National University of Computer and Emerging Sciences, Lahore Campus

	Course:	Software Engineering	**Course Code:**	CS303
	Program:	BS (CS)	**Semester:**	Fall 2020
	Duration:	90 Minutes (1.5 Hour)	**Total Marks:**	45
	Paper Date:	21-Oct-20	**Weight**	15%
	Section:	B,C,D,E	**Page(s):**	6
	Exam:	Mid I		

Instruction/Notes:

1. Attempt all questions on the question paper. <u>Do not submit any extra sheet, it will not be graded.</u>
2. You are allowed to use a single-sided, hand-written, A-4 size help sheet.
3. State your assumptions clearly

Name: _____   Roll Number: _____

Section _____

Question 1   1+3+5+3+3 = 15 Marks

Read the following text from a book by Watts Humphrey written in 1989:

"Requirements change is a continuing problem for software engineering. To have any chance of managing this problem, the software team must follow a few simple rules:

1. *Implement the product in small incremental steps*
2. *Select each increment to support succeeding increments and/or improve requirements knowledge*
3. *Freeze the requirements for each incremental step before starting design*
4. *When the requirements change during implementation, defer the change to a subsequent increment*
5. *If the changes cannot be deferred, stop work, modify the requirements, revise the plan, and start again on design.*

These incremental steps, or builds, are aimed at producing running code as soon as possible. The process starts with minimal function and gradually expands until functionally useful level is reached"
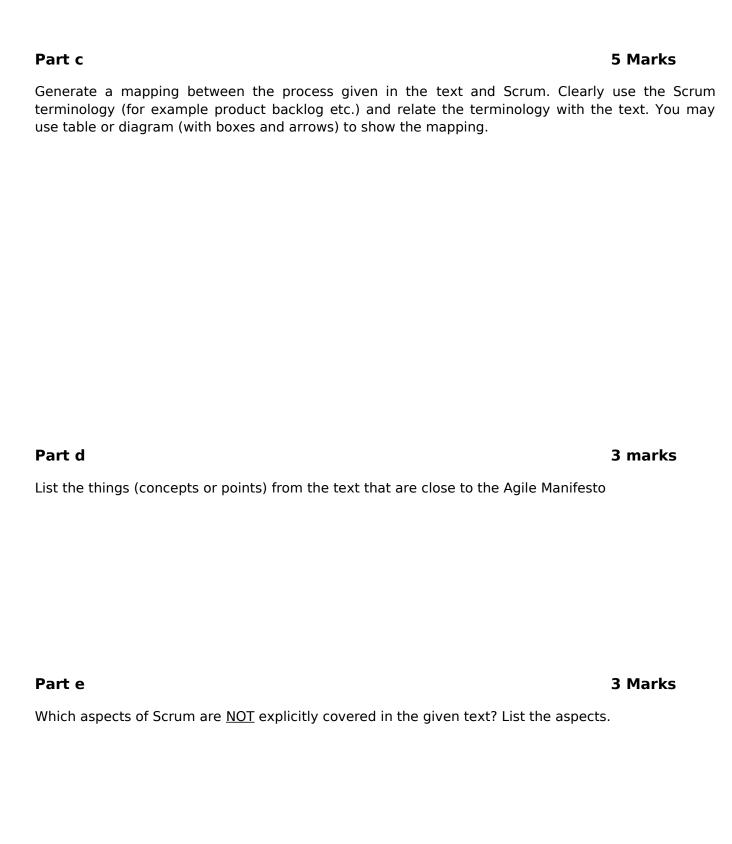
Answer the following questions in the light of above:

Part a   1 Marks

If the proposed rules are followed, is the software team following an incremental approach or an evolutionary approach for software development?

Part b   3 Marks

Which limitations of classical waterfall model are being addressed in the given text? List the limitations and clearly relate them with the exact words/rule number of the given text.

Part c   **5 Marks**

Generate a mapping between the process given in the text and Scrum. Clearly use the Scrum terminology (for example product backlog etc.) and relate the terminology with the text. You may use table or diagram (with boxes and arrows) to show the mapping.

