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



**End Semester Examination – Nov/Dec – 2017**

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| **Code :** | **15MA3011** | **Duration :** | **3hrs** |
| **Sub. Name :** | **NUMERICAL ANALYSIS** | **Max. marks :** | **100** |

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

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| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Prove that the order of convergence is linear in Iteration method and quadratic in Newton Raphson Method. | CO2 | 10 |
| b. | Solve by LU Decompositiion method 2x-2y+z = 2, 5x+y-3z = 0, 3x+4y+z = 9. | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | Explain the Algorithm of Gausss Elimination Method. | CO1 | 10 |
| b. | Solve by Gauss Seidel Method. 28x+4y-z=32, 2x+17y+4z=35, x+3y+10z = 24. | CO1 | 10 |
|  |  |  |  |  |
| 3. | a. | Prove the existence and uniqueness of Legrange’s interpolation polynomial. | CO1 | 10 |
|  | b. | From the following table find f(0.5) using Hermite’s Interpolation.   |  |  |  |  | | --- | --- | --- | --- | | X | -1 | 0 | 1 | | f(x) | 1 | 0 | 1 | | f1(x) | -1 | 1 | 0 | | CO1 | 10 |
| (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(x) | 1 | 3 | 11 | 31 | | CO1 | 10 |
|  | b. | Find cubic splines from the following data and hence find y1(1)given that M0=M2=0.   |  |  |  |  | | --- | --- | --- | --- | | X | 0 | 1 | 2 | | Y | -5 | -4 | 3 | | CO1 | 10 |
|  |  |  |  |  |
| 5. | a. | Determine the truncation error in Trapezoidal Rule. | CO2 | 10 |
|  | b. | Find rate of change of pressure with respect to volume at v=2 and v=10 from the following table.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | v | 2 | 4 | 6 | 8 | 10 | | p | 105 | 42.7 | 25.3 | 16.7 | 13 | | CO3 | 10 |
| (OR) | | | | |
| 6. | a. | Evaluate  using Trapezoidal rule, Simpson’s one-third and three-eighth rules and Weddle’s rule also compare with actual integration. | CO3 | 15 |
|  | b. | Evaluate  using Boole’s rule. | CO3 | 5 |
|  |  |  |  |  |
| 7. | a. | Find y(0.1), z(0.1) from the following system of equations, dy/dx = x+z, dz/dx =x-y2 given y(0)=2, z(0)=1 using Runge kutta method of fourth order. | CO1 | 15 |
|  | b. | Explain the Algorithm of Euler Method. | CO1 | 5 |
| (OR) | | | | |
| 8. | a. | Given dy/dx =x+y, y(0)=1 using Picard’s method find y(0.1). | CO1 | 5 |
|  | b. | Solve dy/dx = 1-y, y(0)=0 using Modified Euler method and find y(0.1) and y(0.2). | CO1 | 15 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. |  | Find y(0.4) given that dy/dx = (xy)/2, y(0)=1, y(0.1)=1.01, y(0.2) = 1.022, y(0.3) = 1.023 using i. Milne’s Predictor and Corrector method ii. Adam Bashforth Predictor and Corrector method | CO1 | 20 |

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