Code No: R05010303 **Set No. 1**

I B.Tech Supplimentary Examinations, Aug/Sep 2007
COMPUTER PROGRAMMING AND NUMERICAL METHODS
(Common to Mechanical Engineering, Chemical Engineering, Mechatronics, Metallurgy & Material Technology, Production Engineering and Automobile Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What are the commenly used input functions in C? How are they accessed?
   (b) What is the purpose of getchar, putchar functions? How is it used in a C program? How is its different from get c ( ) and put c ( ) functions?
   (c) Write a C program to accept a string up to any termination character and count the number of termination character and count the number of blank spaces, lines and characters in the string. [4+4+8]

2. (a) Write a program to compute Fibonacci numbers which are defined by the recurrence relation.
   $fib_{n+1} = fib_n + fib_{n-1}$ for $n > 0$
   (b) What is the scope of variables of type: auto, register and static. [10+6]

3. (a) Write a 'C' program to find factorial of a given number using pointers.
   (b) Write a 'C' program to arrange the given names in alphabetical order using pointers. [8+8]

4. Consider a structure master includes the information like name, code, pay, experience. Write a program to delete and display the information contained in master variables for a give code. [16]

5. Write a C program using pointers to implement a stack with all the operations.[16]

6. (a) Find a real root of x^3-4x-9=0 using bisection method
   (b) Using Newton Raphson method find a real root of sinx=1+x^3 [8+8]

7. (a) Prove that $\Delta\nabla = \nabla\Delta = \Delta - \nabla$
   (b) Find a cubic polynomial which takes the following set of values (0,1). (1,2), (2,1) and (3,10)
   (c) If y_x is the value of y at x for which the fifth differences are constant and $y_1 + y_7$=-784, $y_2 + y_6$=686, $y_3 + y_5$=1088, then find y_4. [5+6+5]

8. Find the solution of $\frac{dy}{dx} = x - y$ at x=.4 subject to the condition y=1, at x=0 and h=.1 using Milne's method. Use Runga Kutta method to evaluate y(.1), y(2) and y(.3). [16]

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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
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1. (a) Write a program to determine and print the sum of the following harmonic series for a given value of n:
   1+1/2+1/3+.....+1/n.
   (b) What are the logical operators used in C and illustrate with examples. [8+8]
2. (a) What do you mean by functions? Give the structure of the functions and explain about the arguments and their return values.
   (b) Write a C program that uses a function to sort an array of integers. [8+8]
3. (a) What is a pointer? List out the reasons for using pointers.
   (b) Write a C Program to illustrate the use of indirection operator " * " to access the value pointed by a pointer. [8+8]
4. (a) Distinguish between an array of structures and an array within a structure. Give an example each.
   (b) Write a C program using structure to create a library catalogue with the following fields; Access number, author's name. Title of the book, year of publication, publisher's name, price. [6+10]
5. What is a Queue? Explain the various operations performed on Queues with suitable algorithms. [4+12]
6. (a) Find a root of e^x sinx=1 using Newton Raphson's method
   (b) Find a root of the equation x tanx=-1 using Regula falsi method. [8+8]
7. (a) Find f(.2) using Newton's interpolation formula

x	0	1	2	3	4	5	6
f(x)	176	185	194	203	212	220	229

   (b) Using Gauss backward difference formula find y(8) from the following table

x	0	5	10	15	20	25
y	7	11	14	18	24	32

   [8+8]
8. If $y' = 2xy$, $y(0) = 1, h = .2,$, calculate y(.8) by Milne's predictor formula by calculating y(.2), y(.4) and y(.6) using Runga kutta fourth order formula. [16]

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Code No: R05010303 **Set No. 3**

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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) C program contains the following declarations and initial assignments.
   int i=8, j=5, k;
   float x=0.005, y = - 0.01, z;
   char a,b,c=‘d’,d=‘c’;
   Determine the value of each of the following assignment expressions.
   i. i -=(j>0) ? j:0; y
   ii. a = (y>=0)? y : 0
   iii. i += (j-2);
   iv. z = (j ==5) ? i : j
   (b) What are the increment and decrement operators? Explain with proper example with differentiates prefix and postfix operations. [12+4]

2. (a) Why is it possible to use the same variable names for actual and formal arguments.
   (b) Distinguish between function prototype and function definition.
   (c) What is recursion. What is its advantage. [5+5+6]

3. (a) Explain the process of declaring and initializing pointers. Give an example.
   (b) Write a C program that uses a pointer as a function argument. [8+8]

4. Write a C program to add the two given complex numbers. Define functions add and print with pointers as arguments. The complex number is a structure object with real and image fields. [16]

5. Declare a queue of integers. Write functions
   (a) To insert an element in to queue
   (b) To delete an element from queue [8+8]

6. (a) Find a real root of xe^x-cosx=0 using Newton Raphson method
   (b) Find a root of the equation x tan x = -1 which lies between 2.5 and 3 by Regula falsi method [8+8]

7. (a) Construct difference table for the following data:

x	0.1	0.3	0.5	0.7	0.9	1.1	1.3
F(x)	0.003	0.067	0.148	0.248	0.370	0.518	0.697

And find F(0.6) using a cube that fits at x=0.3, 0.5, 0.7 and 0.9 using Newton's forward formula

(b) Find log(337.5) from the following table using Gauss backward formula.

x	310	320	330	340	350	360
logxlogx	2.49136	2.50515	2.51851	2.53148	2.54407	2.55630

[8+8]

8. Find y(.1), y(.2) and y(3) using Taylor's series method given that $y' = 3x + \frac{y}{2}, y(0) = 1$ [16]

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Code No: R05010303 **Set No. 4**

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Answer any FIVE Questions
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1. (a) What is the conditional operator. What is its general syntax.
   (b) Write a C program to find the largest of three input numbers using conditional operator. [8+8]
2. (a) Distinguish between getchar and scanf functions for reading strings.
   (b) Write a program to count the number of words, lines and characters in a text. [8+8]
3. (a) Write a 'C' program to find factorial of a given number using pointers.
   (b) Write a 'C' program to arrange the given names in alphabetical order using pointers. [8+8]
4. A company markets Hardware items. Create a structure "hwItem" that stores the title of the item, it's price, an array of three floats so that it can record the sale in rupees of a particular item for the last three months, category of the item and it's original equipment manufacturer. Write a short program that provides facility to read N no. of items information, append new item, and displays all records. [16]
5. Write a C program to convert the infix expression into postfix expression. [16]
6. (a) Find a real root of x^3-4x-9=0 using Regula falsi: method
   (b) Find a real root of the equation x^3-9x+1=0 by bisection method [8+8]
7. (a) Find the 3rd degree polynomial to fit the following points:

i	1	0	1	3
F(X)	6	2	2	10

   Using Newton's forward formula
   (b) Estimate f(3.75) using Gauss forward formula from the following table.

x	2.5	3.0	3.5	4.0	4.5	5.0
f(x)	24.145	22.043	20.225	18.644	17.262	16.047

   [6+10]
8. (a) Find the first two derivatives at x=2.03

x	1.96	1.98	2.00	2.02	2.04
y	.7825	.7739	.7651	.7563	.7473

(b) Find the maximum or minimum values of the following function y(x), the data is given below

x	0	1	2	3	4	5
y	0	2.5	0	2.25	16	56.25

[8+8]

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