

BCS THE CHARTERED INSTITUTE FOR IT

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

SYSTEM DESIGN METHODS

Monday 23rd March 2020 – Afternoon

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. Basic Elements of System Design Methods.

- a) Briefly explain what is meant by an “information system development method”.
(5 marks)
- b) There are different approaches to software development. Discuss the similarities and differences between the waterfall, prototyping and agile lifecycle models.
(12 marks)
- c) Discuss the advantages and disadvantages of throwaway and evolutionary prototyping.
(8 marks)

A2. Construction of a Method.

- a) Briefly discuss how Class Diagrams relate to Entity Relationship Diagrams.
(8 marks)
- b) Compare Use Case Diagrams and Dataflow Diagrams.
(9 marks)
- c) Explain how Dataflow Diagrams (DFDs), Entity Relationship Diagrams (ERDs) and Entity Life Histories (ELHs) should be checked for consistency.
(8 Marks)

[Turn Over]

A3. Selecting a Method.

- a) Assume that you are a project manager of four projects with the following characteristics:
- i) Project 1: A website for a pharmacy. The requirements are vague and are likely to change in the future;
 - ii) Project 2: An e-commerce application for a small retail company. The requirements are vague but stable (i.e. unlikely to change in the near future);
 - iii) Project 3: A complex real-time system whose requirements can be relatively easily identified and are stable;
 - iv) Project 4: A medium size business application whose requirements can be easily prioritised and grouped.

Consider the following software development approaches:
waterfall, incremental, evolutionary prototyping, and throw-away prototyping.

Which of the above approaches would you choose for **EACH** of your projects?
Justify your answers.

(16 marks)

- b) Outline the benefits and disadvantages of using agile approaches to systems development.

(9 marks)

[Turn Over]

Section B
Answer Section B questions in Answer Book B

B4. Introducing a Method.

- a) Your organisation has been using a structured method for many years. Now they want to introduce an agile development method with UML (Unified Modelling Language). Discuss different approaches to training and educating the staff in agile methods and UML. **(9 marks)**
- b) Explain the difference between reverse engineering and re-engineering in the software industry. **(4 marks)**
- c) You are required to re-write a software application in a different programming language. As part of this process, explain how you would reverse engineer the software application. **(12 marks)**

B5. Evaluation and tuning of a method.

- a) Outline the types of software tools that could be used to support systems design activities, explaining the potential benefits that they could provide. **(6 marks)**
- b) NIMSAD (Normative Information Model-based Systems Analysis and Design) is a well-known framework for comparing and evaluating systems design methods. NIMSAD recommends that evaluation of a method should involve evaluation of the Method Context (the problem situation), the Method User (the intended problem solver), and the Method itself (the problem solving process).
 - i) Why is the evaluation of all **THREE** aspects necessary?
 - ii) Give **THREE** criteria that may be used to evaluate the Method Context aspect. **(7 Marks)**
- c) Consider the following criteria that might be used in assessing systems development methods:
 - i) Effective communication;
 - ii) Separation of analysis and design;
 - iii) Design for change;
 - iv) Code generation facility;
 - v) Readability of the source code;
 - vi) Reverse engineering tools.

Discuss, giving appropriate arguments, which criteria are suitable and which are not suitable for the above purpose. Justify your responses.

(12 marks)

END OF EXAMINATION