

UNIVERSITY OF RUHUNA

**BACHELOR OF SCIENCE (GENERAL) DEGREE LEVEL II SEMESTER I
EXAMINATION –JULY 2023**

COURSE UNIT: COM2122- Software Engineering

Time: 2 hours

Answer ALL questions.

- a. Assume that you're a software developer at ESoft-Solutions Company, working on a new project. As you review the business requirements provided by customer for a specific software product, you notice some conflicts and confusion within them. To address this, your team has decided to recollect and analyze the requirements again, ensuring a more thorough understanding.
- i. Briefly explain two (02) techniques that you and your team can employ to collect requirements ensuring there are no ambiguities? (10 marks)
 - ii. Imagine you have been given the responsibility to formulate a well-defined set of requirements to include in the requirements specification document. Briefly explain two key characteristics of well identified requirements. (10 marks)
 - iii. Assume that you want to analyze non-functional requirements of the target software product. Given that their aim is to develop a web based system for a restaurant, write three (02) non-functional and two (02) functional requirements in your product. (30 marks)
 - iv. There are different ways of writing the requirement document. Write down/list two (02) ways of writing them. (10 marks)
- b. Assume that the following observations were made by your team during the analysis of requirements.
- Developers with **JavaScript and ActionScript language** skills are highly available in your team.
 - The requirements are **not clear (vague)** and **unstable**
 - Customer is available to provide feedback whenever required
 - The requirements can be developed **incrementally**

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

- i. Name the best software process model you suggest to be used for the development of the above mentioned system.? Justify your answer. (20 marks)

ii. State two (02) advantages of the above model.

(20 marks)

2.

b. Briefly explain the difference of generic and customized software products. (10 marks)

c. Briefly explain the following two (02) essential attributes of software that are often considered by software developers (20 marks)

i. Maintainability

ii. Dependability

d. 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 successful software engineering. Write down two (02) examples of models to measure the quality of software development processes. (10 marks)

e. List down the layers of the layered technology and briefly explain the bottom most layer in terms of Software Engineering. (30 marks)

f. Briefly explain the meaning of a feasibility study and write down the output of this study (15 marks)

g. The Therac-25, an Australian Cancer Therapy Machine was intended for cancer treatment through software-controlled radiation therapy. Unfortunately, between 1985 and 1987, Therac-25 machines at four medical centers administered dangerously high radiation doses to six patients. Investigation findings revealed that in certain cases, operators mistakenly repeated overdoses due to the machine's display showing no dose delivered. Consequently, some patients received 13,000 to 25,000 rads instead of the required 100-200 rads, resulting in severe injuries and the unfortunate deaths of three patients.

(15 marks)

i. Name 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?

3.

Extreme Programming (XP) aims to deliver high-quality software through its disciplined and flexible approach and popular as one of the agile frameworks in the IT industry.

i. Briefly explain following three (03) main principles of agile methodology.

(15 marks)

1. Customer involvement

2. People not process

3. Embrace change

- (20 marks)
- ii. Briefly explain following techniques in terms of Extreme Programming. (15 marks)
1. Test-first development
 2. Refactoring
 3. Pair programming
- iii. Define XP testing and write down two(02) differences between XP testing and traditional method. (20 marks)
- iv. State one (02) advantages of pair programming. (10 marks)
- v. "Waterfall model utilizes plan-driven development". Briefly explain whether you agree or disagree with this statement. (10 marks)
- vi. Write down four(04) circumstances where you might recommend against software reuse. (20 marks)
- h. "Agile methods are most effective when the system can be developed with a small co-located team who can communicate informally". Explain whether you agree or disagree with this statement. (10 marks)
- 4.
- a.
- i. Briefly explain 'Application generation' phase of Rapid Application Development. (10 marks)
 - ii. State four (04) main task regions that involve in spiral development model. (20 marks)
 - iii. Write down when to use the formal development model and one (01) specific example of using that. (20 marks)
- b.
- i. Name and explain four (04) main types of testing available in software testing? (20 marks)
 - ii. State two (02) reasons that make difficulties in the requirements elicitation phase. (10 marks)
 - iii. Compare three (02) features of adaptive approaches and predictive approaches of Software Development Life Cycle (SDLC). (20 marks)

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