

BCS THE CHARTERED INSTITUTE FOR IT

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

SOFTWARE ENGINEERING 2

Tuesday 16th April 2024 – 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 process improvement and discuss how the adoption of a training and development program based on models such as the Capability Maturity Model Integration (CMMI) might transform the software quality culture of project teams and IT departments.

(15 marks)

- b) Describe **TWO** types of software process metric and relate each to the measuring of specific process improvements. In your answer, you should give specific examples of **each** type of metric.

(10 marks)

A2.

A company needs an online ordering service for electrical goods to extend the functionality of its existing Online Catalogue.

- a) Describe the stages of software requirements engineering and discuss how supporting tools and techniques can be used to successfully deliver the online ordering system.

(12 marks)

- b) Discuss whether the typical requirements of most online ordering services are stable or evolving. Justify your answer with suitable examples and illustrations.

(5 marks)

- c) Explain how evolutionary development generally, and agile methods specifically, might manage evolving or unstable system requirements.

(8 marks)

A3.

- a) Write a report that explains the process of open-source software engineering and presents a general discussion of the progress made through its practice within industry. Your answer should cover methods, tools, resource availability, and development successes.

(15 marks)

- b) Briefly discuss the view that Open-Source Software has decreased the productivity of developers and the quality of the systems produced.

(10 marks)

Section B
Answer Section B questions in Answer Book B

B4.

- a) Explain the cyclomatic complexity metric.

Illustrate this metric by giving examples of code (or pseudocode) whose cyclomatic complexity is:

i. 1.

(3 marks)

ii. 3.

(4 marks)

In your examples use any programming language (or similar notation) which provides 'branching' and 'looping'.

- b) Explain the Lines of Code Count (LOC) metric.

Illustrate this metric by giving an example of code (or pseudocode) which has LOC of 3. In your example use any programming language (or similar notation).

(5 marks)

- c) Explain the following software metrics: coupling and cohesion.

Discuss which 'levels' of coupling and cohesion are considered to be 'good' and which 'bad'. Justify your answers.

(13 marks)

B5.

- a) What are legacy systems and their main characteristics?

(5 marks)

- b) Critically discuss the statement: "Software systems maintenance is an inevitable process and it degrades the system's structure".

Your discussion should include both arguments for and against the statement.

(8 marks)

- c) Your company has a number of legacy systems with different business values and different 'degrees' of maintainability. Periodically these systems should be assessed, and appropriate actions should be taken.

Discuss **FOUR** possible actions you would consider for **each** of these systems and what will you take into consideration.

(12 marks)

END OF EXAMINATION