M.E (EE) 1st Semester Final Examination 2012
Subject : Computational Methods and Programming in Electrical Engineering
(EE 917)

Time : 3 Hours | Full Marks : 70

Answer any Two questions from Group-A and THREE questions from Group-B

Group-A

1. (a) Find the missing term in the following table using Newton's formula:

x	0	1	2	3	4
y	1	3	9	?	81

Derive the formula used.

(b) Solve using Gaussian Elimination method:

$$x_1 + x_2 + x_3 = 6$$
$$3x_1 + 3x_2 + 4x_3 = 20$$
$$2x_1 + x_2 + 3x_3 = 13$$

[(4+3)+7]

2.(a) Students collected the experimental data given in the following table. The relation is $d=\frac{1}{2}gt^2$, where d is distance in meters and t is time in seconds. Find the gravitational constant g.

Time, t	0.2	0.4	0.6	0.8	1.0
Distance, d	0.1960	0.7850	1.7665	3.1405	4.9075

(b) $dy/dx = x - y$, $y(0)=2$. Using Runge-Kutta 4th order method find $y(0.4)$. Take step size $h=0.1$.

[6+8]

3. (a) Solve the following set of equations with LU factorization:

$$3x_1 - 2x_2 + x_3 = -10$$
$$2x_1 + 6x_2 - 4x_3 = 44$$
$$-x_1 - 2x_2 + 5x_3 = -26$$

(b) Find $\int_1^2 (1/x)dx$ using trapezoidal rule. Take step size $h=0.25$.

[9+5]

GROUP-B

4. (a) Explain redirection operator, pipe and filter of UNIX shell with suitable illustration.
   (b) Discuss about the various development tools of UNIX/LINUX programming environment. (9+5)

5. (a) Write a brief note on Object Oriented Programming.
   (b) Define "static" and "dynamic" binding. Write a C++ program to demonstrate "late" binding. (5+9)

6. (a) Explain user defined data type in C/C++ using a suitable example.
   (b) Write a C/C++ code to add two matrices of complex numbers. (5+9)

7. (a) Find the solution of equations using "Gauss-Seidel" iterative method, upto two decimal places.
   $10x_1 + 2x_2 - x_3 = 11$
   $2x_1 + 10x_2 + x_3 = 13$
   $x_1 - 2x_2 + 10x_3 = 9$
   (b) Write a C program to solve above linear system by Jacobi's method and how it is different from "Gauss-Seidel" method. (5+9)

8. Write short notes on following topics: (5+5+4)
   (a) Revision Control System
   (b) UNIX Scheduler
   (c) Find root of $f(x) = e^{-x} - x = 0$ using *bisection method* upto 3 decimal correct value.