TIME: 3 HOURS

MODEL PAPER-1

SEC- Sr. INTER

MATHEMATICS(2B)

MAX. MARKS-75

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Note: This question paper consists of **THREE Sections A, B and C**

SECTION-A (10x2=20)

I. Very short answer type questions :
(i) Attempt **ALL** questions.
(ii) **Each** question carries **TWO** marks.

1) If $x^2 + y^2 - 4x + 6y + C = 0$ represents a circle with radius 6 then find the value of C.

2) Find the value of K if the points (1, 3) and (2, K) are conjugate with respect to the circle $x^2 + y^2 = 35$.

3) Find the equation of the radical axis of the circles $x^2 + y^2 + 2x + 4y + 1 = 0$, $x^2 + y^2 + 4x + y = 0$.

4) Find the equation of the parabola whose focus is S(1, – 7) and vertex is A(1, – 2).

5) If the angle between the asymptotes is 30° then find its eccentricity.

6) Evaluate $\int \frac{2x^3}{1+x^8}\,dx$ on $x \in \mathbb{R}$.

7) Evaluate $\int \frac{xe^x}{(x+1)^2}\,dx$ on $x \in I \subset R\setminus\{-1\}$.

8) Evaluate $\int_0^4 |2-x|\,dx$.

9) Find $\int_{-\pi/2}^{\pi/2} \sin^2 x.\cos^4 x\,dx$.

10) Solve : $\frac{dy}{dx} = e^{x-y} + x^2e^{-y}$.

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SECTION – B (5×4=20)

II. Short answer type questions :

(i) Attempt **ANY FIVE** questions.

(ii) **Each** question carries **FOUR** marks.

11) Show that $x + y + 1 = 0$ touches the circle $x^2 + y^2 - 3x + 7y + 14 = 0$ and find its point of contact.

12) Find the equation of the circle passes through the origin and intersects the circles $x^2 + y^2 - 4x + 6y + 10 = 0$ and $x^2 + y^2 + 12y + 6 = 0$ orthogonally.

13) Find the length of major axis, minor axis and latus rectum of the ellipse $9x^2 + 16y^2 = 144$.

14) Find the equation of the ellipse in the standard form whose distance between foci is 2 and the length of latus rectum is $\frac{15}{2}$.

15) Find the equations of the tangents to the hyperbola $x^2 - 4y^2 = 4$ which are (i) parallel (ii) perpendicular to the line $x + 2y = 0$.

16) Evaluate $\int_0^{\pi/4} \log(1+\tan x)\,dx$.

17) Solve : $\frac{dy}{dx} - x\tan(y-x) = 1$.

SECTION – C (5×7=35)

III. Long answer type questions :

(i) Attempt **ANY FIVE** questions.

(ii) **Each** question carries **SEVEN** marks.

18) If (2, 0), (0, 1), (4, 5) and (0, C) are concyclic then find C.

19) Find the equation of a circle which passes through (2, – 3) and (– 4, 5) and having the centre on $4x + 3y + 1 = 0$.

20) Find the equation of the parabola whose focus is (– 2, 3) and directrix is the line $2x + 3y - 4 = 0$. Also find the length of the latus rectum and the equation of the axis of the parabola.

21) Evaluate $\int \frac{9\cos x - \sin x}{4\sin x + 5\cos x}\,dx$.

22) Obtain the reduction formula for $\int \sin^n x\,dx$ for an integer $n \geq 2$ and find the value of $\int \sin^4 x\,dx$.

23) Evaluate $\int_0^{\pi} \frac{x\sin x}{1+\sin x}\,dx$.

24) Solve : $\sin^2 x\frac{dy}{dx} + y = \cot x$.