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I B. Tech. (CCC) EXAMINATION, Nov./Dec., 2004

COMPUTER PROGRAMMING AND NUMERICAL METHODS

[Common to Civil Engg., Electrical and Electronics Engg., Mech. Engg. and Electronics and Communication Engg.]

Time : Three Hours] [Maximum Marks : 100

Note :— (1) Answer any FIVE questions.

(2) ALL questions carry equal marks.

1. (*a*) What are the components of CPU ? Explain the respective functions.

(*b*) Convert the following decimal numbers into the octal and hexadecimal number system :

(*i*) 7425

(*ii*) 8888

2. (*a*) List the control structures available in C. Demonstrate these control structures with suitable examples.

(*b*) Write a C program to find the sum of digits of the input number only if the given input number is even.

3. (*a*) Write a C function to concatenate two input strings.

(*b*) Write recursive and iterative functions to compute factorial of a given integer number.

4. (*a*) What are the advantages and disadvantages of pointers. Demonstrate the operation of deletion and insertion in a linked list with the appropriate figures.

(*b*) Write a C program to read the integer numbers from a file and place all the even numbers in one output file and all the odd numbers in one ouput file.

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5. (a) Write an algorithm to implement Newton-Raphson method.

(b) Find the real roots of the equation $x^3 - 2x - 5 = 0$ using bisection method.

6. (a) Explain the steps involved in Gauss-Seidel method.

(b) Solve the following system of equations by applying Gauss-Seidel method :

$$10x + y + z = 12$$

$$x + 10y + z = 12$$

$$x + y + 10z = 12$$

7. (a) Explain the algorithm for least square regression approach.

(b) For the given table of points fit the :

(i) straight line, and

(ii) Parabola.

x	0	2	4	6	8	12	16	20
y	10	12	18	22	20	30	26	30

8. (a) Explain the steps involved in trapezoidal method of computing integrals.

(b) Evaluate the following integral by trapezoidal method for $n = 4$

$$\int_1^2 \frac{e^x dx}{x}.$$