Time allowed: 2:40 hours

Total Marks Section B and C: 60

Note: Answer all the questions from sections 'B' and all questions from Section "C" on the E-sheet. Write your answers on the allotted/given spaces.

SECTION – B (Marks 36)

Q-2: Attempt all parts from the following. All parts carry equal marks.   [9×4=36]

i. If A= $\begin{bmatrix} 2 & -4 \\ 3 & 2 \end{bmatrix}$ then

  (a) Find det A and Adj A

  (b) Show that $A(AdjA) = (det A)I$

OR

If A= $\begin{bmatrix} 2 & -2 \\ 4 & 2 \\ -5 & 1 \end{bmatrix}$ and B= $\begin{bmatrix} 8 & 0 \\ 4 & -2 \\ 3 & 6 \end{bmatrix}$,then find the matrix X such that:

2A+3X=5B

ii. Simplify and give your answer in radical form: $(x^{\frac{1}{2}} y^{\frac{1}{3}})^{\frac{1}{2}} \div (x^{\frac{2}{3}} y^{\frac{4}{3}})^{\frac{5}{6}}$

OR

Find the values of x & y if $(2+3i)(x+iy)$ is conjugate of $4+i$.

iii. Show that $7log\frac{16}{15} + 5 log\frac{25}{24} + log\frac{81}{80} = log2$

OR

Find the value of x, if $log(x+5) + log(x-5) = 4log2 + 2log3$

iv. Factorize $(x^2 - 2x - 35)(x^2 - 2x - 3) - 144$

OR

Find L.C.M of x^2-x-12 , x^2-x-56 and x^2-x-72

v. Find the square root of $x^2 + \frac{1}{x^2} + 6\left(x + \frac{1}{x}\right) + 11$ by factorization

OR

Find the product by using formula

$(\sqrt{3}x + 2)(\sqrt{3}x - 2)(3x^2 - 2\sqrt{3}x + 4)(3x^2 + 2\sqrt{3}x + 4)$

vi. Solve $\sqrt{\frac{3x+1}{x+3}} = 2$

OR

If $a=9$, $b=12$, $c=15$ and $S = \frac{a+b+c}{2}$ then find the value of $\sqrt{S(S-a)(S-b)(S-c)}$

vii. Solve the following linear equations graphically,

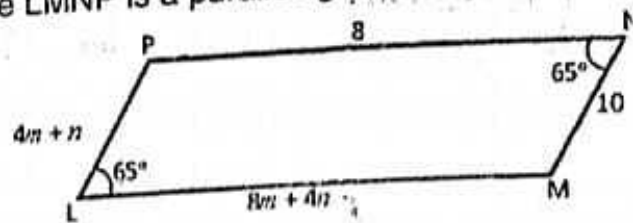2x+3y = 9 ,   3x−2y=7

OR

viii. Three villages P, Q and R are not on the same line. The people of these villages want to make a children park at such a place which is equidistant from these three villages. After fixing the place of children park, prove that the Park is equidistant from the three villages.

ix. The given figure LMNP is a parallelogram. Find the value of m and n.

Handwritten: $4m + n = 10$

Figure: parallelogram with P top-left, N top-right (8 between them), M bottom-right, L bottom-left. Angle at N = 65°, side 10, angle at L = 65°. Side $4n + n$ on left, $8m + 4n$ on bottom.

Handwritten right side:
$8m + 4n = 8$
$4n = 8 - 8m$
$n = \dfrac{8 - 8m}{4}$

OR

ABC is a triangle in which $m\angle A = 35°$, $m\angle B = 100°$, $\overline{BD} \perp \overline{AC}$. Prove that $\triangle BCD$ is an isosceles triangle.

x. Prove that if two angles of a triangle are congruent, then the sides opposite to them are also congruent.

OR

The distance of the point of concurreny of the medians of a triangle from the vertices are $1.2cm$, $1.4cm$ and $1.6cm$. Find the lengths of its medians.

SECTION – C (Marks 24)

Note: Attempt all questions. All questions carry equal marks. [3x8=24]

Q.3: The cost of 3 dozen eggs and 4 dozen oranges is Rs. 560 and the cost of 4 dozen eggs and 5 dozen oranges is Rs. 730. Find the cost per dozen of each item by using Cramer's Rule.

Handwritten: Let each no be x & y. $x + 3y = 53$ · $4x - 2y = 2$

OR

If there are two numbers such that sum of first and three times of second is 53, while the difference between 4 times the first and twice the second is two then find the numbers by Matrix Inversion method

Q.4: The expression $8x^3 + ax^2 + bx - 9$ leaves remainder -95 and 3 when divided by $x+2$ and $2x-3$ respectively. Calculate the value of a and b. x

OR

Prove that $\dfrac{x-1}{x^2+3x+2} + \dfrac{2}{x+1} - \dfrac{x-2}{x^2-2x-3} = \dfrac{2x^2-10x-13}{(x+1)(x+2)(x-3)}$

Q.5: Prove that the line segment, joining the mid-points of two sides of a triangle, is parallel to the third side and is equal to one half of its length.

OR

If in the correspondence of the two right angled-triangles the hypotenuse and one side of one triangle are congruent to the hypotenuse and the corresponding side of the other, then prove that the triangles are congruent.