Part d   **3 marks**

List the things (concepts or points) from the text that are close to the Agile Manifesto

Part e   **3 Marks**

Which aspects of Scrum are <u>NOT</u> explicitly covered in the given text? List the aspects.

Question 2
Marks

5 + 10 = 15

We need to write software for an ATM machine. The software will deal with customers' requests regarding withdrawal of money, change of PIN, checking of account info etc. The software's programming language is JAVA. It will use a data base management tool, which is ORACLE. The hardware will include an ATM Machine at which the software runs and the software interacts with the ATM card reader and a keypad to get the input. The machine will display messages on screen to keep the customers informed during the processing of customers' transaction. The software system needs to perform the following functions:

- The system should validate the user entered PIN from the database
- The system should process the amount withdrawal request for the valid ATM card and PIN
- The system should check for the sufficient amount for withdraw from the database
- The system should process PIN change request for a valid ATM card and valid PIN
- The system should process Balance Check request for a valid ATM Card and valid PIN
- The system should process the print receipt request for any successful transaction

Give a level 0 DFD and level 1 DFD for the requirements mentioned above.

[Marks distribution: level 0 DFD (5); level 1 DFD (10).]

Level 0 DFD

Level 1 DFD

Question 3   1.5x10 = 15 Marks

Problem

Distance learning till today is one-way road as only teachers are delivering content or video lectures. In this way students can't ask questions on parts of lecture, which may leave them with ambiguity on some topic(s).

It is hard to maintain hardcopies of lectures for teachers and rewrite them every time they teach the same class. It is not even a good idea for students to maintain their notes in form of hardcopies and do their assignments on papers and the much of the research work they have to do now days is through internet and eBooks. So it is a tough ask for students even to maintain hardcopies of lectures in each semester or year of their college and where there are many chances to lose the back track of their previous lectures and notes.

Secondly, for professional students and the students of practical subjects like Mathematics and Arts, it is necessary to look through problems deeply and ask teachers questions on each point of confusion.

Thirdly, students lose some concentration to lecture, as they get more involved in taking down notes instead of listening to the lecture and grasping what the teacher is pinpointing. This is another vital issue that causes a lack of interest in many students and many fail to get most out of lectures due to this problem.

The Proposed Solution

To handle these problems, this project suggests an innovative interface for virtual class environment. The focus of the project is to devise an application that will simulate real-world class environment for distance learning and would provide a platform for teachers and students to perform their tasks with more ease and perfection in a timely manner. The teachers would be able to deliver lectures electronically using tablet (promulgator) that would be automatically copied to the tablets (promulgators) of the students attending the class and they would rather be concentrating on lectures instead of taking notes. Moreover students would be engaging in question and answers in a way to cope up with distance learning interactivity problem. Students would be proposing their answers by writing or drawing the idea at real time on tablet (promulgator) and would be questioning by properly writing and preplanning their query, which would all, be visible at runtime to an online class canvas.

So, the core point is to develop a healthy classroom environment that simulates real-world class environment, which would help students in distance learning and teachers in distance teaching.

For the above software project following requirements are extracted, your task is to read the above text and check whether the requirements are **Relevant** with the problem. You also need to categorize the requirements into **Functional Requirements (FR)** and **Non functional Requirements (NFR).** For each requirement listed below, tell whether the requirement is **Testable** (or Verifiable) or not.

Sr. #	Requirements	Relevant/ Not Relevant	FR/ NFR	Testable/ Not Testable
1.	The system shall allow the teacher to search already saved lectures.			

2.	System will be efficient and optimized for better performance.			
3.	Systems' Response time will be as low as 2 seconds.			
4.	The system shall allow the teacher to delete a lecture.			
5.	The new user shall be able to learn the system in 2 – 3 attempts.			
6.	The system shall allow the teacher to update the already saved lectures.			
7.	The system shall be up most of the time.			
8.	The system shall be easy to learn for novice user.			
9.	The system shall allow the teacher to send the lecture to student(s).			
10.	The system shall allow the Student(s) to receive a lecture.			