Pokhara University

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| Level: Bachelor | Semester: Fall | Year : 2013 |
| Programme: BE | | Full Marks: 100 |
| Course: Numerical Method | | Pass Marks: 45 |
| Time : 3hrs. |

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| *Candidates are required to give their answers in their own words as far as practicable.* |
| *The figures in the margin indicate full marks.* |
| Attempt all the questions. |

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|  | 1. Find a positive root of the equation f(x)=cosx-3x+1 correct up to 3 decimal places using Bisection Method. 2. Calculate the root of non-linear equation 3x=cosx+1 using Secant Method. | 7  8 |
|  | 1. Find a real root of the equation: xlog10x=1.2 by using Newton-Raphson (NR) method such that the root must have error less than 0.0001%. 2. Use appropriate method of interpolation to get Sin θ at 45˚ from the given table  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | θ | 10 | 20 | 30 | 40 | 50 | | Sinθ | 0.1736 | 0.3420 | 0.5000 | 0.6428 | 0.7660 | | 7  8 |
|  | 1. From the following data  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | X | 1 | 2 | 3 | 4 | 5 | | y | 0.5 | 2 | 4.5 | 8 | 12.5 |   Fit a power function model of the form y=axb   1. Evaluate the integral I= compare the result in both condition for Simpson 1/3 and 3/8 rule. | 7  8 |
|  | 1. Find the inverse of the given matrix by applying Gauss Elimination Method (GEM) with partial pivoting technique. 2. Solve the following system of equations by applying Gauss-Seidel interative method. Carry-out the interactions upto 6th stage.   28x+4y-z=32  X+3y+10z=24  2x+17y+4z=35 | 8  7 |
|  | 1. The voltage ‘V’ across a capacitor at a time ‘T’ seconds is given by the following table. Use the principle of least squares to fit the curve of the form: to the data.  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | T | 0 | 2 | 4 | 6 | 8 | | V | 150 | 63 | 28 | 12 | 5.6 |  1. Solve: dy/dx=y-2x/y, y(0)=1 in the range by using (1) Euler’s method and (2) Heun’s method. Comment on the results. Take h=0.2. | 7  8 |
|  | 1. Using Runge Kutta method of order 4, solve the equation:   and y’(0)= 0 to find y(0.2) and y’(0.2). take h=0.2.   1. The steady-state two dimensional heat flow in a metal plate of size 30x30cm is defined by +=0. Two adjacent sides are placed at 100˚c and other side at 0˚c. Find the temperature at inner points, assuming the grid size of 10x10cm. | 7  8 |
|  | Write short notes on: (Any two)   1. Romberg Integration. 2. Laplacian Equation. 3. Advantage of pivoting over Gauss Elimination method. | 2×5 |