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| **National University of Computer and Emerging Sciences, Lahore Campus** | | | | |
| C:\Users\saif\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\final design.jpg | **Course Name:** | **Software Design & Analysis** | **Course Code:** |  |
| **Degree Program:** | **BS (CS)** | **Semester:** | **Fall 2021** |
| **Exam Duration:** | **60 min** | **Total Marks:** | **30** |
| **Paper Date:** | **30-Nov-2020** | **Weight** |  |
| **Section:** | **ALL** | **Page(s):** | **3** |
| **Exam Type:** | **Mock up Mid-2** |  |  |
| All the questions carry equal marks. No separate answer sheets required. Rough sheet are allowed, however. Do not attach additional sheets with this question paper. | | | | |

**Question 1**

Following is a description of a behavior of an alarm clock:

User can set or cancel an alarm. When user sets an alarm, the clock displays a bell sign; the sign disappears when user cancels. Once set, the alarm goes off at the specified time. Now the user can either dismiss alarm or can snooze it. If dismissed the alarm is cancelled, otherwise it rings again after 10 minutes. In case the alarm is ringing and the user does not respond for a whole minute, the alarm is automatically snoozed.

Give a UML state diagram for the afore-mentioned alarm clock.



**Question 2**

Following is detail of a PhD program at a local university:

Student needs to pass a course work of 18 credit hours. He must score a GPA of at least 3.0. Afterwards he is required to pass a comprehensive exam. Next he needs to defend PhD synopsis (research proposal). Then he has to publish a paper in a recognized research journal (magazine). Afterwards his thesis is evaluated by two foreign and two local experts. These evaluations by experts can be done in parallel. Finally the candidate appears in a public defense (thesis presentation). If successful he gets the degree.

Give a UML activity diagram for the afore-mentioned process.



**Question 3**

Consider a class having two functions: foo and bar. There are two clients: client1 and client2.



Client1 uses only foo() while client2 uses only bar. Secondly in future we may need to replace class A with another class B, which also provides foo and bar. Now redesign the system in the light of the SOLID principles.



(Here I and J are interfaces)

**Question 4 and 5:**



