

Model Question Paper
Differential Equations - Part I

12th Standard

Maths

Reg.No. :

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I. Answer all questions.

II. Use blue pen only.

Time : 01:30:00 Hrs

Total Marks : 75

3 x 1 = 3

Section-A

- 1) The integrating factor of $\frac{dy}{dx} + 2\frac{y}{x} = e^{4x}$ is
(a) $\log x$ (b) x^2 (c) e^x (d) x
- 2) If $\cos x$ is an integrating factor of the differential equation $\frac{dy}{dx} + Py = Q$ then $P =$
(a) $-\cot x$ (b) $\cot x$ (c) $\tan x$ (d) $-\tan x$
- 3) The integrating factor of $dx + xdy = e^{-y} \sec^2 y dy$ is
(a) e^x (b) e^{-x} (c) e^y (d) e^{-y}

Section-B

5 x 3 = 15

- 4) Form the differential equations by eliminating arbitrary constants given in brackets
(i) $y^2 = 4ax$ { a }
- 5) Solve: $(D^2 + 5D + 6)y = 0$
- 6) Solve: $(D^2 + 6D + 9)y = 0$

Section-C

3 x 6 = 18

- 7) Form the differential equation from the following equations $Ax^2 + By^2 = 1$
- 8) Find the differential equation of the family of straight lines $y = mx + \frac{a}{m}$ when (i) m is the parameter; (ii) a is the parameter; (iii) a, m both are parameters.
- 9) Find the differential equation that will represent the family of all circles having centres on the x -axis and the radius is unity.
- 10) a) Solve: $(D^2 + D + 1)y = 0$
b) Solve the following: $\frac{dy}{dx} = \frac{y(x-2y)}{x(x-3y)}$

Section-D

5 x 10 = 50

- 11) Find the cubic polynomial in x which attains its maximum value 4 and minimum value 0 at $x = -1$ and 1 respectively.
- 12) Solve: $(2\sqrt{xy} - x) dy + y dx = 0$
- 13) Solve: $(x^3 + 3xy^2) dx + (y^3 + 3x^2y) dy = 0$
- 14) Solve: $(1 + e^{x/y}) dx + e^{x/y} (1 - x/y) dy = 0$ given that $y = 1$, where $x = 0$
- 15) Solve the following: $(x^2 + y^2) dx + 3xy dy = 0$
