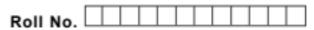


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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech (ME) (Sem.-5) NUMERICAL METHOD ANALYSIS/ NUMERICAL METHODS IN ENGG. Subject Code : ME-309 M.Code : 59028

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

- SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) Define relative and absolute errors.
- b) State Newton-Raphson method for nonlinear equation f(x) = 0.
- c) Define Eigen value and Eigen vector of a matrix.
- d) Write the Euler's method for solving the ordinary differential equation.
- e) Write Newton-cote's quadrature formula.
- f) What is the difference between Simpson 1/3 and Simpson 3/8 rule.
- g) Write the governing equation of cubic splines.
- h) State Lagrange's formula for equally spaced data points.
- i) Write the difference between Euler's and modified Euler's method.
- j) State the Laplace equation for the partial differential equation.

SECTION-B

 Using Newton's iterative method, find the real root of x log₁₀x = 1.2 correct to five decision places.

1 M-59028



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 Determine f (x) as a polynomial in x for the following data, using Newton's divided difference formulae.

x :	-4	-1	0	2
f(x): 1245	33	5	9	1335

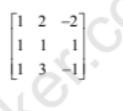
4. Use the method of least squares to fit the curve $f(t) = ae^{-3t} + be^{-2t}$ for the following data :

1:	0.1	0.2	0.3	0.4
f(t):	0.76	0.58	0.44	0.35

5. Solve the following equation by Gauss elimination method :

$$2x + y + z = 10$$
; $3x + 2y + 3z = 18$; $x + 4y + 9z = 16$

Find all the eigen values and the eigen vector corresponding to the largest eigen value (only) of the matrix



SECTION-C

a) Use Simpson's 1/3rd rule to find

By taking seven ordinates, c

b) From the table below, for what value of x, y is minimum? Also find this value of y.

<i>x</i> :	3	<u>4</u>	5	6	7	8
y:	0.205	0.240	0.259	0.262	0.250	0.224

8. Using Runge-Kutta method of fourth order, solve

$$\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$$

with y(0) = 1 at x = 0.2, 0.4.

9. Solve the equation $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$ subjected to the condition $u(x, 0) = \sin \pi x, 0 \le x \le 1$; u(0, t) = u(1, t) = 0. Carry out computations for two levels taking h = 1/3 and k = 1/36.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

2 M-59028



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