

0293**B**

2287439

Total No. of Questions: 24
 Total No. of Printed Pages: 3

 Regd.
 No.

--	--	--	--	--	--	--	--	--	--

MATHEMATICS
 Paper - II (B)
 (English Version)

Time : 3 Hours

Max. Marks : 75

 Note: This question paper consists of **three** Sections **A**, **B** and **C**.
SECTION - A**(10 × 2 = 20)**

Very short answer type questions:

(i) Answer **all** questions.(ii) Each question carries **two** marks:

- Find the centre and radius of the circle $x^2 + y^2 - 4x - 8y - 41 = 0$.
- Locate the position of the point $P(4, 2)$ with respect to the circle $S \equiv 2x^2 + 2y^2 - 5x - 4y - 3 = 0$.
- Find the equation of the common chord of the circles $x^2 + y^2 + 2x + 3y + 1 = 0$, $x^2 + y^2 + 4x + 3y + 2 = 0$.
- Find the coordinates of the points on the parabola $y^2 = 2x$ whose focal distance is $\frac{5}{2}$.
- Find the foci, eccentricity of the hyperbola $16y^2 - 9x^2 = 144$.
- Evaluate $\int \sqrt[3]{2x^2} dx$ on $x \in (0, \infty)$.
- Evaluate $\int 2x.e^{x^2} dx$ on $x \in \mathbb{R}$.
- Evaluate $\int_0^4 |2-x| dx$.
- Find $\int_0^{\pi/2} \sin^7 x dx$.
- Find the order of the differential equation of the family of all circles with their centres at the origin.

[P.T.O.]



Short answer type questions:

(i) Answer any **five** questions.

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

11. Find the equation of tangent and normal at (3, 2) of the circle $x^2 + y^2 - x - 3y - 4 = 0$.

12. Find the equation of the circle which passes through the origin and intersects the circles $x^2 + y^2 - 4x - 6y - 3 = 0$, $x^2 + y^2 - 8y + 12 = 0$ orthogonally.

13. If the length of the major axis of an ellipse is three times the length of its minor axis, then find the eccentricity of the ellipse.

14. Find the value of k, if $4x + y + k = 0$ is a tangent to the ellipse $x^2 + 3y^2 = 3$.

15. Find the equation to the hyperbola whose foci are (4, 2) and (8, 2) and eccentricity is 2.

16. Find the area of the region enclosed by the curves $y = x^2$, $y = 2x$.

17. Solve the differential equation $(xy^2 + x) dx + (yx^2 + y) dy = 0$.

SECTION - C

(5 × 7 = 35)

II. Long answer type questions.

(i) Answer any **five** questions.

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

18. Find the equation of the circle whose centre lies on x-axis and passes through (-2, 3) and (4, 5).

19. Find the transverse common tangents of the circles $x^2 + y^2 - 4x - 10y + 28 = 0$ and $x^2 + y^2 + 4x - 6y + 4 = 0$.

20. Find the coordinates of the vertex and focus, the equations of the directrix and axis of the parabola $y^2 + 4x + 4y - 3 = 0$.



21. Evaluate $\int \frac{1}{1 + \sin x + \cos x} dx$.

22. Obtain reduction formula for $I_n = \int \tan^n x dx$, for an integer $n \geq 2$

deduce the value of $\int \tan^6 x dx$.

23. Evaluate $\int_0^{\pi} \frac{x \sin x}{1 + \cos^2 x} dx$.

24. Solve the differential equation $\frac{dy}{dx} + y \tan x = \sin x$.
