

# THE BRITISH COMPUTER SOCIETY

## THE BCS PROFESSIONAL EXAMINATION Certificate

### INFORMATION SYSTEMS

16<sup>th</sup> October 2003, 10.00 a.m.-12.00 p.m.  
Time: TWO hours

#### SECTION A

Answer TWO questions out of FOUR. All question carry equal marks.

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

1. You have been appointed to investigate the admissions processes of a private education institution and to design an on-line system.

Students apply to the institution to study for a particular course. They may make more than one application for different courses but can only be offered one full time course provided they have the appropriate qualifications and attend a satisfactory interview. They complete the application form and submit it to the Admissions Office who check the application to make sure it is completed correctly. If there are any errors then the forms are returned to the student for amendment. Once the forms are correct they are passed to the Admissions Counsellor who has the options to make an offer for one course, offer an alternative or will reject the application. The student is sent a letter indicating the details of the offer and is asked to accept or reject the offer. Once the offer has been accepted, the student details are entered onto the Admissions Database. At the start of the course, students are registered by the Admissions Office and are allocated to a particular class. Each class for the course has the same timetable for lectures and a different timetable for practical sessions. Only one lecturer teaches a lecture, whereas a different lecturer supervises each practical session.

- a) Draw a Context Diagram and a set of Data Flow Diagrams to depict the above system. **(10 marks)**
- b) Draw a Data Model identifying the main Entities and Relationships indicating the degree of relationship and optionality. **(10 marks)**
- c) Design a set of screens which would:
- i) Be used by the student to apply for a course
  - ii) Be used by the Admissions Counsellor to make an offer
  - iii) Be used by the student to accept/reject the offer.
- (10 marks)**

2. a) Define the main role and typical functions of a database management system (DBMS). **(10 marks)**
- b) Describe the main theories of a relational database approach to storing and accessing data. **(10 marks)**
- c) Object-oriented concepts are widely used within web application development. Explain, using examples, the following:
- i) Class
  - ii) Type
  - iii) Method
  - iv) Inheritance
  - v) Persistence
- (10 marks)**
3. Information is said to be the most powerful resource within a business organisation.
- a) Discuss how information flows in a typical organisation hierarchy giving examples of the type of information at each level and typically what system type is used at each level. **(9 marks)**
- b) Define what is meant by each of the following:
- i) An expert system
  - ii) A decision support system
- (6 marks)**
- c) Security of information within an organisation is extremely important. Describe what measures you would take to ensure complete security of all the information held on the computers within an organisation. **(15 marks)**

Activity Code	Description	Duration (weeks)
1-2	Feasibility Study	2
2-4	Systems Analysis	3
4-7	Analysis Report	1
7-8	Systems Design	6
8-9	Design Report	1
9-10	Testing	2
10-11	Implementation	2
11-12	Review	2
2-3	Evaluate Hardware	8
3-6	Order Equipment	2
6-9	Delivery & Installation	2
2-5	Design Office Layout	1
5-9	Office Alteration	8

**Figure 1**

4. The above table (**Figure 1**) shows the activities that need to take place in the design of an information system development project. The activity m-n refers to the activity that takes place between nodes m and n.
- a) From the information above draw the network diagram (PERT chart) and indicate the critical path(s) of the project. **(10 marks)**
- b) As manager of this project, describe the steps you would take to ensure a quality project was produced on time **(8 marks)**
- c) There are several ways that can be used to transfer the data to this new system and for users to start using it. Describe the following and give an example of when each would be suitable:
- i) Parallel method
  - ii) Direct changeover
  - iii) Pilot systems
- (12 marks)**

## SECTION B

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

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

5. The following can be used in the development of a distributed information system. Write a brief note describing on each of them.
- a) FTP service
  - b) Active Server Page
  - c) HTML form
- Indicate whether the technology runs on the client, on the server, or on both. **(3 x 4 marks)**
6. Describe the main stages within a structured methodology with which you are familiar. Identify the main techniques used at each stage. **(12 marks)**
7. Explain, with examples, the meaning of the following relational database terms:
- a) Join condition
  - b) Schema
  - c) Null value
- (3 x 4 marks)**
8. How might a web site present 'dynamic' information content on its web pages? Describe the technology required and how it is used. Include an example of where dynamic information would be beneficial. **(12 marks)**
9. Explain what is meant by prototyping and describe TWO different approaches to prototyping. What are the main problems with prototyping? **(12 marks)**
10. A large organisation has operated a batch stock control system for a number of years. It is developing a new web based stock control system. Special attention needs to be paid to the design of the user interface. What issues need to be taken into consideration when designing the user interface for the new web based system? Illustrate your answer with sketches of two possible screen interactions between the user and the system. **(12 marks)**
11. An insurance company has traditionally sold its policies (e.g. car insurance, house insurance, sickness insurance, etc) via mail shots or brokers. It now wishes to move to on-line selling. As a consultant, you have been asked to draft a report on the impact this is likely to have on its information systems. Identify the major features, with reasons, that you would include in such a report. **(12 marks)**

**Turn over]**

- 12.** Describe the "ideal" functionality you would expect from a CASE tool. Compare this "ideal" functionality with the functionality of a CASE tool with which you are familiar. **(12 marks)**