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15PCD13/23

First/Second Semester B.E. Degree Examination, July/August 2022
Programming in C and Data Structures

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define data type. Discuss various data types supported in C language with suitable example. (05 Marks)
- b. Define input-output functions. Discuss types of input-output functions in C. (06 Marks)
- c. What is an algorithm? Write an algorithm to find whether a given number is palindrome or not. (05 Marks)

OR

- 2 a. Explain the following operators with suitable examples:
(i) Unary operator
(ii) Compound assignment operator
(iii) Ternary operator (06 Marks)
- b. Evaluate the following expressions:
(i) $\text{int } p = 5, q = 6, r = 7, s = 8, t;$
 $t = (((p + q)/2) - 3) * s + p * s;$
(ii) $\text{int } p = 5, q = 6, r = 7, s = 8, t;$
 $t = p + q < q + r \ \&\& \ r/p == s * p \ || \ q | p > r;$ (04 Marks)
- c. What is a token? What are the different types of tokens available in C language? (06 Marks)

Module-2

- 3 a. Explain with the syntax for-statement. Write a C program to find the sum of first N natural numbers $(1 + 2 + 3 + \dots + n)$ (06 Marks)
- b. Explain the syntax of if, if-else and nested if-else with suitable examples. (06 Marks)
- c. What are unconditional branch statement? Explain. (04 Marks)

OR

- 4 a. What are the difference between while and do-while statement? (04 Marks)
- b. Write an algorithm and C program to compute $\sin(x)$ using Taylor series approximation given by $\sin(x) = x - \left(\frac{x^3}{3!}\right) + \left(\frac{x^5}{5!}\right) - \left(\frac{x^7}{7!}\right) + \dots$. Draw the corresponding flow chart. (12 Marks)

Module-3

- 5 a. Define an Array. What are the rules to be followed while using arrays? (04 Marks)
- b. Develop a C program to multiply two given matrices A, B and store the result in C. (09 Marks)

c. Which of these following statements are legal? If legal explain why:

```
char name[50];
int number = 6;
```

- (i) gets(name);
- (ii) puts (number, name);
- (iii) gets (number);
- (iv) puts (name);
- (v) puts (number, "VTU");
- (vi) gets ("%s", name);

(03 Marks)

OR

- 6 a. What are string variable? How are string variable declared? (04 Marks)
- b. What are the different ways of passing parameters to the function? Explain with example. (06 Marks)
- c. Write a C program to copy one string to another without using build-in function (strcpy). (06 Marks)

Module-4

- 7 a. What is type definition? What are user-defined datatypes? (05 Marks)
- b. What is a structure? What are the various methods of passing structure to function? Explain. (07 Marks)
- c. Explain Array of Structure with example. (04 Marks)

OR

- 8 a. What is a file? What are the various mode in which a file can be opened/created? (04 Marks)
- b. Write a C program to copy one file to another file using fgetc() and fputc() function. (04 Marks)
- c. What are command line arguments? Explain with example. (04 Marks)
- d. Explain any two file handling functions with suitable example. (04 Marks)

Module-5

- 9 a. What is preprocessor? Explain any three preprocessor directives. (05 Marks)
- b. Write a program using Pointers to compute sum, mean and standard deviation of all elements stored in an array of 'n' real numbers. (07 Marks)
- c. Find the values stored in the variables a, b and c at the end of the program.

```
void main ()
```

```
{
    int a, b, c, *x, *y;
    a = 20;
    b = 25;
    c = 30;
    x = &a;
    y = &c;
    *y = *x + b - 5;
    b = b - (*x);
    *x = *y - c;
}
```

(04 Marks)

OR

- 10 a. What is a pointer? Distinguish between call by value and call by reference. (04 Marks)
- b. What is a stack? What are the various operations that can be performed on stack? (06 Marks)
- c. Define binary tree? What are the different ways of traversing the tree? (06 Marks)
