

**CSSR & SRRM DEGREE & PG COLLEGE**

(AUTONOMOUS)

UG (CBCS) REGULAR EXAMINATIONS, APRIL/MAY-2025

BSc(CS), SEMESTER-II

**DIFFERENTIAL EQUATIONS**

(w.e.f. 2024-25 Admitted Batch)

**Time: 3 hrs.**

(No additional sheet will be supplied)

**Max. Marks: 70****SECTION-A****I. Answer any FIVE questions****5 x 4 = 20 M**

- Find the order and degree of the differential equation  $\left[\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^3\right]^{\frac{6}{5}} = 6y$ .
- Solve  $(e^y + 1)\cos x dx + e^y \sin x dy = 0$ .
- Solve  $y^2 \log y = xyp + p^2$ .
- Solve  $(y - px)(p - 1) = p$ .
- Solve  $(D^4 - 4D^3 + 6D^2 - 4D + 1)y = 0$ .
- Solve  $(D^3 - 5D^2 + 8D - 4)y = e^{2x}$ .
- Solve  $(D^2 - 4)y = x^2$ .
- Solve  $(D^2 - 5D + 6)y = xe^x$ .
- Solve  $x^2 \frac{d^2y}{dx^2} - 3x \frac{dy}{dx} + 4y = 2x^2$ .
- Solve  $(1 + x^2) \frac{d^2y}{dx^2} + (1 + x) \frac{dy}{dx} + y = 0$ .

**SECTION-B****II. Answer ALL questions****5 x 10 = 50 M**

- Solve  $(x^2 + 1) \frac{dy}{dx} + 4xy = \frac{1}{x^2 + 1}$   
(Or)
- Solve  $x \frac{dy}{dx} + y = y^2 \log x$ .
- Solve  $p^2 + 2py \cot x = y^2$ .  
(Or)
- Show that the family of confocal conics  $\frac{x^2}{a^2 + \lambda} + \frac{y^2}{b^2 + \lambda} = 1$  is self-orthogonal, where  $\lambda$  is a parameter.
- Solve  $(D^2 - 4D + 3)y = \sin 3x \cdot \cos 2x$ .  
(Or)
- Solve  $(D^2 + 4)y = e^x + \sin 2x + \cos 2x$ .
- Solve  $(D^2 - 2D + 4)y = 8(x^2 + e^{2x} + \sin 2x)$   
(Or)
- Solve  $(D^2 + 2D + 1)y = x \cos x$ .
- Solve  $(x - 1)y'' - xy' + y = 1$ .  
(Or)
- Solve  $(D^2 + a^2)y = \tan ax$  by the method of variation of parameter.