FAROOQ SATTAR OOMERBHOY HIGH SCHOOL FOR BOYS
1st Semester Exam - October 2023

Std : X Subject : ALGEBRA Marks : 40 Time : 2 hours

Q1A. Choose correct alternative from the options given below: **[4]**

1. To solve $x + y = 3$; $3x - 2y - 4 = 0$ by determinant method find D.

    (A) 5   (B) 1   (C) -5   (D) -1

2. One of the roots of equation $x^2 + mx - 5 = 0$ is 2; find m.

    (A) -2   (B) -1   (C) 1   (D) 2.

3. What is the sum of the first 30 natural numbers ?

    (A) 464   (B) 465   (C) 462   (D) 461.

4. GST System was introduced in our country from ......

(A) 31stMarch 2017   (B)1stApril 2017
(C) 1stJanuary 2017   (D) 1stJuly 2017.

Q1B. Solve the following :   **[4]**

   1. Find the value of : $D = \begin{vmatrix} 5 & 3 \\ 2 & 4 \end{vmatrix}$

2. If FV = Rs 100, Premium = Rs 65 then MV = ?.

3. Solve the quadratic equation by factorization : $m^2 - 14m + 13 = 0$.

4. For an given A.P. $t7 = 4$, $d = -4$ then $a = ?$

Q2A. Complete the following activities (any 2) [4]

1. Smita has invested Rs 12,000 and purchased shares of FV Rs 10 at a premium of Rs 2. Find the number of shares she purchased. Complete the given activity to get the answer.

Solution : FV =Rs 10, Premium = Rs 2.
Therefore MV = FV+☐ = ☐ + ☐ = ☐

Number of shares = $\dfrac{\text{Total investments}}{M \cdot V}$ = $\dfrac{12000}{☐}$ = _____ shares.

Ans : Smita has purchased ☐ shares.

2. First term and common difference of an A.P. are 6 and 3 respectively ; find S27. a = 6, d = 3, S27 = ?

Sn   = n/2 [☐ + (n-1) d]
S27   = 27 / 2 [12 + (27-1)☐]
      = 27 / 2 x ☐
      = 27 x 45 = ☐.

3. Determine nature of roots of the quadratic equations $x^2 + 2x - 9 = 0$.

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

a = ☐, $b = 2$, $c = $ ☐

$b^2 - 4ac = 2^2 - 4 \times$ ☐ $\times$ ☐

$D = 4 -$ ☐

$D = 40$

Therefore $b^2 - 4ac > 0$
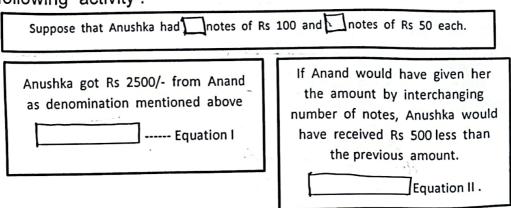
Therefore the roots of the equation are real and unequal.

Q2B. Solve the following : (any 4) [8]

1. Find the value of the discriminant of the equation $x^2 + 10x - 7 = 0$.

2. Solve the given simultaneous equations : $4m - 2n = -24; 4m + 3n = 16$.

3. Given Arithmetic Progression 12, 16, 20, 24, . . . Find the 24th term of this progression.

4. 'Pawan Medical'supplies medicines. On some medicines the rate of GST is 12 %, then what is the rate of CGST and SGST ?
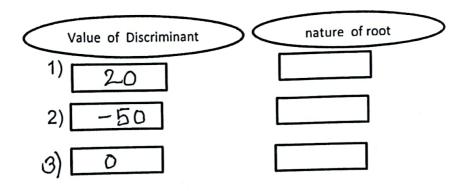
5. How many two digit numbers are divisible by 4 ?

Q3A. Complete the following activity : (any 1) [3]

(1) To find number of notes that Anushka had completed the following activity :

Suppose that Anushka had ⬜ notes of Rs 100 and ⬜ notes of Rs 50 each.

Anushka got Rs 2500/- from Anand as denomination mentioned above

⬜ ------ Equation I

If Anand would have given her the amount by interchanging number of notes, Anushka would have received Rs 500 less than the previous amount.

⬜ Equation II .

(2) Fill in the blanks :

Value of Discriminant	nature of root
1) 20	⬜
2) -50	⬜
3) 0	⬜

Q3B. Solve the following (any 2) [6]

1. Solve using formula : $x^2 + 6x + 5 = 0$.

2. Solve the following simultaneous equations using Cramer's Rule :

   $5x + 3y = -11$; $2x + 4y = -10$.

3. If $x = 5$ is a root of equation $kx^2 - 14x - 5 = 0$ then find the value of k.

Q4. Solve the following (any 2) [8]

1. In an A.P. 1st term is 1 and the last term is 20. The sum of all terms is 39 then find n.

2. Write the quadratic equation if addition of the roots is 10 and product of the roots = 9.

3. Solve the following simultaneous equations graphically.
   $2x + 3y = 12$; $x - y = 1$.

Q5. Solve the following (any 1) [3]

1. The perimeter of a rectangle is 40 cm. The length of rectangle is more than double its breadth by 2. Find length and breadth.

2. Anvar saves some amount every month. In first three months he saves 200, 250 and 300 respectively. In which month will he save 1000?

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