solve the quadratic equation by factorisation method.
   $x^2 - 11 = 0$
3. Find the sum of first 'n' even natural numbers.
4. Find the θ of a component which has 45% of total share.
5. Determine the nature of roots of the following quadratic equation
   $x^2 - 4x + 4 = 0$

Q.3.A Complete the following activity and rewrite it **(any one)** **(3 marks)**

1) In an A.P. the first term is – 5 and last term is 45. If sum of 'n' terms in the A.P is 120, then complete the activity to find n.
Activity:

$t_1 = -5$, $t_n =$ ☐ , $S_n =$ ☐

$S_n = \frac{n}{2}\left(t_1 + \square\right)$

☐ $= \frac{n}{2}\left(-5 + 45\right)$

$240 =$ n x ☐

$\therefore$ n $=$ ☐

2) 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	$\frac{4}{30}$ x 360^0 = ☐
Factories	12	☐
Shops	6	☐
Houses	8	☐
Total	☐	☐

Q.3.B Solve the following questions **(any two)** **(6 marks)**

1) Solve the following quadratic equation using formula
$x^2 + 10x + 2 = 0$

2) Solve the simultaneous equations by using graphical method.
$x + 3y = 7$ $2x + y = -1$

3) If sum of 3rd and 8th term of an A.P. is 7 and sum of 7th and 14th term is – 3 then find the 10th term.

4) The following frequency distribution table shows the number of mango trees in a grove and their yield of mangoes, and also the cumulative frequencies. Find the median of the data.

Class (No. of mangoes	Frequency (No. of trees)	Cumulative Frequency (less than)
50 – 100	33	33
100 – 150	30	63
150 – 200	90	153
200 - 250	80	233
250 – 300	17	250

Q.4. Solve the following sub questions : (Any 2) **(8 marks)**

1) Six years ago, the age of mother was equal to the square of her son's age Three years hence, her age will be thrice the age of her son then find the present ages of the mother and son. https://www.maharashtrastudy.com

2) The perimeter of an isosceles triangle is 24 cm. The length of its congruent sides is 13cm less than twice the length of its base. Find the lengths of all sides of the triangle.

3) Ajay repays the borrowed amount of Rs.3,25,000 by paying Rs.30500 in the first month and then decreases the payment by Rs.1500 every month. How long will it take to clear his amount?

Q.5. Solve the following sub question : (Any 1) **(3 marks)**

1) The co-ordinates of the point of intersection of lines $ax + by = 21$ and $bx + ay = 11$ is (- 2, 3) Find the values of a and b.

2) An analysis of particular information is given in the following table

Age group	Frequency
0 – 10	3
10 – 20	8
20 – 30	7
30 – 40	9
40 – 50	6

For this data, mean = median = 27.12 Calculate the mode. Observe the given frequency distribution and values of the central tendency, interpret your observation.