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 :** | **14MA2012** | **Duration :** | **3hrs** |
| **Sub. Name :** | **Numerical Methods** | **Max. marks :** | **100** |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Fit a straight line to the following data and estimate the value of y at x=2.5.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | 0 | 1 | 2 | 3 | 4 | | y | 1 | 1.8 | 3.3 | 4.5 | 6.3 | | CO3 | 10 |
| b. | Fit a parabola to the following data, also estimate y at x=6.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | 1 | 2 | 3 | 4 | 5 | | y | 5 | 12 | 26 | 60 | 97 | | CO3 | 10 |
| (OR) | | | | |
| 2. | a. | Fit a curve of the form from the following data:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | 1 | 2 | 3 | 4 | 5 | | y | 7.1 | 27.8 | 62.1 | 110 | 161 | | CO3 | 10 |
| b. | Fit a curve of the form to the following data :   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | x | 1 | 2 | 3 | 4 | 5 | 6 | | Y | 151 | 100 | 61 | 50 | 20 | 8 | | CO3 | 10 |
| 3. | a. | Find the positive root of using Newton Raphson Method. | CO3 | 10 |
|  | b. | Using Gauss Jordan Method, Solve the following systems. | CO3 | 10 |
| (OR) | | | | |
| 4. |  | Solve the following system of equations using Gauss Seidal Method. | CO3 | 20 |
| 5. |  | From the following table of half yearly premium for policies maturing at different ages, estimate the premium at ages 46 and 63 using Newton’s forward and Backward Interpolation Formula.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Age(x) | 45 | 50 | 55 | 60 | 65 | | Premium(y | 114.84 | 96.16 | 83.32 | 74.48 | 68.48 | | CO2 | 20 |
| (OR) | | | | |
| 6. | a. | Using Gaus Forward Interpolation Formula , obtain f(3.5) from the following data.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | 2 | 3 | 4 | 5 | | f(x) | 2.626 | 3.454 | 4.784 | 6.986 | | CO2 | 10 |
|  | b. | Using Lagranges Formula of Interpolation , find y(9.5) | CO2 | 10 |
|  |  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | 7 | 8 | 9 | 10 | | y | 3 | 1 | 1 | 9 | |  |  |
| 7. | a. | Evaluate using (i) Trapezoidal rule (ii) Simpson’s 1/3rd rule (iii) Simpson’s 3/8th rule. | CO3 | 10 |
|  | b. | By means of Taylor’s Series expansion , find y at x=0.1 given  = . | CO3 | 10 |
| (OR) | | | | |
| 8. |  | Solve the equation = given using( i) Improved Euler Method  (ii) Modified Euler Method and find at | CO3 | 20 |
|  | | **Compulsory:** |  |  |
| 9. |  | Solve using (i) Third Order Runge Kutta method  (ii) Fourth Order Runge Kutta method and find at . | CO3 | 20 |

ALL THE BEST