B.E. (ETC) Part-II 4th Semester Examination, 2010

Numerical Analysis and Computer Programming

(ET-405)

Time : 3 hours **Full Marks : 70**

Answer anu FIVE questions.
The questions are of equal value.

I. Derive Gauss's Forward and Backward Central Difference Formulas. And hence find out Stirling's Formula for central differences.

The following table gives the value of e^x for certain equidistant values of x. Find the value of e^x when $x = 0.636$ using Stirlings's formulae.

X	0.61	0.62	0.63	0.64	0.65	0.66
e^X	1.840431	1.858928	1.877610	1.896481	1.915541	1.934792

2. Derive the Inverse Interpolation Formulae of successive approximations. Tabulate $y = x^3$ for $x = 2, 3, 4, 5$ and calculate the cube root of 20 correct to 3 decimal places.

3. Derive general formula for numerical integration and hence find out the trapezoidal rule. ,

Compute the values of $I = \int_0^1 \frac{dx}{1 + x^2}$ using trapezoidal rule with h=0.25 and 0.125.

4. Show that the system of equations as follows are consistent and solve them using Gaussian Elimination Method.

$$X_1 + 2x_2 - x_3 = 3$$
$$x_j - x_2 + 2x_3 = 1$$
$$2x_1 - 2x_2 + 3x_3 = 2$$
$$x_j - x_2 + x_3 = -1.$$

5. Derive the Pi card's method of successive approximation for solving ordinary differential equations,

Solve $\frac{dv}{0X} - 1 = xy$ and $y(0) = 1$ using this method and compute $y(0.1)$ correct to 4 decimal places.

(ET-405)

6. What a dynamic memory allocations? How are malloc, calloc and realloc functions used for dynamic memory allocation? How is a link list constructed? What do you understand by system level file management?

7. How can you use function int86()? Mention the prototype of such function. Write a program to display current time using 0x21 interrupt? How can you display the computer configuration using Power-on-self-test (POST) stream?