SECOND SEMESTER B.Sc. DEGREE EXAMINATION, MAY 2015

(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 wrapping up of data and functions into a single unit is called ——————.

2. In C++ the concept of ———— provides a facility to call a function without specifying all its arguments.

3. —————— is a special member function which enables an object to initialize itself when it is created.

4. A protected member inherited in public mode becomes —————— in the derived class.

5. If a member function does not alter any data in the class, then we declare such member functions as —————— member functions.

6. —————— data structure stores a list of finite number of similar data elements referenced respectively by a set of n consecutive numbers.

7. The data structure required to evaluate a postfix expression is ——————.

8. If the address of A[1][1] and A[2][1] are 1000 and 1010 respectively and each element occupies 2 bytes of memory, then the array has been stored in —————— order.

9. The postfix form of A × B + C/D is ——————.

10. The number of interchanges required to sort the list of numbers 5, 1, 6, 2, 4 in ascending order using bubble sort is ——————.

$(10 \times 1 = 10 \text{ marks})$

Part B

*Answer **all** the questions.*
Each question carries 2 marks.

11. List any *four* striking features of OOP methodology.

12. What do you mean by containership ?

13. Define a sparse matrix.

Turn over

14. How will you represent a queue in computers memory ?

15. Write the C++ code to check whether a linked list is circular or not.

<div align="right">(5 × 2 = 10 mark</div>

Part C

*Answer any **five** questions.*
Each question carries 4 marks.

16. How does a class enforce data hiding, abstraction and encapsulation ?

17. By applying the concept of friend functions, write a C++ program to add two complex numbers

18. With the help of a C++ program, explain the use of virtual functions in implementing runtir
    polymorphism.

19. What is *this* pointer ? What is its significance ? Illustrate the use of *this* pointer with the help of
    example.

20. Write an algorithm to find the transpose of a given matrix.

21. Explain how PUSH and POP operations are performed on a STACK ?

22. Write a C++ program to add an element into a circular linked list.

23. What is hashing ? Explain any three commonly used methods used to implement hashing.

<div align="right">(5 × 4 = 20 mar</div>

Part D

*Answer any **five** questions.*
Each question carries 8 marks.

24. Compare and contrast the object oriented programming methodology with procedure orien
    programming methodology.

25. Create a virtual base class ***Student*** that stores rollno with member function get number() a
    putnumber( ). From this derive a class ***Test*** with data members mark1 and mark2 and mem
    functions getmarks( ) and putmarks( ). Create a class ***Sports*** that stores sports marks. From *T*
    and ***Sports*** classes derive the class ***Result*** that stores total mark. Write a program to display
    total mark with other student details.

26. Explain the use of copy constructor and dynamic constructors with the help of examples.

27. Write short notes on :

    (a) Inline functions.

    (b) Dynamic memory management in C++.

28. Write a program in C++ to add two polynomials.

29. Write an algorithm to convert an infix expression to postfix form using stacks. Explain the algori
    with the help of an example.

30. Write an algorithm to insert a given element into a sorted linked list.

31. Write a program in C++ to implement Selection sort and explain the sorting process with the l
    of an example.

<div align="right">(5 × 8 = 40 ma</div>