B.Sc. Engg. SWE 2nd Semester **19 January 2021**

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

SEMESTER FINAL EXAMINATION **SUMMER SEMESTER, 2019-2020**

DURATION: 1 Hour and 30 Minutes **FULL MARKS: 75**

SWE 4201: Object Oriented Concepts I

Programmable calculators are not allowed. Figures in the right margin indicate marks.
There are 3 questions. Answer all of them.
Write Student ID and Name on top of the first page and write **studentID** and **page no** on every page of the answer script. Submission pdf should be named as **Full_Student_ID<space>Course Code.pdf**

---

1 a) Define the terms coupling and cohesion with example in the context of object oriented concept. Within your discussion, explain how coupling and cohesion can lead to either good or bad software design. **12**

b) When do we use composition over inheritance and inheritance over composition? Explain with logic. **7**

c) "To reduce tight coupling one should depend on interface." explain the statement with an example. **6**

2 a) How do we represent the followings in UML class diagram? Use an example to draw them in a consistent way.

i. Visibility of class members as private, protected, public and default **2**
ii. Aggregation and Composition **3**
iii. Multiplicity of association (one to many and many to many relationships) **2**
iv. Inheritance from class, abstract class, and interface **3**

b) Read the following scenario: **15**

Gono Library of Dhaka established in 1983. It has numerous collection of books. Each book has a title, author, publication date, and genre whether it is a novel, story, biography, or fiction. Any person can have an account there. Library maintains those accounts by a unique number, date the account opened, and state whether the account is active, frozen, or closed. A person borrows books using his/her account. A person can be an author. His work is writing books.

Now design the scenario from your knowledge of object oriented concepts. You can make the design in a UML class diagram or in any object oriented programming language. If you use UML class diagram, give proper detail of each class, its properties and methods, and relations.

3 a) Define String pool. Write two scenarios where using String pool (in object creation or storing value) provides advantages and/or disadvantages. **6**

b) Give an example of delegation using an object oriented language. **6**

c) Explain the followings with examples. **3+3**

I. When do we use custom exceptions?
II. When do we use enumeration?

d) Examine listing 1 which contains a section of java code that has exception handling problems. Locate 3 problems in the code and write the correct code. **7**

Listing 1: Erroneous Java code

```
1  import java.util.Scanner;
2
3  public class MyClass {
4      public static void main(String[] args){
5          Integer index = null;
6          int a[] = {10, 20, 30, 40};
7
8          Scanner in = new Scanner(System.in);
9          int divisor = in.nextLine();
10
11         int result = a[index]/divisor;
12         System.out.println("Result: " + result);
13
14         catch(Exception e){
15             System.out.println("Exception");
16         } catch(NullPointerException npe){
17             System.out.println("Null Pointer Exception");
18         } catch(ArrayIndexOutOfBoundsException aie){
19             System.out.println("Array Index Out Of Bounds Exception");
20         } catch(RuntimeException re) {
21             System.out.println("Runtime Exception");
22         }
23     }
24 }
```