4212 ANKIT AGNIHOTRI SE IT

20/01/22 EM - III

Ans (1) (a) $y = c_1 e^{m_1 x} + c_2 e^{m_2 x}$

Ans (2) (b) $y = (c_1 x + c_2) e^{m_2 x}$

Ans (3) (c) $y = e^{\alpha x} [\, c_1 \cos\beta x + c_2 \sin\beta x \,]$

Ans (4) (c) $y = e^{\alpha x} [\, (c_1 + c_2 x) \cos\beta x + i [\, c_3 + c_4 x) \sin\beta x \,]$

Ans (5) $(D^2 - 1) y = 0$

$D^2 - 1 = 0 \Rightarrow (D+1)(D-1) = 0$

$D = \pm 1$

Ans → (a) $y = c_1 e^{x} + c_2 e^{-x}$

Ans (6) $(D^2 + 1) y = 0 \Rightarrow D^2 + 1 = 0$

$D^2 = -1$

$D = \pm i$

$0 + i \;,\; 0 - i$

$\alpha = 0 \;,\; \beta = 1$

$y = (1)[\, A \cos x + B \sin x \,]$

Ans (c)

Ans (7) $(D^2 + 4D + 4) y = 0$

$D^2 + 4D + 4 = 0 \Rightarrow (D+2)^2 = 0 \qquad D = -2, -2$

$y = (c_1 x + c_2) e^{-2x}$

Ans (b)

As.

Ans(8) $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} - 6y = 0$

$D^2y - 5Dy - 6y = 0$

$\Rightarrow [D^2 - 5D - 6]y = 0$

$D^2 - 5D - 6 = 0 \Rightarrow (D-6)(D+1) = 0$

$D = 6, -1$

$y = C_1 e^{6x} + C_2 e^{-x}$

Ans(d)

Ans(9) $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + 5y = 0$

$D^2y + 2Dy + 5y = 0$

$(D^2 + 2D + 5)y = 0 \Rightarrow D^2 + 2D + 5 = 0$

$\Rightarrow (D+1)^2 + 4 = 0$

$(D+1)^2 = -4$

$D+1 = \pm 2i \Rightarrow D = -1 \pm 2i$

$\alpha = -1 \quad \beta = 2$

$y = e^{-x}[C_1 \cos 2x + C_2 \sin 2x]$

Ans (b)

Ans(10) $(D^2 + 3)y = 0$

$\Rightarrow D^2 + 3 = 0 \Rightarrow D = \pm \sqrt{3}i$

$y = [C_1 \cos \sqrt{3}x + C_2 \sin \sqrt{3}x]$

Ans(b)

Ans (11) roots :- $-2, -2, 2 \pm i\sqrt{3}$

$\phi(D)\, y = 0$

$$y = (c_1 + c_2 x) e^{-2x} + e^{2x} [\, c_3 \cos\sqrt{3}x + c_4 \sin\sqrt{3}x \,]$$

Ans (c)

Ans (12) roots : $\pm i, \pm i$

$\alpha = 0, \beta = 1$

$$y = (c_1 + c_2 x) \cos x + (c_3 + c_4 x) \sin x$$

Ans (a)

Ans (13) $0, 0, \pm 2i$

$$y = (c_1 + c_2 x) e^{0 \cdot x} + (c_3 + c_4 x) e^{2x}$$

Ans (a)

Ans (14) roots , $2, 2, 2$

$$y = [\, c_1 x^2 + c_2 x + c_3 \,] e^{2x}$$

Ans (c)