

**BACHELOR OF SCIENCE(GENERAL) DEGREE LEVEL III (SEMESTER II)  
EXAMINATION –NOVEMBER/DECEMBER 2016**

**COURSE UNIT: CSC3212  
Advanced Concepts of Software Engineering**

**Time: 2 hours**

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*Answer four questions only.*

1.

- a. Assume that you have been working in Soft-Solutions Company as a software developer and assigned as a member of a software development team. The current sets of business requirements given by customer A for a particular software product seem to have some ambiguities and confusions. Your team has decided to re-collect and analyze the requirements properly.
- i. State two (02) different techniques that your team can use to collect requirements without any ambiguities. (10 marks)
  - ii. You have to formulate the collected requirement set in an excellent manner to include in the requirements specification document. State three (03) good characteristics that can be seen in defining a set of excellent requirements. (15 marks)
  - iii. Assume that you are required to analyze non-functional requirements of the target software product. Name three (03) types of features you consider as non-functional requirements in your product. (15 marks)
  - iv. There are different ways of writing the requirements document. List two (02) ways of writing the document. (10 marks)
- b. Assume that the following observations were made by your team during the analysis.
- There are no high technical risks found
  - The requirements are clear and can be separated into modules
  - The system has to be completed within a short period of time

Assume many CASE tools that can be used throughout the software project are available in Soft-Solutions Company.

- i. What is the best software process model you suggest to be used for the development of the above mentioned system? Justify your answer. (15 marks)
- ii. State two (02) advantages and two (02) disadvantages of the model, you suggested in (i) above. (20 marks)
- iii. State two restrictions on selecting a proper development team for applying above kind of model. (10 marks)
- iv. Can you apply the above model for a disease prediction system? Justify your answer. (5 marks)

2.

Extreme Programming "XP" is considered as the most famous and prominent agile methodology. Since the development of XP methodology by Kent Beck, researchers in universities and managers in software organizations tried to evaluate the success of this new model.

a.

- i. State three (03) main principles of agile methodology. (15 marks)
- ii. Briefly explain following techniques in terms of Extreme Programming. (24 marks)
  - a) Test-first development
  - b) Refactoring
  - c) Pair programming
- iii. What is meant by 'collective ownership' in extreme programming? (6 marks)
- iv. State one (01) main difference between agile and plan-driven development. (10 marks)
- v. "Waterfall model utilizes plan-driven development". Do you agree with this statement? Justify your answer. (15 marks)

b. Re-use based development often utilize in software engineering. Briefly explain two (02) advantages and two disadvantages of software reuse. (20 marks)

c. "Agile methods are more effective when the system can be developed with a small co-located team who can communicate informally". Is this statement correct? Justify your answer. (10marks)

3.

- a. State two (02) essential attributes of software that are often considered by software developers. (10 marks)
- b. What is the difference between stand-alone applications and interactive transaction based applications? (20 marks)
- c. The software process should be assessed to ensure that it meets a set of basic process criteria that have been shown to be essential for a successful software engineering. Give two (02) examples of models to measure the quality of software development processes. (10 marks)
- d. Briefly explain the layered technology in terms of Software Engineering. (20 marks)
- e. Canadian Cancer Therapy Machine (Therac-25) was designed by Atomic Energy of Canada, Ltd. Therac-25 was a software controlled radiation therapy machine used to treat people with cancer. Between 1985 and 1987, Therac-25 machines in four medical centers gave massive overdoses of radiation to six patients. An extensive investigation and report revealed that in some instances operators repeated overdoses because machine display indicated no dose given. Some patients received between 13,000 - 25,000 rads when 100-

200 needed. The result of the excessive radiation exposure resulted in severe injuries and three patients' deaths. (20 marks)

- i. What is the type of software failure you see in Therac-25?
- ii. What kind of requirement analysis that they should have followed to avoid this failure during the first stage of software development process?

f. What is meant by feasibility study and what will be the output of this study? (20 marks)

4.

a. State four main task regions that involve in spiral development model. (10 marks)

b. Explain the four (04) main types of testing available in software testing? (20 marks)

c. Briefly explain 'Application generation' phase of Rapid Application Development. (10 marks)

d. Describe how the waterfall model suits for developing a web based system of a book-store. Give reasons to your answer. (20 marks)

e. Suggest the most appropriate software process model that can be used as fundamental model for developing following software. Justify your answer. (40 marks)

- i. University accounting system
- ii. Automatic video processing system
- iii. Battlefield network system for military operations
- iv. Simulation system for decision making in brain

5.

a. Give three (03) ways of writing the requirements specification. (15 marks)

b. There are weaknesses in models in system modeling. State two (02) weaknesses of structured methods used in system modeling? (20 marks)

c. State three (03) reasons that make difficulties in the requirements elicitation phase. (15 marks)

d. How does scaling up can utilize with agile methods of software engineering? (20 marks)

e. Compare three (03) features of adaptive approaches and predictive approaches of Software Development Life Cycle (SDLC). (20 marks)

f. Briefly mention a characteristic of a good agile tester. (10 marks)