

B. CSE 2ND Year 2ND Semester Examination, 2018**Object Oriented Programming**

Full marks: 100

Time: 3 hours

Attempt any five questions

1) a) Question paper has number of questions. Each question has question number and assigned marks. Corresponding to an answer sheet roll number of the student, attempted question numbers and scores are noted. Based on all the answer sheets of the students for a question paper following analysis have to be done:

i) For each question in the question paper, find how many students have answered it and corresponding average percentage score?

ii) For each answer sheet, what is the total score?

Assume, nobody attempts any additional question and score does not exceed corresponding assigned marks.

Design and implement the necessary classes using C++/Java. 15

b) What are data abstraction, data encapsulation and inheritance in OOP? 5

2) a) An institute maintains a list of curriculums that it offers. Each curriculum has id (it is unique), name and a list of subjects taught. Each subject has unique code, name and type (theory/practical). Same subject may be offered in multiple curriculums. A student has unique registration number and name. A student must register for one and only one curriculum. The system must be able to find the name of the curriculum in which a student has registered, theory subjects taught in a curriculum, practical papers in a curriculum, curriculums offered by the institutes.

Design the classes. Code is not required. Provide prototype of the methods and brief textual description. Clearly indicate if one method makes use of another and how the mentioned outcomes are met. 12

b) In the context of Java, Discuss the access control for the class and its members. 6

c) Write down the basic difference between an array and ArrayList in Java. 2

3) a) For every cricketer note name, e-mail, date of birth, number of matches played, and country. A cricketer is either a batsman or a bowler or both (all rounder). For a batsman total number of runs scored, number of century, average score are also maintained. Again, for a bowler total number of wickets taken, number of times five or more wickets, average runs per wicket are stored. One should be able to collect and display data. There must be a provision to update statistics for a cricketer.

- Design the classes. Also for each method, provide the prototype and textual description regarding the purpose. 10
- b) What is the use of static members in a class? 4
- c) In C++, why virtual destructor may be essential? 4
- d) Compare function overloading and function template in C++. 2
- 4) a) Design the class(es) for the following system:
For each student roll (it is unique), name and score are to be stored in a file. Apart from storing the records in the file, system should be able to do the following: search and display the details for a given roll number, update the score for a given roll (if it exists), and display all the records.
Write complete code in C++. 15
- b) Discuss exception handling in C++. Also mention the use of **throws** verb. 5
- 5) a) What is friend function in C++? 3
- b) What is the utility of abstract class? How will you define it in C++? 4
- c) What will you do to achieve runtime polymorphism in C++? 3
- d) Suppose A and B are two classes in C++. What are the possible measures to convert an object of A to that of B? 3
- e) What is the utility of namespace in C++? 2
- f) A list of names is to be maintained where names can be added and removed, all the names can be displayed in sorted order, and multiple lists can be merged. How can you do it in C++? [Take the help of suitable STL class]. 5
- 6) a) Write down the steps for creating a package in Java. 4
- b) What is the utility of interface in Java? Compare with abstract class. 4
- c) What is the difference between function overloading in C++ and that in Java? 2
- d) In HashMap, key is not a basic data type. Then what measures will you take to work with the key? 4
- e) How the task of destructor (as in C++) can be accomplished in Java? 2
- f) There is an array of string. Find the number of elements in the array and size of each string. 2
- g) Comment on the ordering of exception handlers in Java. 2
- 7) a) In Java, how do we specify the code of a thread? On which data will it operate? 4
- b) A stock list contains item code and quantity available for different items. Salespersons update the stock. Updating the stock for different items may be simultaneous. But, Care is to be taken to restrict the simultaneous update of same item. Design the necessary classes. Skeleton of the code/textual description (in the context of Java) must be provided to make your design understandable. 8
- c) Design a Student class with roll, name and score. Write the code in Java to store the Student objects in a file and to display maximum score by reading the objects from the file. 8

- 8) a) In comparison to a Java application, what are the restrictions on an applet? 4
- b) In a GUI application in Java, only one out of number choices can be allowed.
How can you achieve this? 3
- c) What is a layout manager? 3
- d) Write the GUI application/Applet in Java for the following:
There are multiple checkboxes showing the subject options. One can select number
of subjects. Finally, when user selects OK button, in a message box the choices are
displayed. 10