

Total No. of Questions : 4]

SEAT No. :

PF-259

[Total No. of Pages : 2

Apr.-26/SE/Insem-318

S.E. (Automobile & Mechanical)/(Mechanical & Sandwich)/

(Automation & Robotics) (Insem.)

ENGINEERING MATHEMATICS - III

(2019 Pattern) (Semester - IV) (207002)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the Candidates :

- 1) Attempt Q1 Or Q2 and Q3 or Q4.
- 2) Neat diagram must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.

Q1) a) Solve any two of the following : [10]

- i)  $(D^2 + 4D + 3)y = e^{-3x} + 2x$ .
- ii)  $(D^2 + 1)y = \tan x$  (solve by using method of variation of parameters)

iii)  $x^2 \frac{d^2y}{dx^2} - 2x \frac{dy}{dx} - 4y = x^2$

b) Solve  $\frac{dx}{y^2} = \frac{dy}{x^2} = \frac{dz}{x^2 y^2 z^2}$  [5]

OR

Q2) a) Solve any two of the following : [10]

- i)  $(D^2 + 5D + 6)y = e^{e^x}$
- ii)  $(D^2 + 1)y = \operatorname{cosec} x$  (Solve by using method of variation of parameters)

iii)  $(x+1)^2 \frac{d^2y}{dx^2} + (x+1) \frac{dy}{dx} + y = 2 \sin [\log(x+1)]$

b) A body of weight 1N is suspended from spring stretches it 4 cm. If the weight is pulled down 8 cm below the equilibrium position & then released, find the displacement, velocity at time t and amplitude of the motion. [5]

P.T.O.

**Q3) a)** Find the laplace transform of the function  $f(t) = \int_0^t e^{-3t} \cos(2t) dt$ . [5]

b) Find the inverse Laplace transform of  $f(s) = \frac{2s+3}{s^2+4s+29}$ . [5]

c) Find the fourier sine integral representation for the function

$$f(x) = \begin{cases} \frac{\pi}{2}, & 0 < x < \pi \\ 0 & x > \pi \end{cases}. \quad [5]$$

OR

**Q4) a)** Find the fourier integral representation of  $f(x) = \begin{cases} a^2 - x^2, & 0 < x < a \\ 0, & n > a \end{cases}$ . [5]

b) Solve the integral equation [5]

$$\int_0^{\infty} f(x) \cos(\lambda x) dx = e^{-2\lambda}, \lambda > 0$$

c) Find the inverse Laplace transform of  $f(s) = \frac{s+3}{(s+4)(s-8)}$ . [5]

