Roll Number:_____ No. of Pages: 01

National Institute of Technology, Hamirpur (H.P.)

Department of Computer Science and Engineering

End Semester Examination

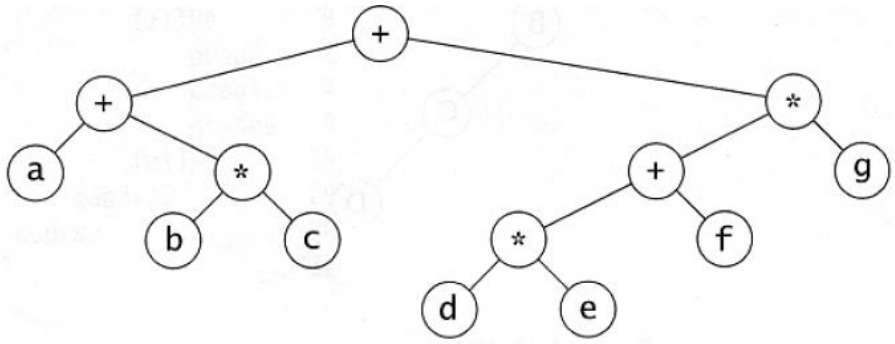
B. Tech.: Semester-I (Section A, B, C, D, E) Course Code: CS-101
Course Name: Computer Programming Time: 2 Hrs. M. Marks: 50 Marks

Note: Attempt all questions in proper sequence. Assume missing data, if any, suitably. Each question is of equal marks.

Q1. (A) What is Programming Language? Describe generations of programming languages in detail. (5 Marks)

(B) Write an algorithm and flowchart that prints the real roots of a quadratic equation. (5 Marks)

Q2. (A) What is type casting or type conversion or coercion? Classify it with examples. (5 Marks)
(B) Find the in-order, pre-order, and post-order traversal for the following expression tree. (5 Marks)



Q3. Explain the different types of loops in C with syntax. Write a program in C for finding the sum of 'n' elements of an array using all loops (*while, do-while, and for loop*s). (10 Marks)

Q4. What is self-referential structure? Write a program to enter the details of 5 employees of a bank with three fields (Employee ID, Name, Designation) using a self-referential structure. Print the details of all employees. (10 Marks)

OR

Discuss various types of storage classes of C and their scopes using suitable examples.

Q5. Write a C program to swap two numbers using the call by value and call by reference methods. (10 Marks)

OR

What is Recursion? Write a C program to calculate the factorial of a number entered by a user using recursive function.

Department of Computer Science & Engineering, NIT Hamirpur (HP)

End Semester Examination, B.Tech. (I Sem) March 2021

Subject: Computer Programming **Code:** CS-101

Max Time: 2:00 Hr(s) **Max Marks:** 50

Note: Each student is required to write Name, Roll No., Subject Name and Subject Code at the top of first page and signature with date at the bottom of each page of answer sheet. Submit the scanned pdf file of answer sheet within 15 minutes after completion of the examination.

Q1. Distinguish between the following: **[4]**

a. Actual and Formal arguments
b. Global and Local variables
c. Automatic and Static variables
d. Scope and visibility of variables

Q2. What are the different ways of passing data to functions in C? Explain each with an example. In what conditions is one method preferable over the other methods? **[5]**

Q3. What is a macro and how is it different from a C variable? What are the advantages of using macro definitions in a program? **[3]**

Q4. When a program is terminated, all the files used by it are automatically closed. Why is it then necessary to close a file during the execution of the program? **[4]**

Q5. Write a C program to enter a number and then calculate the sum of its digits using while loop. **[4]**

Q6. Write a program in C to copy 'n' characters (user input) of a character array from the m^{th} position (user input) onwards in another array. (do not use any inbuilt string functions) **[5]**

Q7. Write a C program to fill a square matrix with value zero to the main diagonal, one to the upper right triangle, and -1 in the lower left triangle. **[5]**

Q8. Write a C program that defines a structure called 'student' with the members: Name, Roll_no., marks in five subjects, and branch. Create a function to read data for 'n' students (n is user input). Create another function that receives a pointer to structure for student details and print the student's details who has scored highest total marks in all subjects. **[6]**

Q9. Write a program to print the following pattern: **[4]**

```
        1
      1 2
    1 2 3
  1 2 3 4
1 2 3 4 5
  1 2 3 4
    1 2 3
      1 2
        1
```

Q10. Write a program in C using a function to print the sum of all prime numbers between two user input numbers, passed as arguments to the function and display the sum in calling function. **[5]**

Q11. What is dynamic memory allocation? How is it different from static memory allocation? Create a one dimensional integer array using dynamic memory allocation to read 'n' numbers. Display the largest odd number amongst all the numbers. **[5]**