

THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATIONS BCS Level 6 Professional Graduate Diploma in IT

SOFTWARE ENGINEERING 2

24th April 2008, 2.30 p.m.-5.30 p.m.

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

Time: THREE hours

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

Calculators are NOT allowed in this examination.

1. a) Differentiate clearly, with reasons and examples, between
 - Verification and validation
 - Quality assurance and quality control
 - Configuration audit and quality audit.

(12 marks)

 b) “Software quality processes are often used only with development activities, yet the biggest impact of quality processes is during the maintenance phase.” Discuss the statement, making clear whether you agree or disagree, with full reasoning.

(13 marks)
2. a) Compare and contrast the methods of software project estimating known as *size-related estimates* and *function-related estimates*.

(7 marks)

 b) Describe THREE types of process metrics you would use in a process improvement programme. Briefly explain the reasons for your choices.

(12 marks)

 c) Discuss TWO critical success factors that will determine a good outcome from a process improvement programme, with your reasons.

(6 marks)
3. Software engineering, like any other mature engineering discipline, needs key principles that underpin methods, techniques, methodologies and tools used in processes to create products.
 - a) Define the three principles of modularity, abstraction, and generality. Discuss how each of these principles impact and benefit software processes and products.
 - b) Briefly discuss the success of software engineering as an engineering discipline in terms of the principle of “rigour and formality”.

Turn over]

4. Software development is characterised by a number of phases, the order and duration of which are determined by software process models.

a) For the incremental and spiral models, discuss how the development phases are ordered, and explain the means by which decisions are made to progress from one phase to the next.

(15 marks)

b) A major retailer requires an online shopping web application to gain a commercial advantage over its competitors. However, the application should run alongside existing legacy systems.

Evaluate the ability of the incremental and spiral process models to deliver software that satisfies the user's functional requirements, and within timescale.

(10 marks)

5. An independent nursing practice has asked you to develop an appointment booking system for use by both the receptionist and nurses in the practice. The system should be able to accommodate new patients, and give priority to patients according to their actual need.

Use an appropriate modelling technique with supporting notation (state any assumptions made) to produce the following:

a) Specification of the problem requirements in the form of a table that clearly identifies the entities and the processes.

(5 marks)

b) Analyse the problem by identifying the input and output data and processes, tabulated in the form of typical data dictionary entries. These may include entities, their attributes, and processes and their parameters.

(6 marks)

c) A diagrammatic representation of the behavioural aspects of the system.

(7 marks)

d) A diagrammatic representation of the structure and relationships within the system.

(7 marks)