H Roll No. .....

TMA–201

B. TECH. (SECOND SEMESTER)

MID SEMESTER

EXAMINATION, April, 2023

ENGINEERING MATHEMATICS–II

Time : 1½ Hours

Maximum Marks : 50

Note : (i) Answer all the questions by choosing any ***one*** of the sub-questions.

(ii) Each sub-question carries 10 marks.

1. (a) Solve : (CO1)

$$\left(x\sec^2 y - x^2\cos y\right)dy = (\tan y - 3x^4)\,dx.$$

OR

(b) Solve : (CO1)

$$\frac{d^2y}{dx^2} - (a+b)\frac{dy}{dx} + aby = e^{ax} + e^{bx}.$$

P. T. O.

2. (a) Solve : (CO1)

$$\left(D^4 - 1\right) y = e^x \cos x$$

OR

(b) Solve : (CO1)

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

3. (a) Solve : (CO1)

$$\frac{d^3y}{dx^3} - 3\frac{d^2y}{dx^2} + 4\frac{dy}{dx} - 2y = e^x + \cos x$$

OR

(b) Solve : (CO1)

$$x^2 \frac{d^2y}{dx^2} + x\frac{dy}{dx} - y = x^3 e^x$$

by using variation of parameters method.

4. (a) Find the Laplace transform of : (CO2)

$$f(t) = \begin{cases} \sin \omega t, & \text{for } 0 < t < \dfrac{\pi}{\omega} \\ 0 \ , & \text{for } \dfrac{\pi}{\omega} < t < \dfrac{2\pi}{\omega} \end{cases}$$

OR

(b) If $f(t) = \frac{e^{at} - \cos bt}{t}$, find the Laplace transform of $f(t)$. (CO2)

5. (a) Find inverse Laplace transform of $\frac{s^2}{(s^2 + a^2)(s^2 + b^2)}$. (CO2)

OR

(b) Using Convolution Theorem, find $L^{-1}\left\{\frac{s}{(s^2 + 1)(s^2 + 4)}\right\}$. (CO2)