

**Sr. Inter Mathematics IIB Model Paper****Time: 3 Hours****Max. Marks: 75****Section – A****I. Very Short Answer Questions.****Answer All Questions.****Each Question carries "Two" marks.****10 × 2 = 20 M**

1. Length of tangent drawn from (5, 4) to  $x^2 + y^2 + 2ky = 0$  is 1 then find the value of k.
2. For circle  $x^2 + y^2 - 10x - 10y + 25 = 0$  find polar equation drawn from (1, -2).
3. Find angle between circles  $x^2 + y^2 - 12x - 6y + 41 = 0$ ,  $x^2 + y^2 + 4x + 6y - 59 = 0$ .
4. Find parabola equation with focus S (1, -7), vertex A (1, -2).
5. If the eccentricity of a hyperbola is  $\frac{5}{4}$ , then find the eccentricity of its conjugate hyperbola.

6. Evaluate  $\int \frac{e^x(1+x)}{\cos^2(xe^x)} dx$

7. Find  $\int \frac{1+\cos^2 x}{1-\cos 2x} dx$  {on  $I \subset R \{n\pi : n \in Z\}$ }

8. Find the value of  $\int_0^3 \frac{x}{\sqrt{x^2+16}} dx$

9. Find the value of  $\int_0^{2\pi} \sin^2 x \cdot \cos^2 x dx$

10. Find order and degree of  $\left[ \frac{d^2 y}{dx^2} + \left( \frac{dy}{dx} \right)^3 \right]^{\frac{6}{5}} = 6y$ .

**Section – B****II. Short Answer Questions.****Answer any "Five" Questions.****Each Question carries "Four" marks.****5 × 4 = 20 M**

11. Find the equation of the circle whose center lies on X-axis and passing through (-2, 3), (4, 5).
12. Find the equation of the circle whose diameter is the common chord of the circles  $S \equiv x^2 + y^2 + 2x + 3y + 1 = 0$  and  $S' \equiv x^2 + y^2 + 4x + 3y + 2 = 0$ .

13. For ellipse  $4x^2 + y^2 - 8x + 2y + 1 = 0$  find eccentricity, length of Latus rectum, length of major axis and minor axis.
14. Find the equation of the tangents to the ellipse  $2x^2 + y^2 = 8$  which are parallel to  $x - 2y - 4 = 0$ .
15. Find the centre, eccentricity, foci, directrix and the length of the Latus rectum of the hyperbola.  $4x^2 - 9y^2 - 8x - 32 = 0$ .
16. Find the value of  $\int x \tan^{-1} x \, dx, x \in R$
17. Solve  $(1 + x^2) \frac{dy}{dx} + y = e^{\tan^{-1} x}$ .

**Section – C**

**III. Long Answer Questions.**

**Answer any "Five" Questions.**

**Each Question carries "Seven" marks.**

**5 × 7 = 35 M**

18. If (2, 0), (0, 1), (4, 5) and (0, c) are Concylic then find c.
19. Find direct common tangent equation for circles  $x^2 + y^2 + 22x - 4y - 100 = 0$ ,  
 $x^2 + y^2 - 22x + 4y + 100 = 0$ .
20. Prove that area of triangle formed by three tangents drawn from  $(x_1, y_1), (x_2, y_2), (x_3, y_3)$  to parabola  $y^2 = 4ax$  ( $a > 0$ ) is  $\frac{1}{16} |(y_1 - y_2)(y_2 - y_3)(y_3 - y_1)|$  square units.
21. Evaluate  $\int \frac{9 \cos x - \sin x}{4 \sin x + 5 \cos x} \, dx$
22. Evaluate  $\int (3x - 2) \sqrt{2x^2 - x + 1} \, dx$
23. Evaluate  $\int_0^{\frac{\pi}{4}} \frac{\sin x + \cos x}{9 + 16 \sin 2x} \, dx$
24. Solve  $\sin^2 x \cdot \frac{dy}{dx} + y = \cot x$ .