

**University of Ruhuna- Faculty of Technology**  
**Bachelor of Information and Communication Technology Honours Degree**  
**Level 3 (Semester II) Examination, December 2023**  
**Academic year 2021/2022**

**Course Unit: ICT3262- Software Verification & Quality Assurance (Written)    Duration: 2 hours**

Answer all **four(04)** questions.

1. Software verification and validation are crucial components of the software development life cycle.
  - a. Briefly describe software verification and software validation. (20 marks)
  - b. List four(04) objectives that a company aims to achieve through software verification. (20 marks)
  - c. Describe the role of verification and validation in the implementation, testing, and deployment stages of the software development life cycle. (30 marks)
  - d. Assume that you are assigned to train your juniors staff on the auditing process of the company. Explain, using a diagram, how you are going to give a brief introduction to them regarding the auditing process. (30 marks)
2. In the domain of software testing and metrics, it is crucial to assess the efficiency and quality of the testing process.
  - a. Calculate *four (04)* indirect metrics using the details in table 1. (16 marks)

Testing Metric	Data retrieved during test case development and execution
No. of requirements	10
Avg. no. of test cases written per requirement	15
Total number of test cases executed	90
No. of test cases passed	75
No. of test cases failed	18
No. of test cases blocked	10
No. of test cases not executed	30

*Table 1 Basic Test Metrics data*

- b. Distinguish between white box testing and black box testing techniques. (20 marks)
- c. Software Metrics are used to measure the quality of the project. Briefly explain the phases of metrics life cycle in a project. (32 marks)

- d. Software testing is the main tool for validating the final software product. As a QA engineer, explain to your newly appointed members the importance of testing a software product should be tested providing at least four(04) valid reasons. (32 marks)
3. In the realm of software development and project management, adopting a thorough testing approach is essential for success, and the following questions explore aspects of testing methodologies, risk management, and planning.
- a. Briefly explain the importance of creating a test plan for a project using three(03) reasons. (15 marks)
  - b. Differentiate suspension criteria and exit criteria in test plan development. (20 marks)
  - c. Briefly explain the concept of Test-Driven Development(TDD) with reference to the importance of using TDD. (25 marks)
  - d. A risk is an uncertain or chance event that planning alone cannot overcome or control. Choose the most suitable response strategy and explain how you intend to assess the following risks.
    - i. A chemical manufacturer considers selling a product line in Japan to expand the business but there are too many local regulations to comply with, thus the costs of mitigating regulatory risks are too high. (20 marks)
    - ii. A building company relies heavily on cars to transport their materials. As a result, there is a risk to the company's operations if the vehicle is involved in an accident or breaks down. (20 marks)
4. In the realm of software quality assurance, topics range from the benefits of Process and Product Quality Assurance to handling defects and applying Quality Engineering in projects.
- a. Briefly explain three(03) benefits of Process and Product Quality Assurance. (09 marks)
  - b. Differentiate between Defect, Error, Fault and Failure. (16 marks)
  - c. For most software development organizations, ensuring quality means dealing with defects. Explain three (03) ways that you can deal with defects. (30 marks)
  - d. As the quality assurance engineer of the company explain how you can apply quality engineering to your projects using the three main stages of Quality Engineering. (45 marks)

\*\*\*\*\*END OF THE PAPER\*\*\*\*\*