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 – April/May – 2017**

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| **Code :** | **14MA3008** | **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 , , , subject to the initial conditions at t=0, x=0, y=0 and at t=, x=y=1. | CO 1 | 12 |
| b. | Show that the extremal of the functional  y(0)=0,  y( is given by y= | CO 1 | 8 |
| (OR) | | | | |
| 2. | a. | State and prove Euler’s equation. | CO 1 | 12 |
| b. | Find the curve passing through the point (x1, y1) and (x2, y2) when rotated about the x axis gives a minimal surface area. | CO 1 | 8 |
| 3. |  | 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. | CO 2 | 20 |
| (OR) | | | | |
| 4. |  | Solve the laplace equation  with the boundary conditions ,where  0using Liebman’s process. | CO 2 | 20 |
| 5. |  | Using Inverse Power method, find the numerically smallest eigen value and eigen vectors of the matrix A = | CO 4 | 20 |
| (OR) | | | | |
| 6. | a. | Using Modified Euler’s method find y(0.1), y(0.2) given | CO 3 | 10 |
|  | b. | Solve  By picard’s method upto the third approximation. Hence find the value of y(0.1) and y(0.2) | CO 3 | 10 |
| 7. | a. | Find the root of  correct to four decimal places that lies between 0 and 1  using Muller’s method. | CO 5 | 10 |
|  | b. | Using (i) Gauss Elimination method (ii)Gauss Jordan method, Solve 5x-y=9, -x+5y-z=4, -y+5z=-6 | CO 5 | 10 |
| (OR) | | | | |

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| 8. | a. | Solve  y(0)=0, y(1)=0 using Raleigh Ritz method. | CO 5 | 10 |
|  | b. | Find the root of 2  that lies between -2 and -1 correct to four decimal places using Chebyshev’s method. | CO 5 | 10 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Evaluate  using three point Gaussian Quadrature formula. | CO 5 | 8 |
|  | b. | Obtain the cubic spline approximation for the function y=f(x) from the following data, given that .   |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | 1 | 2 | 3 | 4 | | y | 1 | 5 | 11 | 8 | | CO 6 | 12 |

ALL THE BEST