

# **BCS THE CHARTERED INSTITUTE FOR IT**

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

### **PROGRAMMING PARADIGMS**

Monday 30<sup>th</sup> 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. Easy Rambles is a travel agency that specialises in walking holidays and wishes to allow its customers to book their holidays online. The company is currently using a mainframe based technology but wants to move towards a Linux platform that will support a web system. This will require a change of programming language from COBOL to something more suitable.

As the IT Manager, you have been asked to produce a short report assessing possible choices of language. Choose two different programming paradigms, such as object-oriented programming, scripting languages, logic programming, functional programming, or imperative programming, and assess their strengths and weaknesses for use in such a web-based system.

**(25 marks)**

- A2. a) Software testing is an important part of producing a quality system. Discuss what tools can be used to test a large complex system, including the advantages and disadvantages of using such tools.

**(15 marks)**

- b) Discuss the key reasons why it is important to have a international standard for any programming language.

**(10 marks)**

**Turn Over]**

## Section B

Answer Section B questions in Answer Book B

- B3. a) "A logic program written in the Prolog programming language specifies what a program should do and not how it does it." With reference to this statement, discuss the differences between a **logic** programming language and an **imperative** programming language.  
(12 marks)
- b) With the aid of examples from functional and imperative programming languages, explain what the term **referential transparency** means.  
(13 marks)
- B4. a) Explain what is meant by the term **concurrency**. Use examples to illustrate your answer.  
(12 marks)
- b) Within the context of concurrent programming, explain what is meant by **mutual exclusion** and describe possible ways of achieving it.  
(13 marks)
- B5. a) Briefly identify the key concepts of the object-oriented paradigm which aid software development.  
(5 marks)
- b) For TWO of the features that you identified in part (a), discuss how they help a programmer to design and implement an application. Illustrate your answer with appropriate examples.  
(2x4 marks)
- c) With the aid of example code, explain the purpose of an **exception**, and how it is defined and used in an object-oriented language. In your answer, discuss the advantages and disadvantages of using this language feature.  
(12 marks)