MODEL QUESTION PAPER

MATHEMATICS – Paper II B

(Coordinate Geometry and Calculus)

Time : 3 Hours Max Marks : 75

Section – A

I. Very Short Answer Questions 10x2=20 Marks

Attempt all Questions. Each Question carries 2 marks.

1. If $x^2 + y^2 - 4x + 6y + c = 0$ represents a circle with radius '6', find the value of 'c'.

2. Find the equation of the directix of the parabola $2x^2 + 7y = 0$.

3. Find the length of the latus rectum of the ellipse $\frac{x^2}{16} + \frac{y^2}{8} = 1$

4. Find the eccentricity of the hyperbola $x^2 - 4y^2 = 4$

5. Find the distance between the two points in a plane whose polar coordinates are $(2, \pi/6)$ $(3, \pi/4)$

6. If $y = \frac{1}{2x+5}$, then find y_n.

7. Find $\int \sqrt{1 + \sin 2x}\, dx$

8. Find $\int \frac{e^{\sin^{-1} x}}{\sqrt{1 - x^2}} dx$

9. Obtain $\int_1^4 x\sqrt{x^2-1}\,dx$

10. State the Simpson's rule for Numerical Integration of a function f(x) over the interval $[a,b]$ by dividing $[a,b]$ into n sub-intervals.

Section – B

II. Short Answer Questions 5 x 4 = 20 Marks

Attempt any five questions. Each question carries 4 marks

11. If the line $y = mx + c$ touches the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ $c^2 = a^2 m^2 + b^2$; $(a > b)$

12. Find the equations of the tangents shown drawn from (-2,1) to the hyperbola $2x^2 - 3y^2 = 6$.

13. Transform the polar equation $r\cos^2\frac{\theta}{2} = a$ (a>0), origin as pole and the +ve axis as initial line, into Cartesian form.

14. If $y = \frac{\log x}{x}$ then show that

$$y_n = \frac{(-1)^n \angle n}{x^{n+1}}\left(\log x - 1 - \frac{1}{2} - \frac{1}{3} - \ldots - \frac{1}{n}\right)$$

15. Evaluate $\int \frac{x^6 - 1}{1 + x^2} \, dx$

16. Solve $(x^2 + y^2)\, dx = 2\, xy\, dy$

17. Solve $\frac{dy}{dx} = \frac{2x + y + 3}{2y + x + 1}$

Section – C

II. Long Answer Questions 5 x 7 = 35 Marks

Attempt any five questions. Each question carries 7 marks

18. Find the equation of the pair of tangents drawn from (3,2) to the circle $x^2 + y^2 - 6x + 4y - 2 = 0$

19. Find the equation of the circle passing through the points of intersection of the circles $x^2 + y^2 - 8x - 6y + 21 = 0$, $x^2 + y^2 - 2x - 15 = 0$ and the point (1,2).

20. Find the equation of the circle passing through the origin and coaxial with the circles $x^2 + y^2 - 6x + 4y - 8 = 0$ and $x^2 + y^2 - 2x + y + 4 = 0$.

21. Find the pole of the line $x + y + 2 = 0$ with respect to the parabola $y^2 + 4x - 2y - 3 = 0$.

22. Evaluate $\int \frac{3 \sin x + \cos x + 7}{\sin x + \cos x + 1} \, dx$

23. Evaluate $\int \frac{x^{1/4}}{x^{1/2}+1}\,dx$

24. Find the area enclosed by the curves $y = 3x$ and $y = 6x - x^2$.

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QUESTION PAPER PATTERN

Subject	:	**Mathematics**
Paper	:	Paper –II B
Class	:	II Year Intermediate (Coordinate Geometry, Calculus)
Time	:	3 Hours
Max. Marks	:	75

1. Weightage of Ojbectives :

Objectives	Knowledge	Understanding	Application	Total
Actual Marks	41	28	28	97

2. Weightage to form of Questions :

Form of questions	VSA Sec A	SA Sec B	LA Sec C	Total
No. of questions	10 of 10	5 of 7	5 of 7	20 of 24
Marks allotted	10 x 2=20 10 x 2=20	5 x 4=20 7 x 4 =28	5 x 7=35 7 x 7=49	75 / 97

3. Weightage to content units / sub-units : **Marks**

Coordinate Geometry

1. Circles	16
2. System of Circles	07
3. Parabola	09
4. Ellipse	06
5. Hyperbola	06
6. Polar Coordiantes	06

Calculus

7. Successive differentiation	06
8. Integration	15
9. Definite Integration	09
10. Numerical Integration	09
11. Differential equations	08
Total	97

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