



UNIVERSITY EXAMINATIONS

**EXAMINATION FOR SEPTEMBER/DECEMBER 2019/2020 FOR BACHELOR OF
SCIENCE IN COMPUTER SCIENCE AND BACHELOR OF BUSINESS
INFORMATION TECHNOLOGY**

RCS 442: SOFTWARE QUALITY ASSURANCE AND TESTING

DATE: 11TH DECEMBER 2019

TIME: 2 HOURS

GENERAL INSTRUCTIONS:

Students are NOT permitted to write on the examination paper during examination time.

This is a closed book examination. Text book/Reference books/notes are not permitted.

SPECIAL INSTRUCTIONS:

This examination paper consists Questions in Section A followed by section B.

Answer **Question 1 and any Other Two** questions.

QUESTIONS in ALL Sections should be answered in answer booklet(s).

- 1. PLEASE start the answer to EACH question on a NEW PAGE.**
- 2. Keep your phone(s) switched off at the front of the examination room.**
- 3. Keep ALL bags and caps at the front of the examination room and DO NOT refer to ANY unauthorized material before or during the course of the examination.**
- 4. ALWAYS show your working.**
- 5. Marks indicated in parenthesis i.e. () will be awarded for clear and logical answers.**
- 6. Write your REGISTRATION No. clearly on the answer booklet(s).**
- 7. For the Questions, write the number of the question on the answer booklet(s) in the order you answered them.**
- 8. DO NOT use your PHONE as a CALCULATOR.**
- 9. YOU are ONLY ALLOWED to leave the exam room 30minutes to the end of the Exam.**
- 10. DO NOT write on the QUESTION PAPER. Use the back of your BOOKLET for any calculations or rough work.**

SECTION A (COMPULSORY)

Question (1) - (30Marks)

- a) Define the following terms / acronyms, as used in Software development and quality assurance. **(10 Marks)**
- i. Bugs.
 - ii. I.S.O.
 - iii. I.E.E.E.
 - iv. I.S.V.V.
 - v. A.N.S.I.
 - vi. E.U.L.A.
 - vii. Software.
 - viii. Firmware.
 - ix. Debugging.
 - x. Pseudocode.
- b) Describe the following levels of software testing. **(8 Marks)**
- i. Unit Testing.
 - ii. Integration Testing.
 - iii. System Testing.
 - iv. Acceptance Testing.
- c) What is the difference between the test to fail and the test to pass? **(4 Marks)**
- d) Describe four software development model and hence discuss the effectiveness of each in the software quality assurance. **(8 Marks)**

SECTION B (Answer Any Two Questions)

Question (2) - (20Marks)

- a) With references to software quality assurance, list five types of bugs and their possible causes. **(10 Marks)**
- b) In details, describe the following concepts as used in software quality assurance. **(6 Marks)**
 - i. Software life cycle.
 - ii. Bug's life cycle.
- c) Explain major contract review stages with reference to software development. **(4 Marks)**

Question (3) - (20Marks)

- a) Name and briefly describe **TEN** types of software testing an SQA personnel would consider to use when testing software. **(10 Marks)**
- b) The software quality assurance SQA architecture consists of important components in order to ensure quality in software development. Describe two of the components by referring to their importance and evolution in software industry. **(4 Marks)**
- c) Discuss the different aspects of verification, validation and qualification for quality assurance activities. **(6 Marks)**

Question (4) - (20Marks)

- a) Name any **FIVE** causes of software errors/failures/bugs. **(5 Marks)**
- b) State and discuss **FOUR** benefits of Automation in software testing. **(8 Marks)**
- c) Explain the implementation of **alpha & beta** site testing, and discuss the advantages and disadvantages of this type of testing. **(4 Marks)**
- d) What are the differences between the **Gorilla testing** and **Monkey testing**? **(3 Marks)**

Question (5) - (20Marks)

a) The case study below involves Boeing 737 MAX.

"On the October 29, 2018: Lion Air Flight 610, a 737 MAX 8, registration PK-LQP, on a flight from Jakarta, Indonesia to Pangkal Pinang, Indonesia, crashed into the sea 13 minutes after takeoff, with 189 people on board the aircraft: 181 passengers (178 adults and three children), as well as six cabin crew and two pilots. The crash killed all aboard. This is the deadliest air accident involving all variants of the Boeing 737 and also the first accident involving the Boeing 737 MAX. On the March 10, 2019: Ethiopian Airlines Flight 302, a 737 MAX 8, registration ET-AVJ, on a flight from Addis Ababa, Ethiopia to Nairobi, Kenya, crashed 6 minutes after takeoff, killing all 157 people aboard: 149 passengers and 8 crew members. The plane was only 4 months old at the time of the accident. In response, numerous aviation authorities around the world grounded the 737 MAX, and many airlines followed suit on a voluntary basis. On March 13, 2019, the FAA became the last authority to ground the aircraft, reversing its previous stance that the MAX was safe to fly.

With hundreds dead, the popular 737 Max jet remains grounded as investigators investigate, the two crashes apparently caused by the same **automated flight control system/software M.C.A.S. (Maneuvering Characteristics Augmentation System)**. "

Considering the case study above,

- i. Based on your opinion, what could have been the causes of the software bugs? **(2 Marks)**
 - ii. Describe the type of software/programming errors likely to have been the cause. **(2 Marks)**
 - iii. Discuss, comprehensively the costs & implications of the software bugs, to the following entities involved. **(4 Marks)**
 - a. Boeing Company.
 - b. Boeing's third party contractors.
 - c. Passengers / customers relatives, etc.
 - d. Federal Aviation Administration Authority.
 - iv. As the quality assurance manager/personnel for the Boeing Company, discuss the relevant software quality assurance strategies/measures you would have deployed to avert the tragedy. **(3 Marks)**
 - v. What kind/types of software testing do you think would be the most appropriate to conduct in the development of M.C.A.S.? Describe **FIVE**. **(5 Marks)**
- b) Discuss Roles/Tasks of a Software Tester in SQA carrier. **(4 Marks)**