Pokhara University

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| Level: Bachelor | Semester: Fall | Year : 2014 |
| 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. The flux equation of an iron core electric circuit is given by :   f(Φ)=10-2.1Φ-0.01Φ3.The steady state value of flux is obtained by solving the equation, f(Φ)=0.By using any close-end method, estimate the steady state value of “Φ” correct to 3 decimal places.   1. Evaluate one of the real roots of the given equation: x.ex-cos(x)=0 by NR- method correct to at least 4 decimal places. | 8  7 |
|  | 1. Find the missing term in the following table using suitable interpolation  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | X | 0 | 1 | 2 | 3 | 4 | | Y | 1 | 3 | 9 | ? | 81 |  1. The following table gives the heights, x(cm) and weights, y(kg) of five persons.  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | 175 | 165 | 160 | 155 | 145 | | y | 68 | 58 | 55 | 52 | 48 |   Assuming the “linear relationship” between x and y, obtain the regression line(x on y) . Also obtain ‘x’ value for y=40. | 7  8 |
|  | 1. The following table gives the displacement, x(cms) of an object at various of time, t(seconds). Find the velocity and acceleration of the object at t=1.6 sec. Using suitable interpolation method.  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | T | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | | X | 9.0 | 9.5 | 10.2 | 11.0 | 13.2 |  1. Find the real root of the equation correct to four places of decimal using Bracketing method. | 8  7 |
|  | 1. Solve the following system of equations by applying Gauss Elimination Method(GEM) with partial pivoting technique. And also determine the determinant value.   2x+2y+z= 6  4x+2y+3z= 4  x-y+z= 0   1. Find the largest eigen value and the corresponding eigen vector correct upto 3 decimal places using power method for the matrix | 8  7 |
|  | 1. Solve the following system by using Gauss Seidel method: 2. Given: ; y(1)=0. Solve for y at x=1.04, by using Euler’s method(take h=0.01). | 7  8 |
|  | 1. Solve: for y(0.6) and z(0.6) given that y=0, z=1 at x=0 by using Heun’s method. Assume, h=0.3. 2. Torsion on a square bar of size 9cm\*9 cm subject to twisting is governed by : ∇2u = -4, with Dirichlet boundary condition of u(x, y)=0 and h=1.Calculate the steady state temperatures at interior points. Assume a grid size of 3cm\*3cm. Iterate until the minimum difference at any point is correct to two decimal places by applying Gauss-Seidel method. | 7  8 |
|  | Write short notes on: (**Any Two**)   1. Monotonic and oscillatory divergence in fixed point iteration method 2. An algorithm for Lagrange’s interpolation polynomial 3. Relaxation method. | 2×5 |