Roll No. .....

TMA–201

B. TECH. (SECOND SEMESTER)

MID SEMESTER EXAMINATION, MAY, 2022

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 the differential question : (CO1)

$$\left(\frac{y}{x}\sec y - \tan y\right)dx + \left(\sec y \log x - x\right)\, dy = 0$$

OR

(b) Define exact equation. Solve : (CO1)

$$\left(x^4y^4 + x^2y^2 + xy\right)y\,dx + \left(x^4y^4 - x^2y^2 + xy\right)x\,dy = 0$$

2. (a) Solve : (CO1)

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

P. T. O.

OR

(b) Define linear differential equation with constant coefficient. Solve : (CO1)

$$\frac{d^2y}{dx^2} + a^2y = \tan ax$$

3. (a) Solve : (CO1)

$$(1+x)^2\frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = 4\cos\{\log(1+x)\}$$

OR

(b) Define Laplace transform and solve : (CO2)

$$\int_0^\infty e^{-pt}t^3\cos t\,dt.$$

4. (a) Solve by variation of parameter : (CO1)

$$x^2y'' + xy' - y = x^2e^x$$

OR

(b) Solve : (CO2)

$$\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + y = t$$

given that $y = -3$ when $t = 0, y = -1$, when $t = 1$.

5. (a) Define Theorem. Use Convolution theorem to find $L^{-1}\left\{\frac{P}{(p^2+4)^2}\right\}$. (CO2)

OR

(b) (i) Define the condition of function of exponential order and prove that $F(t) = t^2$ is of exponential order 3. (CO2)

(ii) Find :

$$L^{-1}\left\{\frac{p^3 - 3p^2 + 6p - 4}{\left(p^2 - 2p + 2\right)^2}\right\}$$

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