

Total No. of Questions : 4]

SEAT No. :

PD35

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S.E. (Computer Engg./ I.T./Computer Science & Design Engg./A.I.  
& M.L./ Computer Science) (Insem)  
ENGINEERING MATHEMATICS - III  
(2019 Pattern) (Semester - IV) (207003)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Attempt Q.1 or Q.2, Q.3 or Q.4.
- 2) Figures to the right indicate full marks.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Use of non-programmable scientific calculator is allowed.
- 5) Assume suitable data, if necessary.

Q1) a) Solve any TWO.

[10]

i)  $(D^2 + 6D + 9)y = \frac{e^{-3x}}{x^3}$

ii) Solve by the variation of parameters method

$$\frac{d^2y}{dx^2} + y = \operatorname{cosec} x$$

iii)  $x^2 \frac{d^2y}{dx^2} - 4x \frac{dy}{dx} + 6y = x^5$

b) Solve  $\frac{dx}{3z-4y} = \frac{dy}{4x-2z} = \frac{dz}{2y-3x}$

[5]

OR

Q2) a) Solve any TWO.

[10]

i)  $(D^2 - 1)y = x \sin x$

ii) Solve by the variation of parameters method

$$\frac{d^2y}{dx^2} - y = \frac{2}{1+e^x}$$

iii)  $(x+2)^2 \frac{d^2y}{dx^2} - (x+2) \frac{dy}{dx} + y = 3x+4$

b) Solve the simultaneous linear differential equations with given conditions.

$$\frac{du}{dx} + v = \sin x$$

$$\frac{dv}{dx} + u = \cos x$$

Given that when  $x = 0$ , then  $u = 1$  and  $v = 0$ .

[5]

P.T.O.

**Q3) a)** Find the Fourier transform of

$$f(x) = \begin{cases} x^2, & |x| \leq a \\ 0, & |x| > a \end{cases} \quad [5]$$

**b)** Using inverse Fourier sine transform, find  $f(x)$ , given [5]

$$F_s(\lambda) = \frac{e^{-a\lambda}}{\lambda}$$

**c)** Solve any one [5]

i) Find Z transform of  $f(k) = \frac{2^k}{k}, k \geq 1$ .

ii) Find inverse Z transform of  $\frac{z}{(z-5)}, |z| > 5$ .

OR

**Q4) a)** Solve any one [5]

i) Find Z transform of  $f(k) = k 5^k, k \geq 0$

ii) Find inverse Z transform of  $\frac{z}{(z-1)(z-2)}, |z| \geq 2$

**b)** Obtain  $f(k)$ , given [5]

$$f(k+2) - 4f(k) = 0, f(0) = 0, f(1) = 2$$

**c)** Solve the following integral equation: [5]

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

