**ORCHID INTERNATIONAL COLLEGE**

**Full Marks:100**

**Time:** 3 hrs

**Sinamangal-9, Kathmandu**

**Pre- Board Exam**

|  |
| --- |
| **BSc. CSIT/Third Semester/CSc 204: Numerical Method** |

**2070**

***Candidates are required to answer the questions in their own words as far as practicable***

**Attempt all questions:**

1. **a**. Find a real root of the equation x = e-x using Newton Raphson method to six decimal place. **[7]**

**b.** Find a root of following equation using bisection method to four decimal places **[8]**

logx – cosx = 0

1. Use the Runge-Kutta method to estimate y(0.5) of the following equation with h=0.25 **[15]**



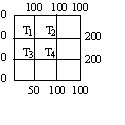
1. **. a.** Find the missing value in the following table of a chemical dissolved in water using Least square approximation to straight line fitting. **[7]**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Temperature | 100 | 150 | 200 | 250 | 300 | 350 |
| Solubility | 20 | 22 | 23 | ? | 26 | 27 |

**b**. The steady-state two dimensional heat-flow in a metal plate is given by **[8]**



Given boundary conditions as shown in the figure below, find the temperature T1, T2, T3 and T4.



1. **a.** Generate a Lagrange interpolating polynomial for the function y = cosπx, taking the pivotal points 0, ¼ and ½. **[10]**

**b.** Use Romberg integration to evaluate **[5]**



.

1. **a.** Derive the two point Gaussian Quadrature formula**. [10]**

**b.** Solve the following boundary value problem using finite differences. **[5]**

y" + xy2 = 0, y(0) = 0, y(1) = 1, h = 1/3

1. **a.** Solve the following system of equation using Gauss Jordan Elimination method **[8]**

2x1+x2+x3-2x4 = 0

4x1+2x3+x4 = 8

3x1+2x2+2x3 = 7

x1+3x2+2x3 = 3

**b.** Determine the smallest eigen value and its corresponding eigenvector for the following matrix using Power method **[7]**



1. ***Write short notes on ( Any Two)* [2\*5=10]**
2. Fixed point iteration method and its convergence
3. Graphical representation of Euler's method for solving differential equation
4. Eigen Value and Eigen Vector
5. Shooting method.

**\*\*\*\*\***