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E36

B. Tech. EXAMINATION, 2020

(Fifth Semester)

(B. Scheme) (Re-appear Only)

(ME)

ME311B

APPLIED NUMERICAL TECHNIQUES AND COMPUTING

Time : 2½ Hours] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. (a) Find the truncation error for e^x at $x = 1/5$ if three first terms are retained in expansion.

(b) Round off the number 865250 and 37.46235 to four significant figures and compute absolute, relative and percentage error in each case.

2. (a) Find the root of $x^2 - 2x + 5 = 0$ using Newton-Raphson Method.

(b) Compute the real root of equation $xe^x = 2$ correct to four decimal places using Regula-Falsi Method.

3. Solve the equation by Guess-Seidel method :

$$10x + 2y + z = 9$$

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

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

4. Fit the parabola $y = a + bx + cx^2$ to the following data :

x	:	1	2	3	4
y	:	2	6	7	8

5. Use the power method to find the largest Eigen Value and the associated Eigen Vector of the matrix :

$$\begin{bmatrix} 2 & -1 & -2 \\ -1 & 6 & 8 \\ -2 & 8 & 30 \end{bmatrix}$$

You can start with $[0\ 0\ 1]^T$ and carry out five iteration.

6. Use the Lagrange's formula to find the form of $f(x)$, given that :

x	:	0	2	3	4
y	:	648	704	729	792

7. From the following table, find the value of $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 2.03$:

x	y
1.96	0.7825
1.98	0.7739
2.00	0.7651
2.02	0.7563
2.04	0.7473

8. Use Runge-Kutta method to find y when $x = 1.2$ in steps of 0.1 given that $\frac{dy}{dx} = x^2 + y^2$ and $y(1) = 1.5$.