

Code No: 56083

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, December - 2018

NUMERICAL METHODS

(Automobile Engineering)

Time: 3 hours

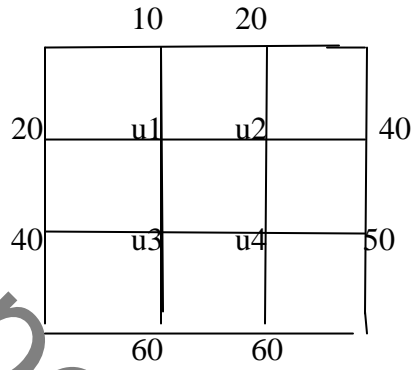
Max. Marks: 75

Answer any five questions
All questions carry equal marks

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- 1.a) Find a real root of $2x - \log x = 7$ by iterative method.
 b) Find a root of the equation $f(x) = x + \log x - 2$ using Newton Raphson method. [7+8]
2. Solve the system of equations by Gauss Seidel method.
 $x + 5y + 2z = 7$, $7x - y + z = 2$, $x + 2y + 5z = 9$ [15]
- 3.a) Find $y(54)$ if $y(50) = 205$, $y(60) = 225$, $y(70) = 248$, $y(80) = 274$ using Newton's forward formula
 b) Find $y(43)$ if $y(20) = 0.939$, $y(25) = 0.906$, $y(32) = 0.848$ and $y(49) = 0.56$ using Lagranges formula. [7+8]
- 4.a) Fit the curve of the form $y = a + bx$ by the method of least squares
- | | | | | | | |
|---|----|----|----|----|----|----|
| x | 0 | 5 | 10 | 15 | 20 | 25 |
| y | 12 | 15 | 17 | 22 | 24 | 30 |
- b) Fit an equation for the form $y = ab^x$ to the following data [7+8]
- | | | | | | |
|---|-----|-------|-------|-------|-------|
| x | 2 | 3 | 4 | 5 | 6 |
| y | 144 | 172.8 | 207.4 | 248.8 | 298.5 |
5. Evaluate $\int_0^1 e^{-x^2} dx$ by dividing the range of integration into 4 equal parts using
 a) Trapezoidal rule b) Simpsons $\frac{1}{3}$ rd rule. [7+8]
6. Tabulate the values of y at $x = 0.1, 0.2$ and 0.3 given that $\frac{dy}{dx} = xy + y^2$ and $y(0) = 1$ using Taylor's series method. [15]
7. Find the values of $y(0.25)$, $y(0.5)$ and $y(0.75)$ by finite difference method, given that $y'' + 3y' - 4y = -8$, $y(0) = 0, y(1) = 1$. [15]

8. Solve the Laplace equation $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ at all internal points of the region shown below by Gauss Seidel method. [15]



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