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



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **17MA2012** | **Duration :** | **3hrs** |
| **Sub. Name :** | **NUMERICAL METHODS** | **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. | Given the following data:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | 0 | 1 | 2 | 3 | 4 | | y | 1 | 5 | 10 | 22 | 38 |   Find the straight line and parabola of best fit and calculate the sum of the squares of the residuals in both cases.Which curve is more appropriate and why? | CO1 | 20 |
| **(OR)** | | | | |
| 2. | a. | Reduce (i)  in to a linear law and write the normal equations to find the constants. | CO2 | 3 |
| b. | Fit a law of the type to the data.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | 0 | 1 | 2 | 3 | | y | 1.05 | 2.1 | 3.85 | 8.3 | | CO2 | 17 |
|  |  |  |  |  |
| 3. | a. | Using Newton’s method, find the root between 0 and 1 of correct to five decimal places. | CO3 | 10 |
| b. | Solve the system of equations by Gauss Elimination method. | CO3 | 10 |
| **(OR)** | | | | |
| 4. | a. | Solve the following system of equations by Gauss Seidel method.  correct to four decimal places. | CO3 | 17 |
| b. | State the condition for convergence of Gauss Jacobi method for solving a syatem of simultaneous algebraic equations. | CO3 | 3 |
|  |  |  |  |  |
| 5. | a. | Using Lagrange’s interpolation formula, find y(10) from the table   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | 5 | 6 | 9 | 11 | | y | 12 | 13 | 14 | 16 | | CO4 | 10 |
| b. | Apply Gauss backward difference interpolation formula to find f(12) given   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | 5 | 10 | 15 | 20 | | f(x) | 54.14 | 60.54 | 67.72 | 75.88 | | CO4 | 10 |
| **(OR)** | | | | |
| 6. | a. | The following data are taken from the steam table   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Temperature | 140 | 150 | 160 | 170 | 180 | | Pressure | 3.685 | 4.854 | 6.302 | 8.076 | 10.225 |   Find the pressure at temperature 142 and 175. | CO4 | 15 |
| b. | Find the relation between the operators E | CO4 | 5 |
|  |  |  |  |  |
| 7. | a. | Evaluate by using (i) Trapezoidal rule (ii) Simpson’s one third rule (iii) Simpson’s three eighth rule. | CO5 | 16 |
| b. | What are the truncation errors in Trapezoidal rule and Simpson’s rule? | CO5 | 4 |
| **(OR)** | | | | |
| 8. | a. | By dividing the range into ten equal parts, evaluate  by Trapezoidal rule and Simpson’s rule. | CO5 | 10 |
| b. | Evaluate  using Trapezoidal rule and Simpson’s rule. | CO5 | 10 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | Solve  and get y(1.1) and y(1.2) using Euler method. | CO6 | 10 |
| b. | Find the value of y when x = 0.2 given using Runge Kutta method of fourth order. | CO6 | 10 |