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 – April/May – 2017**

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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. | Determine the Tayor series for a function coshx at the point x=0. Also evaluate cosh(0.7) by summing 4 terms. Compare the result with the actual value. | CO1 | 8 |
| b. | Expand in powers of h. Then compute and | CO1 | 8 |
|  | c. | Convert the number (110111001.101011101)2 into the decimal number. | CO2 | 4 |
| (OR) | | | | |
| 2. | a. | Using nested multiplication, Convert the number (35554675)8  into decimal form. | CO2 | 6 |
| b. | Derive the formal taylor series for f(x)=ln(1+x) at c=0 and determine the range of positive x for which the series represents the function. | CO1 | 10 |
|  | c. | Convert the number (0.255)10 into the binary system. | CO2 | 4 |
| 3. | a. | Find a root of the equation correct to 4 decimal places by using bisection method. | CO3 | 13 |
|  | b. | Write the Pseudo code of Newton Raphson method. | CO3 | 7 |
| (OR) | | | | |
| 4. | a. | Find a positive root of 3*x - cos x* -1=0 by Newton Raphson method correct to 6 decimal places, the root lies between 0 and 1. | CO3 | 10 |
|  | b. | Write the Pseudo code of Bisection method. | CO3 | 10 |
| 5 | a. | Use inverse Lagrange’s interpolating polynomial method to find x when y=13.5, from the data given below:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | 93 | 96.2 | 100 | 104.2 | 108.7 | | y | 11.38 | 12.8 | 14.7 | 17.07 | 19.91 | | CO4 | 10 |
|  | b. | Construct a divided difference table for the following data and find the newton’s interpolating polynomial.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | 1 | 3/2 | 0 | 2 | | y | 3 | 13/4 | 3 | 5/3 | | CO4 | 10 |
|  |  | (OR) |  |  |
| 6. | a. | Using Newton’s algorithm, find the polynomial of least degree for the following table.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | 0 | 1 | -1 | 2 | -2 | | y | -5 | -3 | -15 | 39 | -9 | | CO4 | 12 |
|  | b. | Use Lagrange’s interpolating polynomial method to find y when x=9.5, from the data given below:   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | 7 | 8 | 9 | 10 | | y | 3 | 1 | 1 | 9 | | CO4 | 8 |
| 7. | a. | Write the Pseudo code for Romberg Algorithm. | CO5 | 10 |
|  | b. | Determine the Gaussian quadrature formula in the interval  [-5, 5] and the nodes are -3,0 and 3. | CO4 | 10 |
|  | | (OR) |  |  |
| 8. | a. | Computeusing (i)Trapezoidal rule (ii) Simpson’s one third rule (iii) Simpson’s three eight rule . Also check the result by using direct integration. | CO5 | 15 |
|  | b. | Using Romberg Algorithm , compute R(5,2) from R(3,0)=R(4,0)=8 and R(5,0)= -4 | CO5 | 5 |
| 9. | a. | Determine the parameters so that is a natural cubic spline, where  ,  , , given S(1)=2. | CO6 | 8 |
|  | b. | Find the equations of the natural cubic interpolating spline for the following data:   |  |  |  |  | | --- | --- | --- | --- | | x | -1 | 0 | 1 | | y | 1 | 2 | -1 | | CO6 | 12 |

ALL THE BEST