Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **15MA3011** | **Duration :** | **3hrs** |
| **Sub. Name :** | **Numerical Analysis** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Prove that the rate of convergence is quadratic in Newton Raphson Method. | CO2 | 10 |
| b. | Solve by L-U Decomposition method: x+y+z = 3, 2x-y+3z = 16, 3x+y-z = -3 | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | Solve by Gauss Seidal Method: 27x+6y-z = 85, 6x+15y+2z = 72,  x+y+54z = 110 | CO1 | 10 |
| b. | Solve by Iteration Method: x3+x2-1 = 0 | CO1 | 10 |
| 3. |  | From the following table find f(-0.5) and f(0.5) using Hermite’s Interpolation.   |  |  |  |  | | --- | --- | --- | --- | | x | -1 | 0 | 1 | | f(x) | 1 | 1 | 3 | | f1(x) | -5 | 1 | 7 | | CO1 | 20 |
| (OR) | | | | |
| 4. | a. | From the following table fit quadratic splines with M(0) = f11(0) = 0 and hence find f(2.5)   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | 0 | 1 | 2 | 3 | | f | 1 | 2 | 33 | 244 | | CO1 | 10 |
|  | b. | Derive the error in Lagrange’s interpolation. | CO2 | 10 |
| 5. | a. | Evaluate  using Trapezoidal rule, Simpson’s(both) rules, Weddle’s rule.Verify using actual integration. | CO3 | 15 |
|  | b. | Explain the algorithm of Trapezoidal rule. | CO3 | 5 |
| (OR) | | | | |
| 6. | a. | Explain the algorithm of Gauss Elimination Method. | CO1 | 10 |
|  | b. | Find f1(1) using Newton’s forward formula from the following data.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | 1 | 3 | 5 | 7 | 9 | | f(x) | 85.3 | 74.5 | 67 | 60.5 | 54.3 | | CO1 | 10 |
| 7. | a. | Solve dy/dx = ex-y, y(0)=0 using Picard’s method and find y(0.1). | CO1 | 10 |
|  | b. | Solve dy/dx = y – (2x/y) , y(0)=1 using Modified Euler method and find y(0.1) and y(0.2) | CO1 | 10 |
| (OR) | | | | |
| 8. |  | Solve (dy/dx ) + (y+xy2) = 0 , y(0)=1 using Third order Runge kutta method and Fourth order Runge kutta method. Find y(0.1) and y(0.2) | CO1 | 20 |
|  | | **Compulsory:** |  |  |
| 9. |  | Find y(2) given that dy/dx = (x+y)/2, y(0)=2, y(0.5)=2.636, y(1) = 3.595,  y(1.5) = 4.968 using (i) Milne’s Predictor and Corrector method  (ii) Adam Bashforth Predictor and Corrector method | CO1 | 20 |

ALL THE BEST