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MM 25

Differential Equations

Time 45 Min

Section A 1 Mark Each

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Write the order and degree of the following differential equations

1. $\frac{dy}{dx} + \sin\left(\frac{dy}{dx}\right) = 0$

2. $x - \sin\left(\frac{dy}{dx}\right) = 0$

3. Solve the differential equation $\frac{dr}{d\theta} = \cos \theta$

Section A 4 Marks Each

4. Show that the differential equation that represents all parabolas having their axis of symmetry coincident with the axis of x is $yy_2 + y_1^2 = 0$.

5. Find the differential equation of the family of curves given by $x^2 + y^2 = 2$

6. Solve the differential equation $\cos x (1 + \cos y) dx - \sin y (1 + \sin x) dy = 0$

7. Show that $y = a \cos nx + b \sin nx$ is a solution of the quadratic equation

$$\frac{d^2y}{dx^2} + n^2y = 0$$

Section A 6 Marks Each

8. Solve the differential equation $\sqrt{1 + x^2 + y^2 + x^2y^2} + xy \frac{dy}{dx} = 0$

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