Ref No.: Ex/CSE/PC/B/T/222 /2022

# BCSE 2nd Year 2nd Semester Examination, 2022

## Advanced Object Oriented Programming

**Full marks: 100** **Time: 3 hours**

**Use separate answer script for each part**

**Part A (answer w.r.t. JAVA) -- 50 Marks**

**CO1 Conceptualize the object oriented features [20 Marks]**

1. a) Java is platform independent -- Explain. 2
   b) Mention few basic features in Java language which make it robust and secured. 2
   c) Compare function overloading and function overriding in Java. 3
   d) Discuss the role of access specifiers for the members of a class. 3
   e) Credential of an applicant consists of academic and skill credential. Academic credential is described by highest academic degree, year of completion, institute awarding the degree and score (if applicable). Skill credential consists of programming languages known, software tools known. Certain operations exist in to access and set the value for academic and skill credential. Academic and skill credentials are always required only as part of credential. Design the necessary class(es). 3
   f) In a two dimensional array of integers number of columns may vary across the rows. Write down the code snippet to implement the array and to show the number of columns in each row. 3
   g) Compare abstract class and interface. 2
   h) Ordering of exception handlers is important -- Explain 2

**CO2 Understand and Develop concurrent programming [10 Marks] [Answer either Q.2 or 3]**

2. a) Why is it important to control the concurrency in multithreaded programming? Explain with an example how it can be done? Provide skeleton code. 3+3
   b) Comment on the usage and purpose of wait() and notify(). 4

**or**

3. a) Consider Account contains account number and balance. In a multithreaded programming environment one may like to know the balance of an account (query), deposit or withdraw certain amount. Query is always allowed. With an account only one transaction (withdraw/deposit) can be

carried out at a time. Furthermore, at the time of withdraw if the withdrawal amount is less than the balance then it must wait till money is deposited. Provide the skeleton code for the scenario. 8

b) Compare start() and run(). 2

**CO3 Understand and Develop event driven programming [10 Marks] [Answer either Q.4 or 5]**

4. a) Assume, an array contains student objects. Student object contains roll, name and scores in five subjects. Provide the skeleton of student class. Now write GUI application/applet that accepts a roll and if 'search' button is clicked it displays the total score for the student. If roll is not found then displays suitable message. Program stops if 'exit' button is clicked. 10

**or**

5. a) Write the code snippet to display number of options to the user. User may select one or more options. Once 'done' button is clicked it will show the selected options. 7

b) What is layout manager? What are the default layouts for frame and panel? 3

**CO4 Design and implement object oriented solution for problems [10 Marks] [Answer either Q.6 or 7]**

6. a) Assume a binary file is there that has stored the marks (integers) for all the students. Write the code to find the highest score. 4

b) What is a collection framework? 2

c) Design a class MyClass so that for the collection of MyClass objects standard contains() method can be applied. 4

**or**

7. a) Each student has roll, name and score. Consider a collection of students. Take the measures and write the relevant code so that standard sort() algorithm can be used to sort the collection in the descending order of score. 7

b) What is the specialty and purpose of Serializable interface? 3

## Part B (answer w.r.t. Python) -- 50 Marks

*Answer any 5 questions. 5 X10 = 50*

1. Discuss advantages of Python over Java as an Object Oriented Programming Language. 10 **[CO1]**
2. Why Python is called as dynamic and strongly typed language? Discuss the ord(), hex(), oct(), complex() and float() type conversion functions with examples. 5+5=10 **[CO1]**
3. Search for palindrome and unique words in a text using class method and string method. 5+5=10 **[CO4]**
4. Create a GUI application in Python that provides an Entry field where the user can provide the name of a text file. Open the file and read it, displaying its contents in a Label. You can also replace the Entry widget with menu that has a File Open option that pops up a window to allow the user to specify the file to read. Also add an Exit or Quit option to the menu rather than having a QUIT button. 10 **[CO3]**
5. Write a Python program to design a simple connection-oriented server, explaining the connection-oriented service. 10 **[CO2]**
6. Discuss the following list functions - a) len() b) sum() c) any() d) all() e) sorted().Write first seven Fibonacci numbers using generator next function/ yield in python. Trace and memorize the function. 5+5=10 **[CO1]**
7. Create a list of Tuples. Each Tuple should contain an item and its price in float. Write a program to sort the tuples in descending order by price. Use **operator:itemgetter()**. Write a program that proves that the dictionary returned by globals() can be used to manipulate values of variables in it. 5+5=10 [CO2]
8. Explain different Functional programming features in Python. Write a program that implements a stack data structure of specific size. If the stack is full and we are trying to push an item, then an **IndexError** exception should be raised. Similarly, if the stack is empty, then an **IndexError** exception should be raised. 5+5=10 **[CO3]**