

Second Year Inter MATHS IIB

MODEL PAPER-1

Max. Marks :75

Section-A

I. Very Short Answer Questions. Answer all Questions.

Each Question carries 'Two' marks

10x2=20M

1. Find circle concentric with $x^2 + y^2 - 6x - 4y - 12 = 0$ and passing through $(-2, 14)$
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 the equation of axis and directrix of the parabola $y^2 + 6y - 2x + 5 = 0$
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 $I \subset \mathbb{R} \setminus \{n\pi : n \in \mathbb{Z}\}$ }
8. Find the value of $\int_1^5 \frac{dx}{\sqrt{2x-1}}$
9. $y = a \cos(nx + b); (a, b)$ From the differential equations of curve where a, b are parameters
10. For the differential equation $x^2 \cdot \left(\frac{d^2 y}{dx^2}\right)^{\frac{1}{3}} + x \frac{dy}{dx} + y = 0$ find order and degree

Section-B

Short Answer Questions. Answer any 'Five' Questions.

Each Question carries 'Four' marks.

5 x4 =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. Find the internal center of similitude for the circles
- i) $x^2 + y^2 + 6x - 2y + 1 = 0$ and $x^2 + y^2 - 2x - 6y + 9 = 0$
14. If the length of the latus rectum is equal $\frac{15}{2}$ and distance between foci is 2 then find equation of ellipse in the standard form
15. Find the eccentricity and the length of the latus rectum of the $9x^2 + 16y^2 - 36x + 32y - 92 = 0$
16. Find the centre, eccentricity, foci, directrix and the length of the Latus rectum of the hyperbola.
 $4x^2 - 9y^2 - 8x - 32 = 0$
17. $\int x \tan^{-1} x \, dx, x \in R$
18. solve $\int_0^1 \frac{\log(1+x)}{1+x^2} dx$
19. Solve $\frac{dy}{dx} = \tan^2(x+y)$.
20. Form the differential equation corresponding to the family of circles of radius r given by
 $(x-a)^2 + (y-b)^2 = r^2,$

Section-C

Long Answer Questions. Answer any 'Five' Questions.

Each Question carries 'Seven' marks.

5 x7 =35 M

21. If $(2,0)$ $(0,1)$ $(4,5)$ and $(0,c)$ are con cyclic then find c.
22. Find direct common tangent equations for circles $x^2 + y^2 + 22x - 4y - 100 = 0$ and $x^2 + y^2 - 22x + 4y + 100 = 0$
23. Show that $x^2 + y^2 - 6x - 9y + 13 = 0, x^2 + y^2 - 2x - 16y = 0$ touch each other .Find the point of contact and the equation of common tangent at their point of contact
24. Find the equation of the circle which cuts the following circles orthogonally $x^2 + y^2 + 4x + 2y + 1 = 0, 2(x^2 + y^2) + 8x + 6y - 3 = 0, x^2 + y^2 + 6x - 2y - 3 = 0$
25. Equation of a parabola in standard form.
26. Evaluate $\int \frac{1}{1 + \sin x + \cos x} dx$
27. Evaluate $\int \frac{2x + 5}{\sqrt{x^2 - 2x + 10}} dx$
28. Evaluate $\int \sqrt{3 + 8x - 3x^2} dx$
29. Evaluate $\int_0^{\frac{\pi}{4}} \frac{\sin x + \cos x}{9 + 16 \sin 2x} dx$
30. Solve $(x - y)^2 \frac{dy}{dx} = a^2$