# 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: | A | 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"*
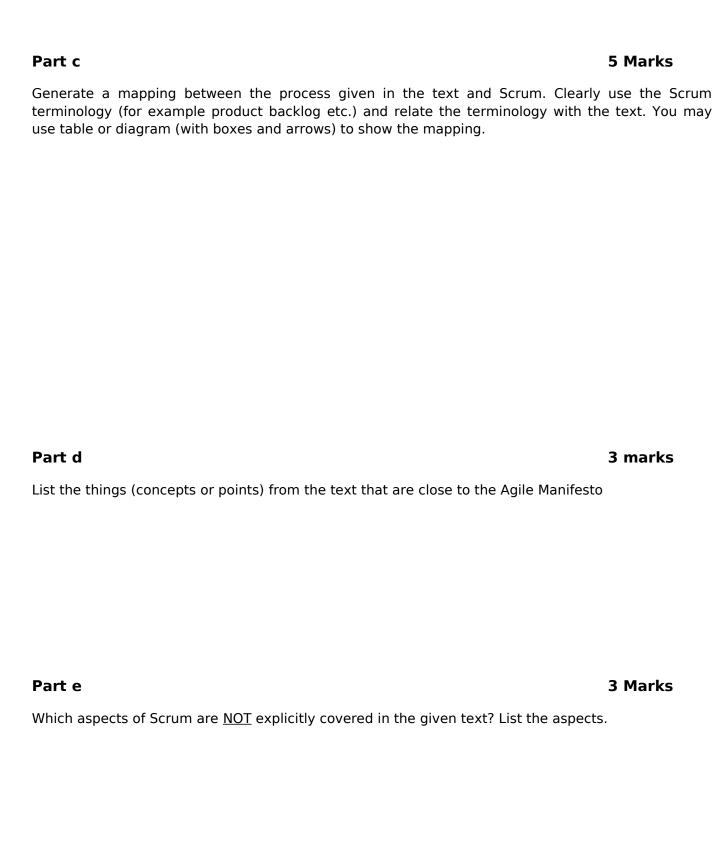
Answer the following questions in the light of above:

## 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.

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**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                                                                $5 + 10 = 15$ Marks

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                                                                5+5+5 = 15 Marks

**Part a**                                                                                          **5 marks**

In most of the software engineering projects the clients are found to be changing their requirements frequently and the software engineers are found to be dealing with the issue of unstable requirements. The requirements keep on changing even when the major portion of the software has been implemented and tested. The software engineers try to incorporate the required changes even in later phases of software development. Which property of software allows the clients to change the requirements that frequently and lets the software engineers attempt the implementation of the changes?

**Name and explain the property**

**Highlight the issues that can arise if the property is exploited**

**Part b**                                                                                          **5 Marks**

Punjab government has sponsored the development of a software application with the name Kisan Dost. The application allows the farmers to get advice on usage of pesticides, water, fertilizer, type of seeds etc. The application also provides the farmers with guidelines to manage certain situations like (worm attack, locust attack etc.). Farmers with smart phones can use the application on their devices whereas the others can visit Kisan Dost centers to use the application through touch screens. Initially the response of farmers was reported to be good but a decline in use of the application has been observed lately. What could be the reason(s)? Initial reports suggest that farmers are not happy with the application. Which mistake(s) by the software engineering team could have resulted in this situation? List the possible mistake(s) and describe it/them in a sentence or two.

**Part c**                                                                    **5 marks**

List the process model that you think will be most appropriate for the following situation. Also, list your reason(s) for choosing a particular model. If you just list the process model without mentioning the reason(s), you will not be awarded any marks.

Situation:

An existing software needs to be developed in a newer and better technology and your company has been assigned this task. The software has been running successfully for a few years and does not require any major changes in its functionalities in the newer technology i.e. same functions that are available in the current version will also exist in the updated version.