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17/ENG06/044
MATHEMATICS ASSIGNMENT 1

$$\frac{dy}{dx} = -4Ae^{-4x} - 6Be^{-6x} \quad -①$$

$$\frac{d^2y}{dx^2} = 16Ae^{-4x} + 36Be^{-6x} \quad -②$$

Solving eqn ① and ② simultaneously

$$\therefore 6\frac{dy}{dx} = -24Ae^{-4x} - 36Be^{-6x} \quad -③$$

$$\frac{d^2y}{dx^2} = +16Ae^{-4x} + 36Be^{-6x} \quad (4)$$

$$6\frac{dy}{dx} + \frac{d^2y}{dx^2} = -8Ae^{-4x}$$

$$\therefore A = 6\frac{dy}{dx} + \frac{d^2y}{dx^2} \quad -⑤$$

Substituting eqn (5) into eqn ①

$$\frac{dy}{dx} = 4\left(\frac{6\frac{dy}{dx} + \frac{d^2y}{dx^2}}{8e^{-4x}}\right)e^{-4x} - 6Be^{-6x}$$

$$\frac{dy}{dx} = 6\frac{dy}{dx} + \frac{d^2y}{dx^2} - 6Be^{-6x}$$

Multiply through by 2

$$2\frac{dy}{dx} = 6\frac{dy}{dx} + \frac{d^2y}{dx^2} - 12Be^{-6x}$$

$$2\frac{dy}{dx} - 6\frac{dy}{dx} = \frac{d^2y}{dx^2} - 12Be^{-6}$$

$$-4\frac{dy}{dx} - \frac{d^2y}{dx^2} = -12Be^{6x}$$

$$-4\frac{dy}{dx} - \frac{d^2y}{dx^2} = B \therefore$$

$$\frac{}{-12e^{-6x}}$$

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$$\frac{4\,dy/dx + d^2y/dx^2}{12e^{-6x}} = B$$

Substitute A and B into the degenerate eqn

$$y = \frac{6\,dy/dx + d^2y/dx^2 \times e^{-6x}}{-8e^{-4x}} + \frac{4\,dy/dx + d^2y/dx^2}{12e^{-6x}} \times e^{-6x}$$

$$y = \frac{6\,dy/dx + d^2y/dx^2}{8} + \frac{4\,dy/dx + d^2y/dx^2}{12}$$

$$y = \frac{-72\,dy/dx - 12\,d^2y/dx^2 + 32\,dy/dx + 8\,d^2y/dx^2}{96}$$

$$y = \frac{-40\,dy/dx - 4\,d^2y/dx^2}{96}$$

$$y = \frac{-40\,dy/dx - 4\,d^2y/dx^2}{96}$$

$$96y = -40\,dy/dx - 4\,d^2y/dx^2$$

$$24y = -10\,dy/dx - d^2y/dx^2$$

$$\therefore \frac{d^2y}{dx^2} + 10\frac{dy}{dx} + 24y = 0$$