

**MODEL QUESTION PAPER**  
**MATHEMATICS – Paper II B**  
**(Coordinate Geometry and Calculus)**

Time : 3 Hours

Max Marks : 75

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**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 directrix 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  $r \cos^2 \theta = a (a > 0)$ , origin as pole and the +ve axis as initial line, into Cartesian form.

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

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

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

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

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	:	<b>Mathematics</b>
Paper	:	Paper –II B
Class	:	II Year Intermediate (Coordinate Geometry, Calculus)
Time	:	3 Hours
Max. Marks	:	75

### 1. Weightage of Objectives :

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	$\frac{10 \times 2=20}{10 \times 2=20}$	$\frac{5 \times 4=20}{7 \times 4=28}$	$\frac{5 \times 7=35}{7 \times 7=49}$	75 / 97

### 3. Weightage to content units / sub-units :

#### Coordinate Geometry

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