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

A.E → $x^3 - 3x + 2 = 0$

put $x = 1$

$1 - 3 + 2 = 0$ (hit & trial)

$(x-1)\overline{)x^3 - 3x + 2\ (x^2 + x - 2}$

$-x^3 + x^2$

$x^2 - 3x + 2$

$-x^2 + x$

$-2x + 2$

$-2x + 2$

0

$x^2 + 2x - x - 2$

$x(x+2) - 1(x+2)$

$(x+2)(x-1)$

$x = 1, 1, -2$

$y(x) = e^x(C_1 + C_2 x) + C_3 e^{-2x}$ option (a)

(52) $\frac{d^4y}{dx^4} - 81y = 0$

$D^4 - 81 = 0 \Rightarrow D = 3, 3, 3, 3$

$y(x) = e^{3x}(C_1 + C_2 x + C_3 x^2 + C_4 x^4)$

option (D)

(53) $\frac{d^2y}{dx^2} + y = \cos 2x$

C.F → $D^2 + 1 = 0 \Rightarrow D = \pm i$

$y = C_1 \cos x + C_2 \sin x$

P.I $\Rightarrow \frac{\cos 2x}{D^2 + 1} = \frac{\cos 2x}{-3}$

Thus $y = C.F + P.I$

$= A\cos x + B\sin x - \frac{\cos 2x}{3}$ option (B)