BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 5 Diploma in IT

Software Engineering 1
March 2019

Wednesday 27th March 2019 - Afternoon

Answer **any** FOUR questions out of SIX. All questions carry equal marks.
Time: TWO hours

Answer any Section A questions you attempt in Answer Book A
Answer any Section B questions you attempt in Answer Book B

The marks given in brackets are **indicative** of the weight given to each part of the question.

Calculators are **NOT** allowed in this examination.

Section A
Answer Section A questions in Answer Book A

A1.

a) Describe each of the five stages of the waterfall model.

(10 marks)

b) Explain the possible advantages and disadvantages in using an incremental approach to project delivery.

(9 marks)

c) Explain the possible benefits and problems of using prototypes in a software development project.

(6 marks)

A2.

a) As part of an incremental testing strategy, integration testing (often referred to as 'smoke testing') is used. Explain the particular benefits in using integration testing for complex or time-critical software development projects.

(8 marks)

b) End user testing of a software product that is intended to be used by a large variety of customers can be tested using a range of testing techniques. Explain two techniques that you might use.

(10 marks)

c) Describe any TWO ways in which you might test a program's response to an unexpected or abnormal input.

(7 marks)

A3.

a) Give an example of how a software project estimating method might be used to estimate project size.

(5 marks)

b) It is possible to categorize software development risk into project risk, business risk and product risk. Give an example of each of these types of risk.

(12 marks)

c) Project development cost modelling estimates can be based on the past experiences of the project manager. Explain some of the disadvantages of relying on experience-based techniques for estimating project resources.

(8 marks)

Section B
Answer Section B questions in Answer Book B

B4. The process of manufacturing a metal component for delivery to a customer is as follows:

i. A machinist creates the component from stock metal and performs a number of reshaping operations on it until it is completed.
ii. Once the component has been shaped, the machinist asks an inspector to check that it meets the customer's specification.
iii. The machinist then polishes the component and asks the inspector to issue it with a certificate.

A software system is being designed to model the above process, but the design is incomplete.

a) Draw a UML Class Diagram which captures a static view of the system.
(13 marks)

b) Draw a UML Sequence Diagram showing the passing of messages within the simulation system when performing the process outlined above. The diagram should be consistent with the Class Diagram given in answer to part a).
(12 marks)

B5.

a)

i) Explain the difference between Upper and Lower CASE tools. As part of your answer, give examples of the types of tools which fall into each of the Upper and Lower CASE categories.
(10 marks)

ii) What risk factors should a development team take into account when considering adopting a new Lower CASE tool?
(9 marks)

b) Outline THREE potential benefits and THREE risks of attempting to re-use software systems and components when planning a new project.
(6 marks)

B6.

a) For each of the following software development projects, identify an appropriate life cycle for the project to follow, and discuss the reasoning behind your selection.

i) The development of a smart phone calendar app by a small team. The user interface of the app will be very important to the client.

(4 marks)

ii) The development of a complex, safety-critical system to control a power station. A large team of developers will be involved.

(4 marks)

iii) The development of an individual student project as part of a diploma. The student has not developed a program like this before, but a working program must be ready in 6 months.

(4 marks)

b) Discuss the extent to which each of the following statements about the Agile approach to software development is true:

i) Agile development does not require planning or documentation, which is why it delivers systems faster than the traditional approach.

(8 marks)

ii) In the traditional waterfall life cycle, it is not possible to go back to an earlier stage. With Agile, however, it is always easy to change anything.

(5 marks)

END OF EXAMINATION PAPER