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

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**End Semester Examination – Nov/Dec – 2018**

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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. | Expand in powers of h. Hence compute and | CO1 | | 10 |
| b. | b. Convert the following.  (7152.46)8= ( \_\_\_\_\_\_\_\_\_\_ )10 = ( \_\_\_\_\_\_\_\_\_ )16 = ( \_\_\_\_\_\_\_ )2 | CO1 | | 5 |
| c | Convert the binary number N=(111011000101)2 to decimal form by using nested multiplication | CO1 | | 5 |
| (OR) | | | | | |
| 2. | a. | Find the Taylor’s series and its error term for the function f(x)= log(1+x) at a point c= 0. | CO1 | | 7 |
| b. | Convert (45653.127664)10 into Binary and Octal number. | CO1 | | 7 |
| c | Find the nested form of and hence find the value of . | CO1 | | 6 |
|  |  |  |  | |  |
| 3. | a. | Find a root of the equation correct to 4 decimal places using bisection method. | CO1 | | 14 |
| b. | Write the pseudo code for the bisection algorithm | CO1 | | 6 |
| (OR) | | | | | |
| 4. | a. | Find a root of the equation correct to 5 decimal places using Newton – Raphson’s method. | CO1 | | 8 |
| b. | Find an iterative formula to find , and hence find . | CO1 | | 6 |
| c. | How many steps of the bisection algorithm are needed to compute the root of to full machine precision om marc-32 if  and | CO1 | | 6 |
|  |  |  |  | |  |
| 5. | a. | Using Newton’s algorithm find a polynomial of least degree from the following table   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | 0 | 1 | -1 | 2 | -2 | |  | -5 | -3 | -15 | 39 | -9 | | CO2 | | 10 |
| b. | Using Lagrange’s interpolation formula find the value of from the following table   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 5 | 6 | 9 | 11 | |  | 12 | 13 | 14 | 16 | | CO2 | | 10 |
| (OR) | | | | | |
| 6. | a. | Write the pseudo code for the Newton’s interpolating polynomial. | | CO2 | 10 |
| b. | Construct a divided difference table for the following data and find the Newton’s interpolating polynomial   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 1 |  | 0 | 2 | |  | 3 |  | 3 |  | | | CO2 | 10 |
|  |  |  | |  |  |
| 7. | a. | Compute by using the trapezoid rule with six uniform points. | | CO3 | 6 |
| b. | Find the value of  using (i) Simpson’s 1/3 rd rule (ii) Simpson’s 3/8 th rule. Check the results by direct Integration | | CO3 | 14 |
| (OR) | | | | | |
| 8. | a. | Determine the quadrature formula of when the interval is [-2,2] and the nodes are-1, 0 and 1. | CO3 | | 10 |
| b. | Use Romberg Algorithm to approximate by evaluating R(1,1). | CO3 | | 10 |
|  | | **Compulsory**: |  | |  |
| 9. | a. | Find the cubic spline approximation for the function given below, where . Also find .   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | 0 | 1 | 2 | 3 | | Y | 1 | 2 | 33 | 244 | | CO3 | | 15 |
| b. | Determine whether the following is a quadratic spline function | CO3 | | 5 |