# THE BRITISH COMPUTER SOCIETY

## THE BCS PROFESSIONAL EXAMINATION
Professional Graduate Diploma

## SYSTEMS DESIGN METHODS

7<sup>th</sup> May 2003, 10.00 a.m.-1.00 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.*

**1.** *a)* Discuss four reasons why object oriented systems design approaches are replacing structured systems design approaches. **(12 marks)**

  *b)* Discuss two reasons why prototyping and RAD (Rapid Application Development) approaches are replacing the traditional waterfall model of systems development. **(4 marks)**

  *c)* Outline the situations in which formal notations based on mathematical logic are appropriate for systems design activities and when they are not. **(9 marks)**

**2.** *a)* Adopting either a structured or object oriented approach, state which techniques you would use to model each of the following:
  *i)* user requirements (functional),
  *ii)* user-system interactions/external communications,
  *iii)* structure of the system i.e. conceptual components,
  *iv)* relationships between conceptual components,
  *v)* system dynamics

  Justify your choices. **(15 marks)**

  *b)* Discuss the similarities and differences between Entity Life Histories (ELHs) and State Transition Diagrams (STDs). Illustrate your discussion using as an example entity X which is affected by a sequence of events Ev1, Ev2, Ev3. **(10 marks)**

**3.** You are a web development manager in a retail company, and have been asked to develop a systems design method for website development projects within your company.

  *a)* Discuss which systems life cycle model you would consider appropriate for website development projects (e.g. waterfall, spiral, or prototyping) justifying your choice. **(9 marks)**

  *b)* Outline how you would approach the task of selecting or creating a systems design method for website development projects within your company. **(8 marks)**

  *c)* Briefly discuss the suitability of object oriented modelling techniques for website development. **(8 marks)**

**Turn over]**

**4.** You are a manager in an expanding software house that currently employs thirty staff. You have decided to introduce a systems design method for use in IT projects undertaken for clients.

*a)* Explain how you would attempt to motivate the IT staff in the company to use the systems design method.

**(9 marks)**

*b)* Systems design methods have a number of limitations and pitfalls that you have to consider. Some of these limitations/pitfalls are related to productivity, required skills, method complexity, and tool support. Explain the nature of each of these limitations. **(8 marks)**

*c)* Discuss the different ways in which you could educate and train the IT staff in the software house in the use of the new method, explaining the advantages and disadvantages of each approach. **(8 marks)**

**5.** *a)* Explain how techniques such as reviews, inspections and walkthroughs can be used to improve the designs produced for information systems as well as the use of systems design techniques themselves. **(10 marks)**

*b)* Software quality can be improved by using systems design techniques that model different aspects of a system and hence allow cross-checking. Discuss the cross-checking that can be achieved by using systems modelling techniques that model the process, data and life history (i.e. dynamic) aspects of a system.

**(15 marks)**