Code No: RR10203 **Set No. 1**

I B.Tech Supplimentary Examinations, Aug/Sep 2007
C AND DATA STRUCTURES
(Common to Electrical & Electronic Engineering, Electronics & Communication Engineering, Computer Science & Engineering, Electronics & Instrumentation Engineering, Bio-Medical Engineering, Information Technology, Electronics & Control Engineering, Computer Science & Systems Engineering, Electronics & Telematics, Electronics & Computer Engineering, Instrumentation & Control Engineering and Bio-Technology)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What is the purpose of switch statement? How does this statement differ from the other statements?

   (b) An electric power distribution company charges its domestic consumers as follows:

Consumption Units		Rate of Charge
0-200		Rs. 0.50 per unit
201-400	Rs.100 plus Rs.0.65	per unit excess 200
401-600	Rs.230 plus Rs.0.80	per unit excess of 400.

   Write a C program that reads the customer number and power consumed and prints the amount to be paid by the customer. [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) 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]

4. (a) Explain the process of accessing a variable through its pointer. Give an Example.

   (b) Write a C program using pointers to read in an array of integers and print its elements in reverse order. [8+8]

5. Write a program to convert a given infix expression to prefix expression using stacks. [16]

6. What is Circular doubly linked list? Explain the various operations on Circular doubly linked lists with suitable algorithms. [4+12]

Code No: RR10203 **Set No. 1**

7. Write in detail about the following:
   (a) Depth first search of a graph
   (b) Minimum spanning trees [8+8]

8. Write a C program that searches a value in a stored array using binary search. What is the time complexity of binary search? [10+6]

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Code No: RR10203 **Set No. 2**

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Write a program that calculates the value of money at the end of each year of investment assuming an interest rate of 12 percent and prints the year & corresponding amount in two columns for a period of 10 years with an intial investment of 5 years.
   Formula: Value at end of year = value at start of year (1+interest rate) [16]

2. The annual examination is conducted for 50 students for three subjects. Write a program to read the data and determine the following:
   (a) Total marks obtained by each student.
   (b) The highest marks in each subject and the Roll No. of the student who secured it.
   (c) The student who obtained the highest total marks. [5+6+5]

3. (a) Explain with an example how a structure can be organized in the 'C' language?
   (b) Write a C program to print maximum marks in each subject along with the name of the student by using structures. Take 3 subjects and 3 students records. [8+8]

4. (a) Explain the process of accessing a variable through its pointer. Give an Example.
   (b) Write a C program using pointers to read in an array of integers and print its elements in reverse order. [8+8]

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

6. Write a C program to create a singly linked list and split it at the middle and make the second half as the first and vice-versa. Display the final list. [16]

7. (a) Define graph. Explain the properties of a graph.
   (b) What is the difference between strongly connected graph and weakly connected graph? [8+8]

Code No: RR10203 **Set No. 2**

8. (a) Write a C program to sort the elements of an array using Quick sort with suitable example.

   (b) What is the worst case and best case time complexity of the above program? [8+8]

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Code No: RR10203 **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) Write a program to read the values of x, y and z and print the results of the following expressions in one line.
   a = $\frac{x+y+z}{x-y-z}$ b = $\frac{x+y+z}{3}$ c = (x+y)(x-y)(y-z)
   (b) Explain the following with general form and flowchart
      i. Simple IF statement.
      ii. IF. . . ELSE statement.
      iii. Nested IF. . . ELSE statement.
      iv. Switch statement. [8+8]

2. The annual examination is conducted for 50 students for three subjects. Write a program to read the data and determine the following:
   (a) Total marks obtained by each student.
   (b) The highest marks in each subject and the Roll No. of the student who secured it.
   (c) The student who obtained the highest total marks. [5+6+5]

3. (a) When are array of structures are used? Declare a variable as array of structure and initialize it?
   (b) Write a C program to calculate student-wise total for three students using array of structure. [8+8]

4. (a) What is a pointer? How is a pointer initiated? Give an example.
   (b) State whether each of the following statements is true or false. Give reasons.
      i. An integer can be added to a pointer.
      ii. A pointer can never be subtracted from another pointer.
      iii. When an array is passed as an argument to a function, a pointer is passed.
      iv. Pointers can not be used as formal parameters in headers to function definitions.
   (c) If m and n have been declared as integers and p1 and p2 as pointers to integers, then find out the errors, if any, in the following statements.

i. p1 = &m;
ii. p2 = n;
iii. m=p2-p1;
iv. *p1 = &n; [4+6+6]

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. Write a C program to insert and delete the elements from a circular doubly linked list. [16]
7. (a) Write a C program to find the depth of a tree.
   (b) Explain the tree traversal methods with suitable examples. [8+8]
8. Explain **heap sort** with example. Write necessary algorithms. [16]

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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) Describe in detail the execution of while statement with example.
   (b) Given a number, write a program using while loop to reverse the digits of the number. For e.g. 12345 should be written as 54321.
   (c) Write a program to compute the sum of the digits of a given integer number. [4+6+6]

2. (a) Explain how strings can be stored using a multidimensional arrays?
   (b) What are the string in-built functions available? Write in detail about each one of them with an example.
   (c) The names of employees of an organization are stored in three arrays, namely, first name, second name, and last name. Write a program to concatenate the three parts into one string to be called name. [4+6+6]

3. Write a C program to compute the monthly pay of 100 employees using each employee's name, basic-pay. The DA is computed as 52% of the basic pay. Gross-salary (Basic_pay+DA). Print the employees name and gross salary. [16]

4. (a) Explain the I/O operations on files.
   (b) Write a C program to read numbers from a file DATA, contains a series of integer numbers, and then write all odd numbers to a file to be called ODD and all even numbers to a file to be called EVEN. [8+8]

5. Write a C program to convert infix expression into prefix expression. Define all the functions used in it. [16]

6. Write a function in 'C' to form a list containing the union of the elements of two lists. [16]

7. (a) Explain the properties of threaded binary tree.
   (b) Prove that a binary tree with n leaves contains 2n-1 nodes. [8+8]

8. (a) Write a C program to sort the elements of an array using Quick sort with suitable example.

(b) What is the worst case and best case time complexity of the above program? [8+8]

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