

**Recommended Question Paper Patterns and Models**  
**BLUE PRINT FOR QUESTION PAPER PATTERN**  
**COURSE-I, DIFFERENTIAL EQUATIONS**

Unit	TOPIC	S.A.Q(including choice)	E.Q(including choice)	Total Marks
<b>I</b>	Differential Equations of 1 <sup>st</sup> order and 1 <sup>st</sup> degree	2	2	30
<b>II</b>	Orthogonal Trajectories, Differential Equations of 1 <sup>st</sup> order but not of 1 <sup>st</sup> degree	2	2	30
<b>III</b>	Higher Order Linear Differential Equations (with constant coefficients) – I	1	2	25
<b>IV</b>	Higher Order Linear Differential Equations (with constant coefficients) – II	2	2	30
<b>V</b>	Higher Order Linear Differential Equations (with non constant coefficients)	1	2	25
<b>TOTAL</b>		8	10	140

**S.A.Q.** = Short answer questions (5 marks)

**E.Q.** = Essay questions (10 marks)

Short answer questions : 5 X 5 M = 25 M

Essay questions : 5 X 10 M = 50 M

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Total Marks = 75 M

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**CBCS/ SEMESTER SYSTEM**  
**(W.e.f 2020-21 Admitted Batch)**  
**B.A./B.Sc. MATHEMATICS**  
**COURSE-I, DIFFERENTIAL EQUATIONS**  
**MATHEMATICS MODEL PAPER**

**Time: 3Hrs**

**Max.Marks:75M**

**SECTION - A**

**Answer any FIVE questions. Each question carries FIVE marks 5 X 5 M=25 M**

1. Solve  $(1 + e^{x/y}) dx + e^{x/y} (1 - \frac{x}{y}) dy = 0$ .
2. Solve  $(y - e^{\sin^{-1} x}) \frac{dx}{dy} + \sqrt{1 - x^2} = 0$
3. Solve  $y + px = p^2 x^4$ .
4. Solve  $(px - y)(py + x) = 2p$
5. Solve  $(D^2 - 3D + 2)y = \cosh x$
6. Solve  $(D^2 - 4D + 3)y = \sin 3x \cos 2x$ .
7. Solve  $\frac{d^2 y}{dx^2} - 6 \frac{dy}{dx} + 13y = 8e^{3x} \sin 2x$ .
8. Solve  $x^2 y'' - 2x(1 + x)y' + 2(1 + x)y = x^3$

**SECTION - B**

**Answer ALL the questions. Each question carries TEN marks. 5 X 10 M = 50 M**

9 a) Solve  $x \frac{dy}{dx} + y = y^2 \log x$ .

(Or)

9 b) Solve  $(y + \frac{1}{3}y^3 + \frac{1}{2}x^2) dx + \frac{1}{4}(x + xy^2) dy = 0$ .

10 a) Solve  $p^2 + 2p \cot x = y^2$ .

(Or)

10 b) Find the orthogonal trajectories of the family of curves

$x^{2/3} + y^{2/3} = a^{2/3}$  where 'a' is the parameter.

11 a) Solve  $(D^3 + D^2 - D - 1)y = \cos 2x$ .

(Or)

11 b) Solve  $(D^2 - 3D + 2)y = \sin e^{-x}$ .

12 a) Solve  $(D^2 - 2D + 4)y = 8(x^2 + e^{2x} + \sin 2x)$

(Or)

12 b)  $\frac{d^2y}{dx^2} + 3 \frac{dy}{dx} + 2y = xe^x \sin x$

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a) Solve  $(D^2 - 2D)y = e^x \sin x$  by the method of variation of parameters.

(Or)

13 b) Solve  $3x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = x$