Name of the Program: B.Sc. in Computer Science and Engineering **14 September 2021**
Semester: Winter 2020-2021 **Time: 2:30 pm – 4:00 pm**

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

Semester Final Examination **Winter Semester: 2020-2021**
Course Code: CSE 4513 **Full Marks: 75**
Course Title: Software Engineering and Object-Oriented Design **Time: 1.5 Hours**

There are **3 (three)** questions. Answer all of them. Figures in the right margin indicate marks. The examination is **Online** and **Close Book**. Marks of each question and corresponding **CO** and **PO** are written in the brackets.

Write **Student ID** and **Name** top of the **first page** and write **student ID** and **page no** in every page of the answer script. Submission pdf of the answer script should be named as **Full_Student_ID<space>Course Code.pdf**

---

1. a) Suppose, you are developing a system for your company that relies on a complex algorithm, and you have already modified that algorithm four times due to marketing pressure. And there is every chance that the algorithm may need to be changed on a regular basis due to such marketing pressures. **2+5+5** (CO3) (PO1, PO2)
   i. What pattern would best support above scenario? Justify your answer.
   ii. Draw the class diagram for that design pattern.

   b) Users are allowed to open exactly one account in a Bank to make transaction. And every time user makes a transaction, he/she will be notified through SMS and email. **3+10** (CO3) (PO2, PO3)
   i. Identify proper design patterns to develop such system.
   ii. Draw the class diagram for your chosen pattens.

2. a) Suppose, your recent project is almost at the end of its development schedule and it has five modules such as home page, login page, new user creation, user detail page, and task creation. According to the requirements, the username in the login page should not accept less than six characters, and a bug is registered by the QA team when a username with less than six characters is accepted. QA Team assigned the bug to the development team for fixing. The development team fixes the issue again passes it to the QA team to recheck. **2+5+3** (CO4) (PO5)
   i. Which test must be performed by the QA team? Justify your answer.
   ii. How does your selected testing techniques help in producing a quality software?

   b) Consider an application that calculates the reimbursements of medical visits for patients having a medical insurance. The medical insurance deductible is defined as the amount of money that the insured patients have to pay before the insurance company begins to pay out benefits. Thus, no charges are reimbursed to the patient until the deductible has been met. There are two types of reimbursable visits: Doctor's Office Visits and Hospital Visits. The reimbursement for Doctor's Office visits is 33%. **12+3** (CO4) (PO5)
   The reimbursement for Hospital visits depends on the type of the specialist visits; four categories (V1, V2, V3, V4) for specialist visits exist and the associated reimbursements are defined as follows:
   - for V1 reimburse 50%
   - for V2 reimburse 66%
   - for V3 reimburse 70%
   - for V4 reimburse 90%

   i. Construct the decision table for this scenario.
   ii. Figure out the MINIMUM number of test cases to cover the full decision table?

3. a) Below is the pseudo-code for a TEST program: **8+5+2**

(CO4)

(PO2)

```
0 program TEST
1 var1, var2, var3: integer
2 easy: boolean
2 begin
3    read (var2)
4    read (var1)
5    read (easy)
6    If (easy = true) then
7       var3 = var2 + var1
8       print (var3)
9       if var1 = 5 then
10         print (var1)
11      else
12         print (var1+1)
13      endif
14      var2 = var2 + 1
15   else
16      var2 = 0
17      write ("Wow – that was tricky!")
18   endif
19 write (var2)
20 end program TEST.
```

i. Draw the control flow graph for the above Pseudo-code.
ii. Find the cyclomatic complexity.
iii. How many independent paths are present in your control flow graph?

b) How does continuous delivery differ from continuous deployment? **3**

(CO4)

(PO1)

c) Compare between software re-engineering and reverse engineering. Describe the process of Software reuse. **2+5**

(CO4)

(PO1)