

**Differential Equations**

**TEST - 01**

- Q01. Write the order and degree of  $\frac{d^4y}{dx^4} = \left\{ c + \left( \frac{dy}{dx} \right)^2 \right\}^{3/2}$ .
- Q02. Form the differential equation corresponding to the curves  $y^2 = a(b-x)(b+x)$ .
- Q03. Solve the differential equation:  $(1+y^2)(1+\log x)dx + xdy = 0$ .
- Q04. Show that the differential equation  $x \cos\left(\frac{y}{x}\right) \frac{dy}{dx} = y \cos\left(\frac{y}{x}\right) + x$  is homogeneous. Hence solve it as well.
- Q05. Solve:  $\frac{dy}{dx} = e^{y+x} + e^y x^2$ .
- Q06. Solve:  $ydx - (x+2y^2)dy = 0$ .
- Q07. Find the particular solution of the differential equation:  $\cos y dy + \cos x \sin y dx = 0$ ;  $y\left(\frac{\pi}{2}\right) = \frac{\pi}{2}$ .
- Q08. Solve:  $(x+y+1)dx - (2x+2y+1)dy = 0$ .

**TEST - 02**

- Q01. Form the differential equation of the family of curves represented by  $y = a(b-x^2)$ .
- Q02. Solve:  $\sqrt{1-y^2}dx = (\sin^{-1}y - x)dy$ ;  $y(0) = 0$ .
- Q03. Solve the differential equation given as:  $\frac{dy}{dx} + \frac{4xy}{x^2+1} = \frac{1}{(x^2+1)^3}$ .
- Q04. Show that the differential equation  $2ye^{x/y}dx + (y - 2xe^{x/y})dy = 0$  is homogeneous and, hence find the particular solution if it is given that  $y = 1$  when  $x = 0$ .
- Q05. Solve:  $2xy + y^2 - 2x^2 \frac{dy}{dx} = 0$ ;  $y(1) = 2$ .
- Q06. Solve:  $\frac{dy}{dx} + y \cot x = 2x + x^2 \cot x$ ,  $x \neq 0$ .
- Q07. Write the order and degree of  $y^2 + \frac{dy}{dx} = \int y dx$ .
- Q08. Solve:  $\left( \frac{e^{-2\sqrt{x}}}{\sqrt{x}} - \frac{y}{\sqrt{x}} \right) \frac{dx}{dy} = 1$ ,  $x \neq 0$ .

**Answers of Differential Equations**

**TEST 01**

- Q01. Degree : 2, Order : 4
- Q02.  $xyy'' + (y')^2 - yy' = 0$
- Q03.  $y = \tan\left(k - \frac{(1+\log x)^2}{2}\right)$
- Q04.  $\sin\left(\frac{y}{x}\right) = k + \log|x|$
- Q05.  $e^x + e^{-y} + \frac{1}{3}x^3 + k = 0$
- Q06.  $x = 2y^2 + ky$
- Q07.  $\log|\sin y| + \sin x = 1$
- Q08.  $3y = 3x + \log|3x + 3y + 2| + \lambda$ .

**TEST 02**

- Q01.  $xy'' - y' = 0$
- Q02.  $x = \sin^{-1}y + ke^{-\sin^{-1}y} - 1$
- Q03.  $y(x^2+1)^2 = \tan^{-1}y + k$
- Q04.  $2e^{x/y} + \log|y| = k$
- Q05.  $\log|x| + 2\left(\frac{x}{y}\right) + k = 0$
- Q06.  $y \sin x = x^2 \sin x + k$
- Q07. Degree : 1, Order : 2
- Q08.  $y = (2\sqrt{x} + k)e^{-2\sqrt{x}}$ .

# If you've any query regarding any question in the test, please write to me on [theopgupta@gmail.com](mailto:theopgupta@gmail.com)

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