*Ex/BESUS/* ***EE- 605/ 06***

**B.E. (EE) Part-Ill 6th Semester Examination, 2006**

# Numerical Methods and Computer Programming
# (EE-605)

**Time : 3 hours** **Full Marks : 100**

*Use separate answerscript for each half.*
***Answer** SIX questions, taking THREE from each half.*
***Two** marks are reserved **for** neatness in each half.*

## FIRST HALF

1. a) Apply Newton-Raphson method to find one positive root greater than 1.0 of
$f(x) = 3x + \sin x - e^x = 0$
Take $|f(x)| < 0.0001$

b) Discuss the convergence characteristics of Newton-Raphson method. [10+6]

2. a) Develop an algorithm for synthetic division of a polynomial,

b) Determine the second remainder of

____

by synthetic division. Verify it with remainder theorem. [8+8]

3. a) What do you mean by direct method and iterative method of solution of a set of linear algebraic equations.

b) Find the inverse of the following coefficient matrix using Gauss-Jordan method and solve the equations. Show the intermediate steps.

$$\begin{vmatrix} 1 & 2 & -3 \\ 1 & 3 & 1 \\ 2 & -4 & -2 \end{vmatrix} \quad \begin{vmatrix} -4 \\ 10 \\ -12 \end{vmatrix}$$

[4+(8+4)J

4. a) What are interpolation and least squares methods?

b) Fit a second-order polynomial to the following data using least squares method.

| | | | | | | |
|---|---|---|---|---|---|---|
| | 2.1 | 7.7 | 13.6 | 27.2 | 40.9 | 61.1 |
| x; | 0 | 1 | | | | |

5. a) Derive the formula for integral of a function using trapezoidal rule.

b) Evaluate the integral of the function with the following tabulated data over the interval from x= 1.8 to x = 3.0.

| **x** | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.8 | 3.0 |
|---|---|---|---|---|---|---|---|
| **f(x)** | 6.050 | 7.389 | 9.025 | 11.023 | 13.464 | 16.445 | 20.086 |

[10+6]

## SECOND HALF

6. a) What are the outputs of following two programs? Give justification of each answer.

   i) int main () { int x,y; x = 1 2 ; y=0; x++; ++x; x = -1; y% = ( x - 1 ); printf("%f\n", y); return 0; }

   ii) int main() { unsigned int p=-30; if(p>0) printf("Positive"); else printf("Negative"); return 0; }

   b) Develop a prime function to check whether a number is prime or not. Then discuss how that C code can be used to create a header and library. [4+4+8]

7. a) Write a function to exchange the values of two variables. Discuss the program in brief.

   b) Write a C program to compute $c = a + b*d^2 + k$, where a, b, c, d are complex numbers and k is a constant number. [8+8]

8. a) Write a short note on the salient features of UNIX/LINUX operating system.

   b) Discuss about the file system permission and security mechanism in UNIX/ LINUX environment. [6+10]

9. a) How > is different from » operator in case of UNIX shell?

   b) Discuss about pipe and filter of UNIX/LINUX operating system with appropriate examples.

   c) How can you run a program as a background process? Then show, how to monitor the execution and terminate the program in case of emergency? [8+8]

10. Write short notes on a, b, c below : [4x4]

    a) UNIX/LINUX is a case sensitive silent operating system

    b) Functions in C

    c) chmod command in UNIX/LINUX

    d) Fill up the blanks

    i) ar is an _____ .

    ii) kill is used to _____ .

    iii) A valid c variable name must be started with

    iv) chown is used to _____ .