Hall Ticket No | | | | | | | | | | | Question Paper Code: ACSB01

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER-I

B.Tech I Semester End Examinations, April - 2020

Regulations: IARE - R18

PROGRAMMING FOR PROBLEM SOLVING

(Common to CSE / IT / ECE / EEE / ME)

Time: 3 hours **Max. Marks: 70**

Answer ONE Question from each Module
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. a) Explain in detail with neat diagram about the computer system components. **[7M]**

   b) Write an algorithm that calculates the sum of the digits of an integer. For example, the sum of the digits of the number 2155 is 13 (i.e. 2+1+5+5). **[7M]**

2. a) What is an operator? Explain different types of operators in C language. **[7M]**

   b) Write a program that estimates the temperature in a freezer (in °C) given the elapsed time (hours) since a power failure. Assume this temperature (T) is given by **[7M]**

$$T = \frac{4t^2}{t + 2} - 20$$

   Where t is the time since the power failure. Your program should prompt the user to enter how long it has been since the start of the power failure in whole hours and minutes. Note that you will need to convert the elapsed time into hours. For example, if the user entered 2 30 (2 hours 30 minutes), you would need to convert this to 2.5 hours.

MODULE – II

3. a) Explain loop control statements in C language. **[7M]**

   b) Write a C program to arrange the numbers stored in the array in such a way that the array will have the odd numbers followed by the even numbers. For example Input array is IN[]={1,23,4,12,5,6}, output array is OUT[]={1,23,5,4,12,6}. **[7M]**

4. a) What is an array? What type and range must an array subscript have? Demonstrate the storage of two-dimensional arrays in memory with the help of a diagram. **[7M]**

   b) Given a string, find the longest substring which is palindrome. For example, if the given string is “abaccddccefe”, the output should be “ccddcc”. **[7M]**

MODULE – III

5. a) What is a pointer? Why are they important? Why pointers should have data types when their size is always 4 bytes (in a 32-bit machine), irrespective of the variable they are pointing to? **[7M]**

   b) A year is called leap year if it is divisible by 400. If it is not divisible by 400 as well as 100 but it is divisible by 4 then that year is also leap year. Example 1600, 2000 etc leap year while 1500, 1700 is not leap year. Write a function definition to check whether a given year is a leap year or not. **[7M]**

6. a) How is a multidimensional array defined in terms of an array of pointers? What does each pointer represent? How does this definition differ from a pointer to a collection of contiguous array of lower dimensionality? **[7M]**

   b) Using pointers, write a function that receives a character string and a character as argument and deletes all occurrences of this character in the string. The function should return corrected string with no holes. For example input string is "hello world", character to be deleted is „l", output string is "heo word" **[7M]**

MODULE – IV

7. a) Define Structure and write the general format for declaring and accessing structure members. Why can"t structures be compared? **[7M]**

   b) Write a C program to maintain a book structure containing name, author and pages as structure members. Pass the address of structure variable to a user defined function and display the contents. **[7M]**

8. a) How Structure and unions are assigned in memory? Explain with diagram. **[7M]**

   b) Define a structure called Cricket that will have player name, team name, and batting average of the player. Using Cricket, declare an array player with 10 elements. Write a program to read the information about all the 10 players and print a team wise list containing names of players with their batting average. **[7M]**

MODULE – V

9. a) What is the purpose of fopen() function? Describe the different file opening used with the fopen() function. **[7M]**

   b) Write a program that opens an existing text file and copies it to a new text file with all lowercase letters changed to capital letters and all other characters unchanged. **[7M]**

10. a) Is it possible to pass arguments to C programs when they are being executed? Justify. **[7M]**

    b) Write a C program to write employee name, department and salary of seven employess using an array of structures to a file via fwrite(). Further, the program must read the array from the file and display the details of employees on the screen. **[7M]**

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COURSE OBJECTIVES:

The course should enable the students to:

I	Learn adequate knowledge by problem solving techniques.
II	Understand programming skills using the fundamentals and basics of C Language.
III	Improve problem solving skills using arrays, strings, and functions.
IV	Understand the dynamics of memory by pointers.
V	Study files creation process with access permissions.

COURSE OUTCOMES (COs):

CO 1	Describe the concept of computer system, analyze a given problem, develop an algorithm, fundamental programming constructs, identify data representation formats, describe operators and their precedence, associativity.
CO 2	Understand branching and loop statements.
CO 3	Describe the concept of homogeneous derives data types, strings and functions.
CO 4	Understand pointers and heterogeneous data types.
CO 5	Describe the concept of file system.

