

SECOND SEMESTER B.Sc. DEGREE EXAMINATION, MAY 2017**(CUCBCSS—UG)****Core Course—Computer Science****BCS 2B 02—OOP CONCEPTS AND DATA STRUCTURES USING C++****Time : Three Hours****Maximum : 80 Marks****Part A***Answer all the questions.**Each question carries 1 mark.*

1. The process of making an operator to exhibit different behaviours in different instances is known as _____.
2. In C++ the concept of _____ provides facility to assign values to function parameters when the function is declared.
3. A protected member inherited in private mode becomes _____ in the derived class.
4. A constructor that initializes an object with the data values of another object is known as _____.
5. To open an existing file for updating without losing its original contents, the file should be opened in _____ mode.
6. When the upper bound (UB) and lower bound (LB) are given, its size is calculated as _____.
7. Each element of an array $A[6][8]$ requires one byte of storage. If the array is stored in column major order with base address 351, the address of $A[3][4]$ is _____.
8. The total number of comparisons required to merge 4 sorted files containing 15, 3, 9 and 8 records into a single sorted file is _____.
9. The postfix form of $(A-B) * (C/D) + E$ is _____.
10. A linked list with two links each pointing to the predecessor and successor of a node is known as _____.

(10 × 1 = 10 marks)**Turn over**

Part B

Answer all the questions.

Each question carries 2 marks.

11. What is data abstraction ?
12. Code reusability is a striking feature of an object oriented programming. How it is implemented in C++ ?
13. What is the significance of access specifiers in a class ?
14. List any *two* advantages of a doubly linked list over singly linked list.
15. What do you mean by the term collision handling in hashing ?

(5 × 2 = 10 marks)

Part C

Answer any five questions.

Each question carries 4 marks.

16. Create a class Date with data members day, month and year. Write a C++ program to perform the following functions :
 - (a) To accept a date.
 - (b) To display a date.
 - (c) To increment a date.
17. With the help of an example program, explain the concept of function overloading.
18. Differentiate between compile time polymorphism and runtime polymorphism. Explain the role of virtual functions in implementing runtime polymorphism.
19. Explain various built-in classes supporting file management.
20. Explain about various applications of stacks.
21. Write a program to create a class string. Overload == operator to compare two strings.
22. Write an algorithm to implement binary search.
23. Write an algorithm to delete the last node of a singly linked list.

(5 × 4 = 20 marks)

Part D

Answer any five questions.

Each question carries 8 marks.

24. Explain various types of inheritance with example.
25. Explain the three different situations that arise in the data conversion between incompatible types in C++.
26. Create a class *Complex* for storing a complex number of the form $x + iy$, where x is the real part and y is the imaginary part. Write a C++ program to perform the following:
 - (a) Overload $+$ to add two complex numbers.
 - (b) Overload $-$ to subtract one complex number from the other.
27. Write short notes on :
 - (a) Friend functions in C++.
 - (b) Significance of virtual base classes.
28. Write a program to implement a queue using linked list.
29. Write a program in C++ to insert a node into a sorted linked list.
30. Write an algorithm to evaluate a prefix expression.
31. Write short notes on :
 - (a) Sorting of a list of numbers using Quick sort.
 - (b) Circular queue implementation using one dimensional array.

(5 × 8 = 40 marks)