

Class 6 - Particular Integral of Standard Functions- Type-4

Solve the following Linear Differential Equations :

$$1. (D^3 - 3D^2 + 3D - 1) y = x^2 e^x$$

$$\text{Answer : } y = (c_1 + c_2 x + c_3 x^2) e^{-x} + \frac{x^5 e^x}{60}$$

$$2. (D^2 - 2D + 1) y = x e^x.$$

$$\text{Answer : } y = (a + bx) e^x + \frac{x^3 e^x}{6}$$

$$3. (D^2 - 2D + 4) y = e^x \cos x.$$

$$\text{Answer : } y = e^x (a \cos \sqrt{3} x + b \sin \sqrt{3} x) + \frac{e^x \cos x}{2}$$

$$4. (D^3 - 2D + 4) y = e^x \sin\left(\frac{x}{2}\right)$$

$$\text{Answer : } y = c_1 e^{-2x} + (c_2 \cos x + c_3 \sin x) e^x - \frac{16}{111} \left\{ \frac{1}{2} \cos\left(\frac{x}{2}\right) + 3 \sin\left(\frac{x}{2}\right) \right\}$$

$$5. (D^3 + 8) y = e^{-2x} x^2.$$

$$\text{Answer : } y = c_1 e^{-2x} + e^x (c_2 \cos \sqrt{3} x + c_3 \sin \sqrt{3} x) + \frac{1}{144} e^{-2x} (4x^3 + 6x^2 + 4x + 1)$$
