

JEE Chapter 19 CD

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C. MCQ WITH ONE CORRECT ANSWER

- 1) A solution of the differential equation (1999 – 2Marks)

$$\left(\frac{dy}{dx}\right)^2 - x\frac{dy}{dx} + y = 0$$
 - a) $y = 2$
 - b) $y = 2x - 4$
 - c) $y = 2x$
 - d) $y = 2x^2 - 4$
- 2) If $x^2 + y^2 = 1$, then (2000S)
 - a) $yy'' - 2(y')^2 + 1 = 0$
 - b) $yy'' + (y')^2 + 1 = 0$
 - c) $yy'' - (y')^2 - 1 = 0$
 - d) $yy'' + 2(y'')^2 + 1 = 0$
- 3) If $y(t)$ is a solution of $(1+t)\frac{dy}{dt} - ty = 1$ and $y(0) = -1$, then $y(1)$ is equal to (2003S)
 - a) $-\frac{1}{2}$
 - b) $e - \frac{1}{2}$
 - c) $e + \frac{1}{2}$
 - d) $\frac{1}{2}$
- 4) If $y = y(x)$ and $\frac{2+\sin x}{y+1}\left(\frac{dy}{dx}\right) = -\cos x$, $y(0) = 1$, then $y\left(\frac{\pi}{2}\right)$ (2004S)
 - a) $\frac{1}{3}$
 - b) $-\frac{1}{3}$
 - c) $\frac{2}{3}$
 - d) 1
- 5) If $y = y(x)$ and it follows the relation $x \cos y + y \cos x = \pi$ then $y''(0) =$ (2005S)
 - a) 1
 - b) -1
 - c) $\pi - 1$
 - d) $-\pi$
- 6) The solution of primitive integral equation $(x^2 + y^2)dy = xy dx$ is $y = y(x)$. If $y(1) = 1$ and $x_0 = e$, then x_0 is equal to (2005S)
 - a) $\sqrt{2(e^2 - 1)}$
 - b) $\sqrt{3e}$
 - c) $\sqrt{2(e^2 + 1)}$
 - d) $\sqrt{\frac{e^2 + 1}{2}}$
- 7) For the primitive integral equation $ydx + y^2dy = x dy$; $x \in \mathbb{R}, y > 0, y = y(x), y(1) = 1$, then $y(-3)$ is (2005S)
 - a) 3
 - b) 1
 - c) 2
 - d) 5
- 8) The differential equation $\frac{dy}{dx} = \frac{\sqrt{1-y^2}}{y}$ determines a family of circles with (2005S)
 - a) variable radii and a fixed centre at $(0, 1)$

- b) variable radii and a fixed centre at $(0, -1)$
 c) fixed radius 1 and variable centres along the x-axis
 d) fixed radius 1 and variable centres along the y-axis

9) The function $y = f(x)$ is the solution of the differential equation (JEEAdv.2014)

$$\frac{dy}{dx} + \frac{xy}{x^2 - 1} = \frac{x^4 + 2x}{\sqrt{1 - x^2}} \quad (2)$$

in $(-1, 1)$ satisfying $f(0) = 0$. Then

$$\int_{-\frac{\sqrt{3}}{2}}^{\frac{\sqrt{3}}{2}} f(x) dx \text{ is} \quad (3)$$

- a) $\frac{\pi}{3} - \frac{\sqrt{3}}{2}$ c) $\frac{\pi}{3} - \frac{\sqrt{3}}{4}$
 b) $\frac{\pi}{6} - \frac{\sqrt{3}}{4}$ d) $\frac{\pi}{6} - \frac{\sqrt{3}}{2}$

10) If $y = y(x)$ satisfies the differential equation (JEEAdv.2018)

$$8\sqrt{x} \left(\sqrt{9 + \sqrt{x}} \right) dy = \left(\sqrt{4 + \sqrt{9 + \sqrt{x}}} \right)^{-1} dx, x > 0 \quad (4)$$

and $y(0) = \sqrt{7}$, then $y(256) =$

- a) 3 c) 9
 b) 16 d) 80

D. MCQ WITH ONE OR MORE THAN CORRECT ANSWER

1) The order of the differential equation whose general solution is given by $y = (C_1 + C_2) \cos(x + C_3) - C_4 e^{x+C_5}$, where C_1, C_2, C_3, C_4, C_5 are arbitrary constants, is (1998 – 2Marks)

- a) 5 c) 4
 b) 3 d) 2

2) The differential equation representing the family of curves $y^2 = 2c(x + \sqrt{c})$, where c is a positive parameter, is of (1999 – 3Marks)

- a) order 1 c) order 2
 b) degree 3 d) degree 4

3) A curve $y = f(x)$ passes through $(1, 1)$ and at $P(x, y)$, the tangent cuts the x -axis and y -axis at A and B respectively such that $BP : AP = 3 : 1$, then (2006 – 5M, –1)

- a) equation of curve is $xy' - 3y = 0$
 b) normal at $(1, 1)$ is $x + 3y = 4$
 c) curve passes through $(2, \frac{1}{8})$
 d) equation of curve is $xy' + 3y = 0$

4) If $y(x)$ satisfies the differential equation $y' - y \tan x = 2x \sec x$ and $y(0) = 0$, then (2012)

- a) $y\left(\frac{\pi}{4}\right) = \frac{\pi^2}{8\sqrt{2}}$ c) $y\left(\frac{\pi}{4}\right) = \frac{\pi^2}{18}$
 b) $y\left(\frac{\pi}{3}\right) = \frac{\pi^2}{9}$ d) $y\left(\frac{\pi}{3}\right) = \frac{4\pi}{3} + \frac{2\pi^2}{3\sqrt{3}}$

5) A curve passes through the point $(1, \frac{\pi}{6})$. Let the slope of the curve at each point (x, y) be $\frac{y}{x} + \sec\left(\frac{y}{x}\right)$, $x > 0$. Then the equation of the curve is (JEEAdv.2013)

a) $\sin\left(\frac{y}{x}\right) = \log x + \frac{1}{2}$

b) $\sec\left(\frac{2y}{x}\right) = \log x + 2$

c) $\cos \sec\left(\frac{y}{x}\right) = \log x + 2$

d) $\cos\left(\frac{2y}{x}\right) = \log x + \frac{1}{2}$