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



**End Semester Examination – Nov / Dec – 2019**

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|  |  |  |  |
| **Code :** | **14MA2006** | Duration : | **3hrs** |
| **Sub. Name :** | **NUMERICAL MATHEMATICS AND COMPUTING** | Max. marks : | **100** |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Convert (110101011101 . 1011001)2 into the decimal number using Nested multiplication. | CO1 | 10 |
| b. | Convert the following numbers.   1. (1001100101.01101)2 = ( )10 2. (2576.35546375)10 = ( )8 = ( )2 | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | Derive the Taylor series for the function at and determine the range of positive x for which the series represents the function. | CO1 | 12 |
| b. | Convert (7152.46)8 into the decimal and binary number. | CO1 | 8 |
|  |  |  |  |  |
| 3. | a. | Find the positive root of , between 0 and 1  by Newton Raphson method correct to five decimal places. | CO1 | 12 |
|  | b. | Write the Pseudocode of Bisection method. | CO1 | 8 |
| (OR) | | | | |
| 4. | a. | Find the positive root of  by bisection method correct to four decimal places. | CO1 | 12 |
|  | b. | Write the Pseudo code of Newton Raphson method. | CO1 | 8 |
|  |  |  |  |  |
| 5. | a. | Using Newton’s algorithm find the interpolating polynomial of least degree from the following table .   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | -2 | -1 | 0 | 1 | |  | 2 | 14 | 4 | 2 | | CO2 | 10 |
|  | b. | Write the pseudocode for Newton’s divided difference formula. | CO2 | 10 |
| (OR) | | | | |
| 6. | a. | Using Lagrange’s formula find y(1) , given   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | =1 | 0 | 2 | 3 | |  | -8 | 3 | 1 | 12 | | CO2 | 10 |
|  | b. | Write the pseudocode for Newton’s Interpolating polynomial. | CO2 | 10 |
| 7. | a. | Determine the Gaussian quadrature formula of when the interval is [-2, 2] and the nodes are -1, 0 and 1. | CO3 | 14 |
|  | b. | Write the pseudocode for Romberg Algorithm. | CO3 | 6 |
| (OR) | | | | |
| 8. | a. | Find the value of  using (i) trapezoidal rule (ii) Simpson’s rule with 6 uniform subintervals. Verify your answer with direct Integration. | CO3 | 10 |
|  | b. | By using Romberg Algorithm approximate by evaluating R(1,1). | CO3 | 10 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Write the equations of Cubic Spline function from the following table, where y0|| = y3|| = 0   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | -1 | 0 | 1 | 2 | | y | -1 | 1 | 3 | 35 | | CO3 | 10 |
|  | b. | Detrmine the constants , ,  ,, e, f, g, h so that the function S(x) is a natural cubic spline function where    With the interpolating conditions S(-1)=1, S(0)=2, S(1)= -1 | CO3 | 10 |