

Model Question Paper
Differential Equations - Part IV

12th Standard

Business Maths

Reg.No. :

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I. Answer all the questions.

II. Use blue pen only.

Time : 01:30:00 Hrs

Total Marks : 85

5 x 1 = 5

Part-A

- 1) The solution of the equation of the type $\frac{dy}{dx} + py = 0$, (P is a function of x) is given by
(a) $ye^{\int p dx} = c$ (b) $y \int p dx = c$ (c) $xe^{\int p dx} = y$ (d) $y = cx$
- 2) The solution of the equation of the type $\frac{dy}{dx} + px = Q$ (P and Q are functions of y) is
(a) $y = \int Qe^{\int p dx} dy + c$ (b) $ye^{\int p dx} = \int Qe^{\int p dx} dx + c$ (c) $xe^{\int p dy} = \int Qe^{\int p dy} dy + c$ (d) $xe^{\int p dy} = \int Qe^{\int p dx} dx + c$
- 3) The integrating factor of $x \frac{dy}{dx} - y = e^x$ is
(a) $\log x$ (b) $e^{-\frac{1}{x}}$ (c) $\frac{1}{x}$ (d) $\frac{-1}{x}$
- 4) The integrating factor of $(1+x^2) \frac{dy}{dx} + xy = (1+x^2)^3$ is
(a) $\sqrt{1+x^2}$ (b) $\log(1+x^2)$ (c) $e^{\tan^{-1}x}$ (d) $\log(\tan^{-1}x)$
- 5) The integrating factor of $\frac{dy}{dx} + \frac{2y}{x} = x^3$ is
(a) $2\log x$ (b) e^{x^2} (c) $3\log(x^2)$ (d) x^2

Part-B

5 x 6 = 30

- 6) Solve : $\frac{dy}{dx} + y \cot x = \operatorname{cosec} x$
- 7) Solve : $x \frac{dy}{dx} - 3y = x^2$
- 8) solve : $\frac{dy}{dx} - y \tan x = e^x \sec x$
- 9) Find the differential equation by eliminating the arbitrary constants a and b from $y = a \tan x + b \sec x$.
- 10) Solve the equation $(1-x^2) \frac{dy}{dx} - xy = 1$

Part-C

5 x 10 = 50

- 11) Form the differential equation of the family of curves
 $y = A \cos 5x + B \sin 5x$ where A and B are parameters.
- 12) Form the differential equation of the family of curves
 $y = ae^{3x} + be^x$ where a and b are parameters.
- 13) Find the differential equation of a family of curves given
by $y = a \cos(mx + b)$, a and b being arbitrary constants.
- 14) Solve $\cos x \frac{dy}{dx} + y \sin x = 1$
- 15) Solve $\frac{dy}{dx} + ay = e^x$ (where $a \neq -1$)
