[Total No. of Questions - 9] [Total No. of Printed Pages - 4]

Dec-24-0064 (CBCS/NEP)

CS-111 (Computer Programming) (Group-B)

B.Tech. 1st

Time : 3 Hours **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt one question each from Section A, B, C, D & attempt all questions of Section E.

SECTION - A

1. (a) Explain the concept of tokens in C++ with suitable examples. (4)

   (b) Differentiate between keywords and identifiers. Provide a list of five keywords and five valid identifiers. (4)

   (c) Describe the structure of a C++ program, including the role of header files and the main function. (4)

2. (a) Define data types in C++. Classify data types into built-in and user-defined data types. (4)

   (b) Explain the difference between variables and constants. How are they declared and initialized? (4)

   (c) Discuss the concept of type modifiers in C++. Give examples of signed, unsigned, and long data types. (4)

SECTION - B

3. (a) Explain the concept of an array in C++. Distinguish between one-dimensional and two-dimensional arrays. (4)

(b) Write a C++ program to input 10 numbers into an array, calculate their sum, and find the largest number. (4)

(c) Discuss the advantages and disadvantages of using arrays. In what situations would you prefer to use an array over other data structures? (4)

4. (a) Create a structure named Student to store student information (roll number, name, and marks in three subjects). Declare an array of 5 Student structures. (4)

(b) Write a C++ program to input details of 5 students using the array of structures defined in part (a). Calculate the total marks for each student and display the results. (4)

(c) Explain the concept of nested structures. Provide an example of a nested structure and how to access its members. (4)

SECTION - C

5. (a) Explain the concept of constructors in C++. Describe the different types of constructors (default, parameterized, copy constructor). (4)

(b) Define a class named Student with data members roll_no (int), name (string), and marks (float). Create a parameterized constructor to initialize these data members. (4)

(c) Explain the concept of friend functions in C++. Create a friend function to overload the + operator for two Student objects, adding their marks. (4)

6. (a) What is inheritance in C++? Explain the different types of inheritance (public, private, protected). (4)

(b) Create a base class named Person with data members name and age. Create a derived class named Student that inherits from Person and adds data members roll_no and marks. (4)

(c) Explain the concept of virtual base classes in C++ with an example. (4)

SECTION - D

7. (a) Explain the concept of polymorphism in C++. Differentiate between compile-time and run-time polymorphism. (4)

(b) Create a base class named Shape with a pure virtual function area(). Create derived classes Rectangle and Circle that override the area() function. Demonstrate run-time polymorphism using pointers to base class objects. (4)

(c) Explain the concept of virtual functions in C++. How do they differ from non-virtual functions? (4)

8. (a) What is file handling in C++? Explain the basic file operations (opening, closing, reading, writing). (4)

(b) Write a C++ program to create a text file, write some data to it, close the file, and then read the data back from the file and display it on the console. (4)

(c) Discuss the different file modes in C++ (text mode, binary mode, append mode). (4)

SECTION - E (Compulsory)

9. (a) What are the basic data types in C++?

(b) Explain the difference between a keyword and an identifier.

(c) What is the purpose of the main() function in a C++ program?

(d) How do you declare an array and a pointer in C++?

(e) What is the difference between a try block and a catch block?

(f) What is a file pointer? (6×2=12)