

Deptt: CSE

Exam: Spring 2020 (Final Term)

Time: 03 Hours

Marks: 50

Part-I :- MCQs Please click the right option by solving the following ODEs.

(1) $y^{(IV)} + y^{(II)} = 3x^2 + 4 \sin x - 2 \cos x$

(a) $y = c_1 + c_2 x + c_3 x^2 + c_4 x^3 + \frac{x^4}{4} - 3x^2 + 6 + 2x \cos x + x \sin x$

(b) $y = c_1 + c_2 x + c_3 \cos x + c_4 \sin x + x^4 - 3x^2 + 6 + x \cos x + x \sin x$

(c) $y = (c_1 + c_2 + c_3 + c_4) e^x + \frac{x^4}{4} - 3x^2 + 6 + 2x \cos x + x \sin x$

(d) $y = c_1 + c_2 x + c_3 \cos x + c_4 \sin x + \frac{x^4}{4} - 3x^2 + 6 + 2x \cos x + x \sin x$

(2) $y''' + y' = 2x^2 + 4 \sin x$

(a) $y = c_1 + c_2 x + c_3 x^2 + 3x + 4 \sin - 2 \cos x$

(b) $y = c_1 + c_2 \cos x + c_3 \sin x + \frac{2}{3} x^3 - 2x \sin x$

(c) $y = c_1 + c_2 \cos x + c_3 \sin x + \frac{2}{3} x^2 + \ln(x)$

(d) $y = c_1 + c_2 \cos x + c_3 \sin x + \frac{2}{3} x^3 - 4x - 2x \sin x$

(3) $y'' + 2y' - 3y = 2e^x - 10 \sin x$

(a) $y = c_1 e^{3x} + c_2 e^{-x} + \frac{1}{2} e^x + \frac{5}{2} \sin x$

(b) $y = c_1 + c_2 e^{3x} + \frac{1}{2} e^x + \frac{5}{2} (\sin x + \cos x)$

(c) $y = c_1 e^{3x} + c_2 e^{-x} + \frac{1}{2} e^x + \frac{5}{2} (\sin x - \cos x)$

(d) None of the above.

- $y = c_1 e^x + c_2 e^{-2x} + c_3 e^{2x} + \frac{1}{45} e^x (\sin 3x - 1 \cos 3x)$
 (b) $y = c_1 e^x + c_2 e^{2x} + c_3 e^{-2x} + \frac{1}{45} e^x (\sin 3x - 1 \cos 3x)$
 (c) $y = c_1 e^x + c_2 e^{-2x} + c_3 e^{2x} + \frac{1}{45} e^x (\sin 3x - 1 \cos 3x)$
 (d) None of the above.

(5) $y''' + y = 1 + e^{-x} + e^{2x}$

- (a) $y = c_1 e^{-x} + (c_2 \cos \frac{\sqrt{3}}{2} x + c_3 \sin \frac{\sqrt{3}}{2} x) e^{\frac{x}{2}} + 1 + \frac{1}{2} e^{-x} + \frac{1}{2} e^{2x}$
 (b) $y = c_1 e^{-x} + (c_2 \cos \frac{\sqrt{3}}{2} x + c_3 \sin \frac{\sqrt{3}}{2} x) e^{\frac{x}{2}} + 1 + \frac{1}{2} e^{-x} - \frac{1}{2} e^{2x}$
 (c) $y = c_1 e^{-x} + c_2 \cos \frac{\sqrt{3}}{2} x + c_3 \sin \frac{\sqrt{3}}{2} x + 1 + \frac{1}{2} e^{-x} + \frac{1}{2} e^{2x}$
 (d) None of them.

(6) $y'' + 5y' + 6y = 1 + \sin 3x$

- (a) $y = c_1 e^{2x} + c_2 e^{-3x} + \frac{1}{78} (\sin 3x - 5 \cos 3x)$
 (b) $y = c_1 e^{2x} + c_2 e^{-3x} - \frac{1}{78} (\sin 3x - 5 \cos 3x)$
 (c) $y = c_1 e^{2x} + c_2 e^{-3x} - \frac{1}{78} (\cos 3x - 5 \sin 3x)$
 (d) None of the above.

$\frac{d^2 y}{dx^2} - 4y = x^{1/2}$

- (a) $y = c_1 e^{2x} + c_2 e^{-2x} + \frac{1}{4} (x^2 + 1/2)$
 (b) $y = c_1 e^{2x} + c_2 e^{-2x} + \frac{1}{4} (x^2 - 1/2)$
 (c) $y = c_1 e^{2x} + c_2 e^{-2x} - \frac{1}{4} (x^2 + 1/2)$
 (d) None of them.

8. $x^2 y'' - (2m-1)xy' + (m^2+n^2)y = n^2 x^m \ln x$
- (a) $y = x^m (C_1 \sin(n \ln x) + C_2 \cos(n \ln x)) + x^{-m}$
- (b) $y = x^m (C_1 \sin(n \ln x) + C_2 \cos(n \ln x)) - x^{-m}$
- (c) $y = x^{-m} (C_1 \sin(\ln x \cdot n) + C_2 \cos(\ln x \cdot n)) + x^m$
- (d) None of the above statements.

9. The orthogonal Trajectory of $x^2 + y^2 = C$

- (a) $x^2 - y^2 = C_1 x$
- (b) $x^2 - y^2 = C_1 x^2$
- (c) $x^2 - y^2 = C_1 y$
- (d) None of these statements.

10. Solve $y' + \frac{y}{2x} = \frac{x}{y}$, $y(1) = 2$

- (a) $x^2 y^4 = x^4 + 15 + 1/x$
- (b) $x^2 y^2 = x^4 + 15 - x$
- (c) $x^2 y^4 = x^4 + 15$
- (d) None of them

11. $(x-1)^3 \frac{dy}{dx} + 4(x-1)^2 y = x+1$

- (a) $(x-1)^4 y = \frac{x^3}{3} + x + Cx$
- (b) $(x-1)^4 y = \frac{x^3}{3} - x + 1/x + C$
- (c) $(x-1)^4 y^2 = \frac{x^3}{3} - x + C$
- (d) $(x-1)^4 y = \frac{x^3}{3} - x + C$