

THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATIONS Diploma

SOFTWARE ENGINEERING 1

4th May 2006, 10.00 a.m.-12.00 p.m.

Answer FOUR questions out of SIX. All questions carry equal marks.

Time: TWO hours.

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

1.
 - a) Discuss at least FOUR key roles that must be undertaken by staff within a software engineering project team. (12 marks)
 - b) Outline FOUR factors that can influence communication within a software engineering project team. (8 marks)
 - c) In his book, *The Mythical Man-Month*, Fredrick P. Brooks, Jr. stated Brooks's Law: "Adding manpower to a late project makes it later". Discuss the evidence for and against Brooks's Law. (5 marks)
2. The outline of a project you have been asked to develop is given below:

Enquiries and Orders Information Management System

A manufacturing company, ABC Composites, is the client.

The client wants development of a new management information system (MIS) to enable multi-user data entry and querying. It is expected that the system will encompass the following areas:

- User-friendly interface
- Data entry validation
- Defined reports, especially job control sheets, which the client already uses on paper
- Querying of data to produce reports

The client has a SQLserver system that should be the database and will support intranet access from several desks.

The development models suggested for this project are

- **Incremental Development** using a series of prototypes and
- **Systematic, sequential Development** with progression through analysis, design, coding, testing and maintenance.

Compare the advantages and disadvantages of these two life cycle models for this project. Give at least THREE examples to support your analysis of each life cycle model. (25 marks)

Turn over]

3. a) Give THREE reasons for the use of CASE tools to support the work in a large software project. **(9 marks)**
- b) Your company has agreed to develop a large software system using Object-Oriented methods. Choose and describe THREE capabilities or functionalities you would want in a CASE tool to support this O-O development. Give your reasons for each choice. **(16 marks)**

4. Some definitions of quality are given below:

- Quality means “to make without any errors”;
- Quality means “to make fit for the client’s purpose”;
- Quality means “to make each product statistically the same as the previous product”.

Which view, or views, of quality do you think best address the development of software? Give your reasons for accepting, rejecting or modifying each view. **(25 marks)**

5. a) Define what is meant by *black box testing* and *white box testing*. **(4 marks)**
- b) Discuss TWO examples of a black box testing technique and TWO examples of a white box testing technique. **(6 marks)**
- c) How is software documentation used in the testing processes of unit testing, integration testing, system testing, and user acceptance testing? In each case, explain which software documents are most relevant. **(10 marks)**
- d) Explain the importance of the practice of regression testing during software maintenance. **(5 marks)**
6. An often quoted software design principle is "aim for low coupling and high cohesion".
- a) Define what is meant by software coupling and by software cohesion. **(4 marks)**
- b) Give examples of both of these with respect to the design of component-based software system. **(6 marks)**
- c) Explain the rationale for this principle and describe at least THREE benefits that follow from its practice. **(10 marks)**
- d) Explain how refactoring of software can be used to improve its cohesion. **(5 marks)**