Total No. of Questions : 4]

PC384

[6359]-504 S.E. (Civil) (Insem) ENGINEERING MATHEMATICS - III (2019 Pattern) (Semester - III) (207001)

Time : 1 Hour]

[Max. Marks : 30

SEAT No. :

- Instructions to the candidates:
 - 1) Attempt Q.1 or Q.2 and Q.3 or Q.4.
 - 2) Use of electronic pocket calculator is allowed.
 - 3) Assume suitable data, if necessary.
 - 4) Neat diagrams must be drawn wherever necessary.
 - 5) Figures to the right indicate full marks.

Q1) a) Solve the following differential equations (Any two)

i)
$$(D-4)^{3}y = e^{4x} + 3^{x}$$
 where $D = \frac{d}{dx}$ [5]
ii) $x^{2}\frac{d^{2}y}{dx^{2}} - x\frac{dy}{dx} + 4y = x^{6}$ [5]

iii) $(D^2 + 3D + 2)y = \sin e^x$ [Use variation of parameter method] [5]

b) A light horizontal strut AP of length 'l' is freely pinned at A & B and is under the action of equal and opposite compressive forces 'P' at each of its ends with load 'W' at its centre governed by the differential equation

$$\mathrm{EI}\frac{d^2y}{dx^2} = -\left[\frac{\mathrm{W}x}{2} + \mathrm{P}y\right]$$

for
$$x = 0$$
, $y = 0$, for $x = \frac{l}{2}$, $\frac{dy}{dx} = 0$

show that the deflection at the cent

where
$$n^2 = \frac{P}{EI}$$
, E: modulus of
elasticity
I: Moment of inertia

P.T.O.

Solve the following differential equations (Any two) *Q2*) a)

i)
$$(D^2 - 6D + 9)y = \frac{e^{3x}}{x}$$
 [5]
ii) $(D^2 - 4D + 3)y = e^x \cos 2x$ [5]
iii) $\frac{dx}{yz} = \frac{dy}{xz} \frac{dz}{xy}$ [5]
Find the elastic curve of a uniform cantilever beam of length '*l*' having a

- b) constant weight 'W' kg per unit length and determine the deflection at the free end. [5]
- Solve following system of equations by using Gauss-elimination method **Q3**) a) [5] 0x + 2y + z = 9

$$2x + 20y - 2z = -44$$

$$-2x + 3y + 10z = 22$$

Use the Runge - Kutta fourth order method to solve b)

$$\frac{dy}{dx} = x^2 + y^2$$
; $y(0) = 1$ at $x = 0.1$ with $h = 0.1$

esky-mer. Solve the following system of equations by using Cholesky-method [5] c) $9x_1 + 6x_2 + 12x_3 = 0$ $6x_1 + 13x_2 + 11x_3 = 23.6$

$$12x_1 + 11x_2 + 26x_3 = 30.8$$

OR

2

Q4) a) Solve by Jacobi Iteration method 10x + y - z = 11.19x + 10y + z = 28.08-x + y + 10z = 35.61Correct to two decimal places.

[6359]-504

[5]

[5]

