

BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 6 Professional Graduate Diploma in IT

SOFTWARE ENGINEERING 2

Friday 29th September 2017 – Morning

Answer **any** THREE questions out of FIVE. All questions carry equal marks.

Time: THREE 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) Explain what is meant by software product complexity, and demonstrate how measures of module coupling, cohesion, and size can help the engineer monitor the build quality of software.

(10 marks)

- b) Functionality is one of the most important software quality characteristics. Give the definition of functionality.

It has been suggested that the functionality is influenced by the following software quality sub-characteristics: suitability, accuracy, interoperability and security. Justify this claim.

(10 marks)

- c) Which of the following software quality characteristics are 'easier' to measure:

- Efficiency or functionality,
- Efficiency or reliability?

Justify your answers.

(5 marks)

A2.

- a) As a software engineer, you have been given the task of reverse engineering and re-engineering a large legacy system written in languages which are no longer widely used in modern development with out-of-date and incomplete documentation.

Give an assessment of the problems likely to be encountered in this task. Explain how you would go about the reverse engineering of this system. Outline the techniques and tools that you could use, and the results that you would expect to produce.

(15 marks)

- b) The four categories of software maintenance are: Perfective, Adaptive, Corrective and Preventive.

Explain the meaning of each category.

How would you classify the following maintenance activities:

- (i) hardware and software platform change,
- (ii) correcting errors found by users,
- (iii) producing a design document (as the original document has been lost), and
- (iv) modifying some parts of software due to changing user requirements.

(10 marks)

Section B

Answer Section B questions in Answer Book B

B3.

A small specialist language training company would like to improve the services offered to existing clients and increase its client base by replacing existing call centre and paper-based mailshots, with online web technology deployment.

- a) As a consultant requirements engineer, discuss the tools and techniques that you would deploy to elicit, analyse, document, and check services requested by the company and any actual or implied constraints.

(16 marks)

- b) Discuss whether it is advantageous for the company to continue requirements engineering beyond the first phase of the development process.

(9 marks)

B4.

- a) A small software tool construction business is considering whether adopting Open Source Software Engineering (OSSE) would improve software quality, and increase overall programmer productivity. As a Freelance IT Consultant, write a report that presents an outline of OSSE, compares it to similar process methods, and demonstrates how it might be deployed in the business.

(16 marks)

- b) Briefly discuss the significance of Collaborative Development Environments (CDE) to the short-term and long-term future of Open Source Software Engineering.

(9 marks)

B5.

A local transport service requires proprietary software that can manage passenger access of services by introducing automated entry and exit barriers.

- a) Briefly discuss the applicability of the following architectural models, and illustrate how each might be applied to the scenario described:
- (i) The repository model;
 - (ii) The client-server model;
 - (iii) The abstract machine model.

(15 marks)

- b) Briefly discuss the potential benefits and challenges of code, architectural and design refactoring.

(10 marks)