

Code.No: 09A1EC01

R09

SET-1

I - B.TECH EXAMINATIONS, DECEMBER - 2010
COMPUTER PROGRAMMING AND DATA STRUCTURES
(COMMON TO CE, EEE, ME, ECE, CSE, CHEM, EIE, BME, IT, MECT, E.COMP.E,
MMT, MEP, AE, ICE, BT, AME)

Time: 3hours**Max.Marks:75**

Answer any FIVE questions
All questions carry equal marks

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- 1.a) Explain and specify the interactions between various components that support the basic functionality of a computer?
- b) Discuss in detail the program execution steps? [7+8]
- 2.a) List the basic data types, their sizes and range of values supported by 'C' language?
- b) Describe the purpose of commonly used conversion characters in scanf() function?
- c) Explain the only ternary operator available in 'C' with illustrative example? [6+6+3]
- 3.a) Differentiate between call by value and call by reference with suitable examples?
- b) Write a 'C' program using functions to check whether the given 3x3 matrix is symmetric or not? [8+7]
- 4.a) Explain how strings are declared and initialized in 'C'?
- b) What are the arithmetic operators that are permitted on pointers?
- c) Write a 'C' function to reverse the string passed as an argument that cannot be altered? [4+6+5]
- 5.a) Briefly explain the type definition statement in 'C'? Give any two examples where usage of type definition statement increases the readability of programs?
- b) Write a 'C' program to read, write, add, subtract, multiply and divide two complex numbers? (Represent complex number using structures). [4+11]
- 6.a) What is a file? How to open and close different types of files in 'C'?
- b) Explain the possible modes of opening files? In all these modes what happens when the file doesn't exist and the file already exists?
- c) Write a 'C' program to copy the contents of a file to another file? [4+5+6]
- 7.a) Write a C program for binary search using functions without using recursion?
- b) An array contains 8, 13, 17, 26, 44, 56, 88, and 97. Trace the steps using binary search Algorithm.
 - I. To find value 88
 - II. To find the value 20
 - III. To find the value 8.

[9+6]
- 8.a) What is the main disadvantage of Queue over Circular Queue?
- b) Write a 'C' Program to demonstrate the operations of a Circular queue using arrays? [3+12]

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- 1 a) Define Algorithm? What are the characteristics that any algorithm should satisfy?
 b) Draw a flowchart for finding maximum of given three integers?
 c) Differentiate between compiler and interpreter? [7+4+4]
- 2 a) Differentiate between if-else-if ladder and switch statement?
 b) What is the implicit type conversion hierarchy that is applied while evaluating expressions?
 c) List and give examples for different bitwise operators available in 'C'? [4+4+7]
- 3 a) What is the need for user-defined functions?
 b) What are the different ways in which 1-dimensional arrays can be declared and initialized?
 c) Write a C program using recursion for finding GCD (Greatest Common Divisor) of two given numbers? [4+3+8]
- 4 a) Explain the syntax with suitable examples the dynamic memory allocation functions available in C?
 b) Write a C function to find the length of a string passed as an argument? [12+3]
- 5 a) Differentiate between structures and unions?
 b) What do you mean by bit fields? How bit fields are different from structures?
 c) Suppose or oppose the statement "In C a structure contains a union inside it". Give suitable example? [5+5+5]
- 6 a) Distinguish between getc() and getchar() functions?
 b) Explain the general format of fseek() function with illustrative examples?
 c) Write a C program to append the contents of a file to another file? [4+5+6]
- 7 a) Write a C program for insertion sort using functions?
 b) An Array contains 47, 3, 66, 32, 56, and 92. After two passes of a sorting algorithm, the array has been rearranged to: 3, 47, 66, 32, 56, and 92. Which sorting algorithm among selection, insertion, and bubble sort is used? Defend your answer? [9+6]
- 8 Write the steps with illustrative figures involved in the following operations of a singly linked list without the head node?
 - I. Insert into an empty List
 - II. Insert at the first position
 - III. Insert at the last position
 - IV. Insert before a given element
 - V. Insert after a given element.

[15]

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- 1 a) Differentiate between application software and system software?
- b) Draw a flowchart for finding the sum of 'n' numbers starting from 1?
- c) Briefly discuss various computing environments with neat diagrams? [2+5+8]

- 2 a) What do you mean by operator precedence and associativity? How one can override the precedence defined by C language? Give illustrative examples?
- b) Explain the structure of a C program? [7+8]

- 3 a) Discuss with suitable examples the storage classes available in C?
- b) Derive the expression for finding the address of any element of a 1-dimensional array? [10+5]

- 4 a) Discuss briefly the following pointers.
 - I. Pointer pointing to a variable
 - II. Pointer pointing to a constant
 - III. Constant pointer pointing to a variable
 - IV. Constant pointer pointing to constant.
- b) Write a C program to swap two integers using functions. [10+5]

- 5 a) How many possible ways one can access the members of a structure using a structure variable and a pointer to a structure variable? Illustrate with examples.
- b) Differentiate between Arrays of structures and structures containing arrays with suitable examples? [5+10]

- 6 a) Explain syntax with illustrative examples the functions support reading and writing formatted data to and from files?
- b) Write a C program to count characters and lines in a given file? [7+8]

- 7 a) Write a C program for bubble sort using functions?
- b) An Array contains 3, 13, 7, 26, 44, 23, 98, and 57. Trace the steps using merge sort? [9+6]

- 8 a) Write the steps with illustrative figures involved in the following operations of a singly linked list without the head node?
 - I. Delete the first element
 - II. Delete the last element
 - III. Delete before a given element
 - IV. Delete after a given element.
- b) What is a doubly linked list? What is the main advantage over singly linked list? [12+3]

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- 1 a) List the activities involved in each phase of waterfall system development life cycle model?
- b) What are the different types of errors one can encounter during the program execution? [10+5]
- 2 a) What is an identifier? What are the naming rules for identifiers in C?
- b) List different categories of C operators based on their functionality? Give examples?
- c) Explain different types of coding constants in a C? [3+8+4]
- 3 a) Explain different categories of functions in C with simple illustrative examples?
- b) Write a C program using functions to calculate the factorial of a given number? [10+5]
- 4 a) Demonstrate command-line arguments using a simple program? Explain?
- b) Differentiate between a pointer and a variable? How a pointer is declared and initialized? What do you mean by pointer to another pointer?
- c) Write a C function to convert the string passed as an argument to its uppercase equivalent? [6+4+5]
- 5 a) What is an enumerated type? How it can be declared? What are the different ways one can initialize enumerations?
- b) Differentiate between self referential and nested structures with suitable examples? [7+8]
- 6 a) What is the purpose of the ferror() and feof() functions?
- b) What are the possible ways to set the file pointer to the beginning of the file?
- c) Write a C program to count the number of words in a given file? [4+4+7]
- 7 a) Write a C program for selection sort using functions?
- b) An Array contains 3, 13, 7, 26, 44, 23, 98, and 57. Trace the steps using quick sort? [9+6]
- 8 a) Trace the output string and the stack contents at every step in converting the expression $A * B / (C - D) + E * F - G$ into postfix expression?
- b) Write a C Program to demonstrate the operations of a Stack using arrays? [6+9]

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