Computational Methods and Programming in Electrical Engineering
(EE917)

Time: 3 hours   Full Marks:70

i) Answer any TWO questions from Group-A and THREE questions from Group-B.

GROUP-A

1. (a) A solid of revolution is formed by rotating about the x-axis, the area between the lines $x = 0$ and $x = 1$ and a curve through the points with the following coordinates. Estimate

x	0	0.25	0.50	0.75	1.00
y	1	0.9896	0.9589	0.9089	0.8415

the volume of the solid formed by using Simpson's 1/3 formula.

   (b) Use LU factorisation method to solve the following system of equations:

$$4x_1 + 3x_2 - x_3 = -2$$
$$-2x_1 - 4x_2 + 5x_3 = 20$$
$$x_1 + 2x_2 + 6x_3 = 7$$

(5+9)

2. (a) $\frac{dy}{dx} = (1 + y^2)$, $y(0) = 0$. Find $y(0.6)$. Use Runge-Kutta 4th order method. Take step size $h = 0.2$.

   (b) Fit a function of the form $y = ax^b$ to the following data :

x	2	4	7	10	20	40	60	80
y	43	25	18	13	8	5	3	2

Derive the formula used.   (6+8)

3. (a) The pressure of a gas (P in mm of Hg) measured at various temperatures (T, in $°C$) is given below :

T	0	5	20	31
P	115.2	131.8	215.9	391.8

Using Lagrange's interpolation method, find the pressure when the temperature is $25°C$.

   (b) Compare Jacobi's iterative method and gauss-Seidel iterative method

   (c) Solve the following system of equations using Gaussian elimination method.

$$x + 4y - z = -5$$
$$x + y - 6z = -12$$
$$3x - y - z = 4$$

(5+3+6)

GROUP-B

4. (a) What is meant by developers' tool under UNIX? Discuss about each type of tools in a brief.

   (b) How ">", ">>" and "|" shell operators are used under UNIX OS? Develop a system to show their usage with appropriate remarks.

   (c) Write a brief notes on the following commands:
   tr, grep (5+5+4)

5. (a) Define the UNIX file system and process.

   (b) Write a brief note on UNIX processes and process system commands.

   (c) What is "crontab"? Develop an application using crontab. (3+5+6)

6. (a) Define "Object" and "Class". Discuss various aspect of OOP and it's advantages over the other methods.

   (b) How the various access modifiers works in a C++ program? Write a brief note on them.

   (c) Write a brief note on inheritance and its advantages and disadvantages. (5+4+5)

7. Write short notes on following topics. (5+5+4)

   (a) Pipes and Filters of UNIX

   (b) GNU plot

   (c) Basic and user defined data types