

BCS THE CHARTERED INSTITUTE FOR IT

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

SOFTWARE ENGINEERING 2

Tuesday 24th March 2015 - 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 software company engaged in Object Oriented development has been collecting both software product metrics and software process metrics over a number of years.

- a) Explain what is meant by software product metrics and give three examples of product metrics relating to OO software. **(8 marks)**
- b) Explain what is meant by process metrics and give examples of three such metrics relevant to a software company's process improvement. **(8 marks)**
- c) Explain what is meant by the Goal Question Metric (GQM). Outline how GQM and both software product metrics and software process metrics can be used in a company's efforts to determine and to improve their software quality. **(9 marks)**

A2.

- a) Explain what is meant by the phrase "software as a service" giving at least 3 examples of software services available today. **(8 marks)**
- b) As a Software Engineering consultant, you have been asked to advise a small company on the advantages and disadvantages of using an externally provided payroll system provided as a software service. In your answer, outline both the advantages and disadvantages to the company. **(12 marks)**
- c) As a developer of a software service, discuss what steps you could take to overcome the disadvantages that you identified in b). **(5 marks)**

A3.

- a) Explain what is meant by an assertion in the context of software design and explain how the Object Constraint Language can be used to express the following assertions and in each case give an example:
- i) Invariant property of a class
 - ii) Pre-condition of a method
 - iii) Post-condition of a method
- (10 marks)**
- b) Outline three reasons why assertions are useful in software design. **(9 marks)**
- c) Discuss software verification and its role in ensuring the correctness of a software implementation. **(6 marks)**

Section B

Answer Section B questions in Answer Book B

B1.

- a) Write a report that presents an overview of open source software engineering. The report should highlight some of the successful projects, and discuss how one of these projects has been used alongside or instead of commercial and proprietary application software to great advantage. **(15 marks)**
- b) Discuss the extent to which open source has helped companies deliver software with higher developer productivity, improved product quality, and projects completed within set budget and timescales. **(10 marks)**

B2.

- a) Write a report that gives an overview of the Spiral software lifecycle model, and demonstrate how it might be used to plan, organise, and run new software development projects in commercial enterprises. **(15 marks)**
- b) Discuss the view that Agile methods are far more able to deliver high customer and worker satisfaction than their traditional counterparts. **(10 marks)**