COMILLA UNIVERSITY

Dept. of Computer Science & Engineering

2nd Year 1st Semester B Sc (Hon's) Final Examination 2013

Course Title: Numerical Methods

Course Code: CSE-216

Session: 2011-2012

Total Marks: 30

Time: 2 hours

There are 5(Five) questions. Answer any 3(Three). Figures in the right margin indicate marks. Writing anything on the question paper is strictly prohibited.

1) a. Distinguish between numerical and analytical method. 1

b. Explain numerical stability. 2

c. Mention some sources of errors in numerical computation. Why are some errors inherent in nature? 2

d. When do blunders occur in numerical computation? 2

e. Find chopping error if keeping four digits after decimal point, remaining digits are dropped. $X=0.423789\times10^{1}$ 2

2) a. Explain method of false position. 2

b. Find the real root of the following equation by using method of false position. 3

$f(x) = x^3 - 2x - 5 = 0$

c. Find the convergence of Secant Method. 3

d. Distinguish between bisection and false position method. 2

3) a. Explain Gauss-Jordan method and write its algorithm. 2

b. Use Gauss-Jordan method to solve the following system of equations. 3

$$2x + y + z = 7$$
$$4x + 2y + 3z = 4$$
$$x - y + z = 0$$

c. Solve the following system of equations using Gauss-Seidel method. 4

$$2x - 7y - 10z = -17$$
$$5x + y + 3z = 14$$
$$x + 10y + 9z = 7$$

4) a. When and why to use interpolation and regression? Explain. 2.5

b. Derive formula for n-degree Lagrange interpolation polynomial. 3.5

c. Estimate $\cos 1.15^{c}$ from the following table of values using second order Newton interpolation polynomial. 4

x	1.0	1.1	1.2
$\cos x$	0.5403	0.4536	0.3624

5) a. Explain the Taylor's series. 3

b. Form the Taylor series for $y(x)$, find $y(0.1)$ correct to four decimal places if $y(x)$ satisfies

$y' = x - y^2$ and $y(0) = 1$ 3

c. Describe the basic concept employed in Runge-Kutta methods. 4