

[6579]-370

T.E. (Mechanical) (Mechanical Sandwich) (Insem)
NUMERICAL & STATISTICAL METHODS
(2019 Pattern) (Semester - I) (302041)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Solve Q.1 or Q.2 and Q.3 or Q.4.
- 2) Figures to the right side indicate full marks.
- 3) Use of electronic Calculator is allowed.
- 4) Assume the suitable data, if necessary.

- Q1) a)** Draw the Flow chart for Newton raphson Method (Accuracy Criteria). [6]
b) Solve the system of equation Gauss seidel up to 4 iteration. [9]

$$x_1 + 2x_2 + 3x_3 = 6$$

$$4x_1 + 3x_2 + x_3 = 8$$

$$5x_1 + 5x_2 + 4x_3 = 14$$

OR

- Q2) a)** What is meant by partial pivoting. Write a steps for Gauss elimination to solve simultaneous equations? [6]
b) Using three iteration of bisection method determine root of the equation. Initial guesses are $x_1 = 2.8$ and $x_2 = 3$, $f(x) = -0.9x^2 + 1.7x + 2.5$. [9]

- Q3) a)** Solve the differential equation by Euler's method to solve the initial value problem over the interval $x = 0$ to 2 with $h = 0.5$ where $\frac{dy}{dx} = yx^2 + 1.1y$; where $y(0) = 1$. [6]

- b)** Using Runge-Kutta method of fourth order, solve for y at $x = 1.2, 1.4$ for $\frac{dy}{dx} = \frac{2xy + e^x}{x^2 + xe^x}$. Given $x_0 = 1, y_0 = 0$. [9]

OR

- Q4) a)** Draw a Flow chart for Runge-Kutta second order method. [6]
b) A steel plate of 750×750 mm has its two adjacent sides maintained at 100° degree celsius while the two other sides are maintained at 0° degree Celsius. What will be the steady state temperature at interior points assuming a grid size of 250 mm. [9]

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