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 :** | **14MA3008** | **Duration :** | **3hrs** |
| **Sub. Name :** | **COMPUTATIONAL MATHEMATICS** | **Max. marks :** | **100** |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Find the curve passing through and which when rotated about x – axis gives minimum surface area. | CO1 | 10 |
| b. | Find the extremal of given , | CO1 | 10 |
| **(OR)** | | | | |
| 2. | a. | Show that the functional given , and , is stationary for  *x* = *sint* and *y = sint*. | CO1 | 12 |
| b. | Find the general solution of the curve for which the functional  is extremum. | CO1 | 8 |
| 3. | a. | Solve the Poisson’s equation over the square mesh with sides x = 0 , y = 0, x = 3 , y = 3 with u = 0 on the boundary with mesh length 1. | CO2 | 10 |
|  | b. | Solve by Bender - Schimit Method subject to  u(x,0) = , u(0,t) = 0, u(5,t) = 0 taking *h* = 1 and upto 5 seconds. | CO2 | 10 |
| **(OR)** | | | | |
| 4. | a. | Solve by Crank Nicklson Method subject to u(x,0) = 0, u(0,t) = 0, u(1,t) = t for two time steps taking *h* = 0.25. | CO2 | 10 |
|  | b. | Solve the hyperbolic equation up to *t* = 2.5 given  *u*(0, *t*) = *u*(5, *t*) = 0, *u*(*x*, 0) = *x2* ( 5 – *x*), | CO2 | 10 |
| 5. | a. | Solve given y(0) = 0. Obtain the values of y(0.1), y(0.2) using Picard’s Method. | CO3 | 10 |
|  | b. | Using Jacobi method find all the eigen values of the matrix | CO3 | 10 |
| (OR) | | | | |
| 6. | a. | Solve and y(0) = 0. Determine the value of y(0.2) and y(0.4) using Improved Euler Method. | CO3 | 10 |
|  | b. | Solve , y(0) = = 0 using Rayleigh Ritz Method. | CO3 | 10 |
| 7. | a. | Find the positive root of  by Chebyshev’s Method. | CO3 | 10 |
|  | b. | Solve the equations 3x + 4y + 5z = 18 ; 2x – y + 8z = 13 ; 5x – 2y + 7z = 20 by Gauss Elimination Method | CO3 | 10 |
| (OR) | | | | |
| 8. | a. | Find all the roots of the equation by Graeffe’s method squaring upto three times. | CO3 | 10 |
|  | b. | Solve the equations ,  by Newton-Raphson method (2 iterations). | CO3 | 10 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Evaluate using (i) Trapezoidal rule, (ii) Simpson’s Rule and verify with exact integration. | CO3 | 10 |
|  | b. | Find the cubic spline approximation for the function given below   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *x* | 0 | 1 | 2 | 3 | | *y = f(x)* | 1 | 2 | 33 | 244 |   Assume M(0) = M(3) = 0. Also find *y*(2.5) | CO3 | 10 |

ALL THE BEST