# DIFFERENTIAL EQUATIONS

## GENERAL AND PARTICULAR SOLUTIONS OF A DIFFERENTIAL EQUATION

## EXERCISE

**Q.1** Which of the following functions satisfies the differential equation $\frac{dy}{dx}+2y=0$?

(a) $y=-2e^{-x}$ (b) $y=2e^{x}$ (c) $y=e^{-2x}$ (d) $y=e^{2x}$

**Q.2** The function $y = 8\sin^2 x$ is a solution to the differential equation $\frac{d^2y}{dx^2}+4y=0$.

(a) True (b) False

**Q.3** Which of the following functions satisfies the differential equation $xy' - y = 0$?

(a) $y = 4x$ (b) $y=x^2$ (c) $y=-4x$ (d) $y=2x$

**Q.4** Which of the following differential equations is satisfied by the solution $y = 3x^2$?

(a) $\frac{d^2y}{dx^2}-6x=0$ (b) $\frac{dy}{dx}-3x=0$

(c) $x\frac{d^2y}{dx^2}-\frac{dy}{dx}=0$ (d) $\frac{d^2y}{dx^2}-\frac{3dy}{dx}=0$

**Q.5** Which of the following functions satisfies the differential equation $y'' + 6y = 0$?

(a) $y = 5\cos 3x$ (b) $y = 5\tan 3x$

(c) $y = \cos 3x$ (d) $y = 6\cos 3x$

**Q.6** Which function among the following is a solution to the differential equation $\frac{dy}{dx} - 14x = 0$?

(a) $y = 7x^2$ (b) $y = 7x^3$ (c) $y = x^7$ (d) $y = 14x$

**Q.7** Which of the following given differential equations has y = log x as a solution?

(a) $\frac{d^2y}{dx^2} - x = 0$ (b) $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^2 = 0$

(c) $\frac{d^2y}{dx^2} - \frac{dy}{dx} = 0$ (d) $x\frac{d^2y}{dx^2} - \log x = 0$

**Q.8** How many arbitrary constants will be present in the general solution of a second-order differential equation?

(a) 3 (b) 4 (c) 2 (d) 1

**Q.9** The count of arbitrary constants in a specific solution of a fourth-order differential equation is ___

(a) 1 (b) 0 (c) 4 (d) 3

**Q.10** The function y = 3 cos x is a solution to the equation $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} = 0$

(a) True (b) False

## ANSWER KEY

**1.** (c)
**2.** (a)
**3.** (d)
**4.** (c)
**5.** (a)
**6.** (a)
**7.** (b)
**8.** (c)
**9.** (b)
**10.** (b)