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 – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14MA2006** | **Duration :** | **3hrs** |
| **Sub. Name :** | **Numerical methods and computing** | **Max. marks :** | **100** |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | What is the Taylor series of the function at the point c=2? | CO 1 | 7 |
| b. | Find from the polynomial by using nested multiplication. | CO 1 | 3 |
| c. | Write pseudocode for Newton Raphson method. | CO 1 | 10 |
| (OR) | | | | |
| 2. | a. | Find a root of the equation correct to 4 decimal places by using bisection method. | CO 1 | 10 |
| b. | Convert 2576.35546875 to octal, binary and hexadecimal forms. | CO 1 | 10 |
| 3. | a. | Find a root of the equation using Newton Raphson method. | CO 1 | 10 |
|  | b. | How many steps of the bisection algorithm are needed to compute a root of f to full machine precision on the Marc-32 if a=16 and b=17? | CO 1 | 5 |
|  | c. | Determine f[1,3,-2,4] from the following table:   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | 1 | 3 | -2 | 4 | | y | 2 | 6 | -1 | -4 | | CO 2 | 5 |
| (OR) | | | | |
| 4. | a. | Using the Newton’s algorithm, find the interpolating polynomial of least degree  from the following table:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | -2 | -1 | 0 | 1 | 2 | | Y | 2 | 14 | 4 | 2 | 2 | | CO 2 | 12 |
|  | b. | Write pseudo code of Newton’s interpolating polynomial. | CO 2 | 8 |
| 5. | a. | Find a polynomial of least degree using Lagrange’s interpolating polynomial method from the following table:     |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | 0 | 1 | 3 | 2 | 5 | | Y | 2 | 1 | 5 | 6 | -183 | | CO 2 | 10 |
|  | b. | Use inverse Lagrange’s interpolating polynomial method to find x when y=10 from the data given below:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | X | -2 | -1 | 0 | 1 | 2 | | Y | 2 | 14 | 4 | 2 | 2 | | CO 2 | 10 |
| (OR) | | | | |
| 6. | a. | Compute with 11 uniform points using trapezoid rule. | CO 3 | 10 |
|  | b. | Write pseudo code for Romberg’s algorithm. | CO 3 | 10 |
| 7. | a. | If the trapezoid rule is to be used to computewith an error of at most , how many points should be used? | CO 3 | 5 |
|  | b. | Find an approximate value of  using Simpson’s one third rule  when n=12. | CO 3 | 15 |
| (OR) | | | | |
| 8. | a. | Evaluate when n=1 and n=2. | CO 3 | 10 |
|  | b. | Write pseudo code for Simpson’s one third rule. | CO 3 | 10 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Determine whether the function is a linear spline or not :  ,  ,  , . | CO 3 | 5 |
|  | b. | Determine whether the function is a Quadratic spline or not :  ,  ,  , . | CO 3 | 5 |
|  | c. | Find the equations of the natural cubic interpolating spline for the following data:   |  |  |  |  | | --- | --- | --- | --- | | x | -1 | 0 | 1 | | y | 1 | 2 | -1 | | CO 3 | 10 |

ALL THE BEST