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 – 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)**

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| Q. No. | Sub Div. | Questions | Course  Outcome | | Marks |
| 1. | a. | What is the Taylor Series of the function  at the point c=2?*.* | CO1 | | 5 |
| b. | Convert the following numbers.   1. (3BC459.972)16 = ( )10  = ( )2 2. (57.321)10 = ( )8 = ( )2 | CO1 | | 10 |
| c. | Convert (0.276)8 to the decimal number using nested multiplication. | CO1 | | 5 |
| (OR) | | | | | |
| 2. | a. | Derive the taylor series for the function f(x)=ex at c=0 and prove that it converges to ex using Taylor’s theorem. | CO1 | | 10 |
| b. | What is the Hexadecimal and binary form of (2576.35546875)10? | CO1 | | 5 |
| c. | Convert the number N=(35554675)8 to decimal form by using nested multiplication. | CO1 | | 5 |
| 3. | a. | Find a root of correct to 4 decimal using Bisection method. | CO1 | | 14 |
|  | b. | Find the value of using Newton Raphson method. | CO1 | | 6 |
| (OR) | | | | | |
| 4. | a. | Find the positive root of *f(x) = x3 – 6x + 4* between 0 and 1 by Newton Raphson method correct to five decimal places. | | CO1 | 10 |
|  | b. | Find the Pseudo code of Bisection method. | | CO1 | 6 |
|  | c. | If a=0.1 and b=1.0, how many steps of bisection method are needed to determine the root with an error atmost ? | | CO1 | 4 |
| 5. | a. | Write out the cardinal functions appropriate to the problem of interpolating to the following table and give the Lagrange Interpolating polynomial.   |  |  |  |  | | --- | --- | --- | --- | | x | 1/3 | 1/4 | 1 | | f(x) | 2 | -1 | 7 | | | CO2 | 12 |
|  | b. | Find an interpolating polynomial using Newton’s divided difference formula from the given table.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | 0 | 1 | 2 | 4 | 6 | | f(x) | 1 | 9 | 23 | 93 | 253 | | | CO2 | 8 |
| (OR) | | | | | |
| 6. | a. | Using the Newton algorithm, find the interpolating polynomial of least degree for the following table   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | 0 | 2 | 3 | 4 | | y | 7 | 11 | 28 | 63 | | CO2 | | 10 |
|  | b. | Interpret the polynomial,  using nested multiplication and then find . | CO2 | | 5 |
|  | c. | State the pseudocode for Newton’s Divided difference formula.. | CO2 | | 5 |
| 7. | a. | Find the value of  using (i) Simpson’s 1/3 rd rule  (ii) Simpson’s 3/8 th rule. Check the result by direct Integration. | CO3 | | 10 |
|  | b. | Compute  by using the trapezoidal rule by taking h=0.2 | CO3 | | 5 |
|  | c. | State the pseudocode for Simpson’s 1/3 rd rule. | CO3 | | 5 |
| (OR) | | | | | |
| 8. | a. | By the Romberg Algorithm establish a numerical value for the approximation  . Compute the approximation to only three places of accuracy. | CO3 | | 10 |
|  | b. | Develope the Gaussian quadrature formula for the interval (-3, 3) whose nodes are -2,0,2. | CO3 | | 10 |
|  | | **Compulsory**: |  | |  |
| 9. | a. | Examine whether the following function is first degree spline or not. | CO3 | | 5 |
|  | b. | Find the coefficients in the function    so that it is a cubic spline that takes the value 2 when x=1. | CO3 | | 5 |
|  | c. | Find the cubic spline for the following data with M0=10, . M2=10   |  |  |  |  | | --- | --- | --- | --- | | x | -1 | 0 | 1 | | y | 1 | 0 | 1 | | CO3 | | 10 |

ALL THE BEST