COURSE LEARNING OUTCOMES (CLOs):

ACSB01.01	Identify and understand the working of key components of a computer system.
ACSB01.02	Analyze a given problem and develop an algorithm to solve the problem.
ACSB01.03	Describe the fundamental programming constructs and articulate how they are used to develop a program with a desired runtime execution flow.
ACSB01.04	Gain knowledge to identify appropriate C language constructs to write basic programs.
ACSB01.05	Identify the right data representation formats based on the requirements of the problem.
ACSB01.06	Describe the operators, their precedence and associativity while evaluating expressions in program statements.
ACSB01.07	Understand branching statements, loop statements and use them in problem solving.
ACSB01.08	Learn homogenous derived data types and use them to solve statistical problems.
ACSB01.09	Identify the right string function to write string programs.
ACSB01.10	Understand procedural oriented programming using functions.
ACSB01.11	Understand how recursion works and write programs using recursion to solve problems.
ACSB01.12	Differentiate call by value and call by reference parameter passing mechanisms.
ACSB01.13	Understand storage classes and preprocessor directives for programming
ACSB01.14	Understand pointers conceptually and apply them in C programs.
ACSB01.15	Distinguish homogenous and heterogeneous data types and apply them in solving data processing applications.
ACSB01.16	Explain the concept of file system for handling data storage and apply it for solving problems
ACSB01.17	Differentiate text files and binary files and write the simple C programs using file handling functions.
ACSB01.18	Apply the concepts to solve real-time applications using the features of C language.
ACSB01.19	Gain knowledge to identify appropriate searching and sorting techniques by calculating time complexity for problem solving.
ACSB01.20	Possess the knowledge and skills for employability and to succeed in national and international level competitive examinations.

MAPPING OF SEMESTER END EXAMINATION TO COURSE LEARNING OUTCOMES:

SEE Question No		Course Learning Outcomes		Course Outcomes	Blooms Taxonomy Level
1	a	ACSB01.01	Identify and understand the working of key components of a computer system.	CO 1	Understand
	b	ACSB01.02	Analyze a given problem and develop an algorithm to solve the problem.	CO 1	Understand
2	a	ACSB01.06	Describe the operators, their precedence and associativity while evaluating expressions in program statements.	CO 1	Understand
	b	ACSB01.06	Describe the operators, their precedence and associativity while evaluating expressions in program statements.	CO 1	Understand
3	a	ACSB01.07	Understand branching statements, loop statements and use them in problem solving.	CO 2	Understand
	b	ACSB01.08	Learn homogenous derived data types and use them to solve statistical problems.	CO 2	Remember
4	a	ACSB01.08	Learn homogenous derived data types and use them to solve statistical problems.	CO 2	Understand
	b	ACSB01.09	Identify the right string function to write string programs.	CO 2	Understand
5	a	ACSB01.14	Understand pointers conceptually and apply them in C programs.	CO 3	Understand
	b	ACSB01.10	Understand procedural oriented programming using functions.	CO 3	Understand
6	a	ACSB01.08	Learn homogenous derived data types and use them to solve statistical problems.	CO 3	Understand
	b	ACSB01.14	Understand pointers conceptually and apply them in C programs.	CO 3	Understand
7	a	ACSB01.15	Distinguish homogenous and heterogeneous data types and apply them in solving data processing applications.	CO 4	Understand
	b	ACSB01.15	Distinguish homogenous and heterogeneous data types and apply them in solving data processing applications.	CO 4	Understand
8	a	ACSB01.15	Distinguish homogenous and heterogeneous data types and apply them in solving data processing applications.	CO 4	Understand
	b	ACSB01.15	Distinguish homogenous and heterogeneous data types and apply them in solving data processing applications.	CO 4	Understand
9	a	ACSB01.16	Explain the concept of file system for handling data storage and apply it for solving problems	CO 5	Understand
	b	ACSB01.17	Differentiate text files and binary files and write the simple C programs using file handling functions.	CO 5	Understand
10	a	ACSB01.19	Differentiate call by value and call by reference parameter passing mechanisms.	CO 5	Understand
	b	ACSB01.16	Explain the concept of file system for handling data storage and apply it for solving problems	CO 5	Understand

Signature of Course Coordinator **HOD, EEE**