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

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**End Semester Examination – Nov/Dec – 2018**

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| **Code :** | **14MA2012/17MA2012** | **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. | By the method of least squares fit a straight line to the following data . Also estimate the value of y at x=22.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | X | 5 | 10 | 15 | 20 | 25 | 4 | | Y | 15 | 19 | 23 | 26 | 30 | 6.3 | | CO1 | 10 |
| b. | From the table given below find the best values of a and b in the law y = a ebx by the method of least squares.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | X | 0 | 1 | 2 | 3 | | Y | 1.05 | 2.10 | 3.85 | 8.30 | | CO1 | 10 |
| (OR) | | | | |
| 2. |  | Fit a straight line and a parabola to the following data by the least squares method and find out which one is most appropriate. Reason out for your conclusion.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | X | 0 | 1 | 2 | 3 | 4 | 5 | | Y | 14 | 18 | 22 | 28 | 35 | 39 | | CO1 | 20 |
|  |  |  |  |  |
| 3. | a. | Using Newton Raphson method find the positive root of  correct to 5 decimal places. | CO3 | 10 |
| b. | Using Gauss Elimination method, Solve the following system of equations.  2x+3y-z=5  4x+4y-3z=3  2x-3y+2z=2 | CO3 | 10 |
| (OR) | | | | |
| 4. |  | Solve the following system of equations by using Gauss-Seidal method (Correct to 3 decimal places). | CO3 | 20 |
|  |  |  |  |  |
| 5. | a. | Find the value of y at x=43 from the following data using Newton’s Forward Interpolation formula.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | x | 40 | 50 | 60 | 70 | 80 | 90 | | y | 184 | 204 | 226 | 250 | 276 | 304 | | CO2 | 10 |
| b. | Using Lagrange’s interpolation formula, find from the following table.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 7 | 8 | 9 | 10 | | y | 3 | 1 | 1 | 9 | | CO2 | 10 |
| (OR) | | | | |
| 6. | a. | Apply Gauss’s forward formula to obtain  at x=3.5 from the table given below:   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | 2 | 3 | 4 | 5 | | y | 2.626 | 3.454 | 4.784 | 6.986 | | CO2 | 10 |
| b. | Using Newton’s Backward Interpolation formula, find the value of y  at x=28 from the following data.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | 20 | 23 | 26 | 29 | | y | 0.3420 | 0.3907 | 0.4384 | 0.4848 | | CO2 | 10 |
|  |  |  |  |  |
| 7. | a. | Solve numerically , y(0)=1 for x=0.1, 0.2 by Improved Euler method. | CO3 | 10 |
| b. | Solve given , and find  correct to four decimal places using Taylor Series Method. | CO3 | 10 |
| (OR) | | | | |
| 8. |  | Using R-K method of fourth order, solve  Given y(0)=1 at x=0.2, 0.4 | CO3 | 20 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | By dividing the range into ten equal parts, evaluate  by Trapezoidal rule and Simpson’s rule. Verify your answer with direct Integration. | CO3 | 15 |
| b. | The table below gives the velocity v of a moving particle at time ‘t’ seconds. Find the distance covered by the particle in 12 seconds.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | t | 0 | 2 | 4 | 6 | 8 | 10 | 12 | | v | 4 | 6 | 16 | 34 | 60 | 94 | 136 | | CO3 | 5 |