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



**End Semester Examination – Nov/Dec – 2017**

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| **Code :** | **17MA3008** | **Duration :** | **3hrs** |
| **Sub. Name :** | **COMPUTATIONAL MATHEMATICS** | **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. | Find the extremal of the functional I=  subject to the conditions  , | CO1 | 8 |
| b. | Show that the extremal of the functional , , , subject to the initial conditions at t=0, x=0, y=0 and at t=, x=y=1 is x=y=cosech sinht | CO1 | 12 |
| (OR) | | | | |
| 2. | a. | Show that  is the extremal of the functional  I=  through the origin and the point (1,1). | CO1 | 8 |
| b. | State and prove Euler’s Equation. | CO1 | 12 |
| 3. | a. | Solve over the square mesh x=0, y=0,x=3, y=3 with u=0 on the boundary and mesh length 1 unit correct to one decimal place. | CO2 | 12 |
|  | b. | Using Bender schimidt, find the values of the function u(x,t) satisfying the equation with the boundary conditions u(0,t)=0, u(8,t)=0, u(x,0)=(8x-x2)/2, x=i, where i=0,1,2,3,4,5,6,7,8.  t=j/8, where j=0,1,2,3,4,5. | CO4 | 8 |
| (OR) | | | | |
| 4. | a. | Solve the Laplace equation  with the boundary conditions ,where  0using Liebman’s process. | CO2 | 12 |
|  | b. | Using Crank Nicholson method, find u(x,t) satisfying the equation  0<x<1, t>0, with the boundary conditions , Compute u for 2 step in t direction taking h=1/4 and k=1. | CO4 | 8 |
| 5. | a. | Using Modified Euler’s method, find y(0.25), y(0.5), y(0.75) given  correct to four decimal places. | CO3 | 10 |
|  | b. | Using Picard’s method, solve , y(0)=1 up to second iteration and hence find y(0.1) , y(0.2), y(0.3) and correct to four decimal places. | CO3 | 10 |
| (OR) | | | | |
| 6. | a. | Using Improved Euler’s method find y(0.1), y(0.2) , y(0.3)given  correct to four decimal places. | CO3 | 10 |
|  | b. | Given  , y(0)=1, find y(0.2), y(0.4) , y(0.6) , y(0.8), y(1) using Euler’s method. | CO3 | 10 |
| 7. |  | Using Inverse Power method, find the numerically smallest eigen value of the matrix A = | CO5 | 20 |
| (OR) | | | | |
| 8. | a. | Using Power method, find the numerically largest eigen value and eigen vectors of the matrix A = | CO5 | 10 |
|  | b. | Using Jacobi’s method, find the Eigen values and Eigen vectors of the matrix A= | CO5 | 10 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Find the positive root of lies  between 0 and 1 Correct to four decimal places using Muller’s method. | CO6 | 10 |
|  | b. | Obtain the cubic spline approximation for the function y=f(x) from the following data, given that .   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | -1 | 0 | 1 | 2 | | y | -1 | 1 | 3 | 35 | | CO6 | 10 |

ALL THE BEST