****

**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

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

**End Semester Examination – Nov/Dec - 2016**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **12CE216** | **Duration :** | **3 hrs** |
| **Sub. Name :** | **Computational Methods** | **Max. marks :** | **100** |

|  |  |  |
| --- | --- | --- |
| **Q. No.** | **Questions** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | |
| 1. | What are roundoff errors? | (1) |
| 2. | Explain the term pivoting? | (1) |
| 3. | Write any one limitation of Newton Raphson’s method? | (1) |
| 4. | Give the equation for trapezoidal rule? | (1) |
| 5. | Name any one numerical integration method? | (1) |
| 6. | What is least- square regression? | (1) |
| 7. | Give an application of differential equation? | (1) |
| 8. | What is the order of Euler’s method? | (1) |
| 9. | Name two engineering applications of finite difference approach? | (1) |
| 10. | Mention which eigen value is obtained by power? | (1) |

|  |  |  |
| --- | --- | --- |
| **PART B(5 X 3= 15 MARKS)** | | |
| 11. | State any three approaches available for solving a system of linear equations? | (3) |
| 12. | Evaluate the square root of 2.5 using linear interpolation technique, if the square roots of 2 and 3 are 1.4142 and 1.7321 respectively. | (3) |
| 13. | 1.5  Evaluate the integral I =∫(x3+1)dx using trapezoidal rule for the intervals 1 and 1.5  1 | (3) |
| 14. | Given the equation y’(x) = 2y/x with y(1)=2, estimate y(1.5) using h = 0.25? | (3) |
| 15. | State the condition for hyperbolic equation and give an example of hyperbolic problem? | (3) |

|  |  |  |  |
| --- | --- | --- | --- |
| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. | Solve the following system of equations by the Gaussian elimination:  2x + y + z = 10  3x + 2 y +3 z = 18  x + 4 y +9 z = 16. | | (15) |
| (OR) | | | |
| 17. | Find the numerically smallest eigen value of matrix [A] by finding [A] -1  -15 4 3  A = 10 -12 6  20 -4 2 | |  |
| 18. | Find the root of the equation ex = 2x + 1 correct to four places of decimals using Newton Raphson’s method. The root lies between 1 and 2 | | (15) |
| (OR) | | | |
| 19. | Evaluate the integration shown below by using i) Simpson’s 1/3rd ii) Simpson’s 3/8th rule  6  I = ∫ dx / (x2 + 1)  0 | |  |
| 20. | The population of a town in the census is given in the data. Estimate the population in the year 1996 using Newton’s forward interpolation formula.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Year (x) | 1961 | 1971 | 1981 | 1991 | 2001 | | Population in 1000’s | 46 | 66 | 81 | 93 | 101 | | |  |
|  |
|  |
|  |
|  |
| (OR) | | | |
| 21. | Write the procedure involved for finding the deflection for the beam using Newmark’s method | | (15) |
| 22. | Find the values of y(1.2) and y(1.4) using modified Euler’s method with h= 0.2, given that  dy = 2y + 3 ; y(1) = 0.5  dx x | |  |
| (OR) | | | |
| 23. | Using Adam Predictor Corrector method, find the solution of the initial value problem  dy = y – t2 ; y(0) = 1 at t = 1.0, taking h = 0.2.  dx | | (15) |
| 24. | Solve the Laplace equation uxx+uyy = 0 by employing five point formula which satisfy the following Dirchlets boundary condition  u(0,y)=0 u(x,0) =0  u(x,1)=100x u(1,y) =100y | | (15) |
| (OR) | | | |
| 25. | a. | Explain the various method s available to solve differential equation? | (7.5) |
| b. | How are partial differential equation classified? Give an example from real life situation for each type. | (7.5) |

ALL THE BEST