

Code No: 54018

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, November/December - 2015

NUMERICAL METHODS

(Common to ME, MCT, MIE, MIM)

Time: 3 hours

Max. Marks: 75

Answer any five questions  
All questions carry equal marks

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- 1.a) State the pitfalls method of false position. [7+8]  
 b) Find the root of the equation  $3x - \sqrt{1 + \sin x} = 0$  by iteration. [7+8]
2. Explain the procedure of improving the accuracy for an ill conditioned system given as  
 $a_{11}x_1 + a_{12}x_2 + a_{13}x_3 = b_1$ ;  $a_{21}x_1 + a_{22}x_2 + a_{23}x_3 = b_2$ ;  $a_{31}x_1 + a_{32}x_2 + a_{33}x_3 = b_3$  [15]

3. For the following data fit a polynomial by using  
 a) Newton's backward difference formula  
 b) Lagrange's interpolation formula. Compare (a) and (b) and comment. [7+8]

x	1	2	3	4
y	2	5	16	41

- 4.a) Fit a function of the form  $y = Ae^{bx} + Be^{cx}$  to the data given below

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8
y	1.54	1.67	1.81	1.97	2.15	2.35	2.58	2.83	3.11

- b) Fit a straight line to the following data giving weights to x as 1, 1, 2, 1, 1 by the method of least square. [7+8]

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.5

5. Derive the solution for the Simpson's  $3/8^{\text{th}}$  rule from the Newton-Cotes formula for solving the integral equation. [15]
- 6.a) Obtain the solution in the form general formula for Euler's method for solving the differential equation.
- b) Given  $\frac{dy}{dx} = \frac{x^2}{y^2+1}$  with  $y(0) = 0$ , use Picard's method to obtain the y for different values of  $x = 0.25$  and  $0.5$ . [7+8]

7. Find the largest Eigen value in modulus and the corresponding Eigen vector of the

matrix  $\begin{bmatrix} -15 & 4 & 3 \\ 10 & -12 & 6 \\ 20 & -4 & 2 \end{bmatrix}$  using the power method. [15]

8. Write down the implicit formula to solve one dimensional heat flow equation and suggest the suitable method to solve the equation. [15]

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