National Exams May 2018

04-Soft-A6, Software Quality Assurance

3 hours duration

NOTES:

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made.

2. This is an OPEN BOOK EXAM. Candidates may use any non-communicating calculator.

3. FIVE (5) questions constitute a complete exam paper. The first five questions as they appear in the answer book will be marked.

4. Each question is of equal value.

5. Most questions require short written answers. Clarity and organization of the answer are important, but full sentences are NOT required. Be sure to bullet lists and ideas wherever possible.

Marking Scheme

1.	a) 3 marks b) 3 marks c) 4 marks		5	a) 5 marks b) 5 marks
2.	a) 5 marks b) 5 marks		6.	a) 5 marks b) 5 marks
3.	a) 4 marks b) 3 marks c) 3 marks		7.	a) 4 marks b) 3 marks c) 3 marks
4.	a) 5 marks b) 5 marks		8.	a) 3 marks b) 4 marks c) 3 marks

1.
   a) Provide a general definition of quality and explain how this definition relates to the software quality.
   b) Draw three curves, which depict failure rate over time for hardware, software with no upgrade and software with upgrades.
   c) Provide definitions of software metrics and measures. What is the role of software measurement in software development?

2.
   a) Software Quality Assurance (SQA) consists of many activities. List and describe briefly three of them.
   b) Describe how the SQA lifecycle is related to the software development lifecycle (hint: consider phases of the software development lifecycle and SQA activities used during each phase).

3.
   a) Describe briefly the software verification activities and relate them to the phases of the software development activities
   b) What is the difference between fault prevention, fault tolerance and fault detection?
   c) Explain briefly what are system test, functional test and performance test.

4.
   a) List and describe briefly various unit testing techniques (including traditional functional testing, object-oriented testing and state-based testing).
   b) Compare and contrast the techniques mentioned in the answer (4.a).

5.
   a) Assume you are testing a system with a very large database with many attributes and many interdependencies within the fields. What steps would you use to test the system, and what are effects of the steps you have taken on the test plan?
   b) Assume you are a test manager. The developers reported that the system will be delivered for SQA with a few-day delay. You cannot change the resources (hours, days, tools). What steps will you take to finish the testing in time?

6.
   a) List and describe briefly the main factors, which influence quality of the object-oriented design.
   b) Propose a quality metric for object-oriented software that may help to better understand both the design and architecture information of the software system, which in turn may help to comprehend the process of development and maintenance.

7.
   a) Describe briefly the three principles of Software Engineering: Quality, Management and Engineering.
   b) What is the role of procurement in quality control?
   c) What is the role of training in maintaining software quality?

8.
   a) What is software reliability?
   b) Explain briefly techniques to increase reliability.
   c) What are safety-critical and safety related systems?