

THE BRITISH COMPUTER SOCIETY
THE BCS PROFESSIONAL EXAMINATION
Certificate

INFORMATION SYSTEMS

18th October 2001, 10.00 a.m.-12.00 p.m.
Time: 2 hours

SECTION A

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

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

1. a) Information systems development requires careful thought and planning. Several methods are available to support the development.

Give examples and a brief overview of the main stages in THREE of the following:

- i) Waterfall method
- ii) A soft system method
- iii) A specified structured method
- iv) A prototyping method

(15 marks)

- b) Using any system as an example, describe the use of the following techniques:

- i) Normalisation
- ii) Data flow diagrams
- iii) Logical data model

(15 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. a) A software house that sells commercial applications is to set up a Help Desk for customers with problems or complaints. Information from the calls received is to be stored on a database for subsequent solution and analysis.
- i) Design screen input on which the Help Desk staff can record the details of the call. **(8 marks)**
 - ii) Design a simple data model which will need to be implemented for your screen. **(3 marks)**
 - iii) Define the validation needed for typical fields. **(4 marks)**
- b) Fact finding techniques such as interviews and questionnaires would be required to enable you to design the above system.
- i) Draft a memo to your manager describing the benefits and drawbacks of using these techniques. **(12 marks)**
 - ii) Give an example of an 'open' question and a 'closed' question which could be used in your questionnaire. **(3 marks)**

4.

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

The above table 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 and indicate the critical path of the project. **(12 marks)**
- b) As manager of this project, describe the steps you would take to ensure a quality project was produced on time. **(9 marks)**
- c) There are several ways that can be used to implement this new system. Describe THREE different ones. **(9 marks)**

NOW PLEASE ANSWER QUESTIONS FROM SECTION B OVERLEAF →

SECTION B

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

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

5. List and briefly describe FOUR major sources of business information that you, as an information systems consultant, would need to consult in order to investigate and understand the business processes and activities of a large organisation. **(12 marks)**

6. Using the following Table of Data, in terms of the RELATIONAL model of data, give reasons why this Table is designed badly. **(12 marks)**

EmployeeID	Gender	Monthly Salary	Annual Salary	Department ID	Current Department	Date Started
M5746	Male	2,000	24000	1, 10	SocH, D.S.S.	june 5
	Female	1,501	18,012	1	SocH	6/6/99
M3253		23092.45		Left july 4		6/6/99
F2031	Female	23,000		4,5,10	HRD	7/6/99
F1039	Female	20,000	1,666.67	5,10	DSS	8/6/99

Table of Data

7. Outline how a developer of a web-based information system could use the following computer languages and techniques:
- a) Mark-up languages **(4 marks)**
 - b) Client-side scripting languages **(4 marks)**
 - c) The Common Gateway Interface (CGI) **(4 marks)**
8. Explain, using the keywords below as a guide, the security measures that are needed to prevent unauthorised users from reading confidential information that is available over the Internet. (E.g. when goods are purchased using credit cards over the Internet).

Keywords: SSL (Secure Socket Layer); Digital Signatures; Encryption **(12 marks)**

9. The following list represents different types of computer viruses:

trojan horse; macro; family and friends; stealth

Using the above types or others that you know, describe FOUR different ways that computer viruses spread and infect computer systems during information exchange. **(12 marks)**

10. Explain the differences between THREE of the following pairs of information system terms:

- a) Inverted File and an Indexed Sequential File
- b) Object Oriented Analysis and Entity Relationship Analysis
- c) Primary Key and Foreign Key
- d) Firewall and a Sandbox

(3 x 4 marks)

11. a) Give an example of an information system that could utilise either method of user interaction given below.

(4 marks)

- b) For each method, specify, with reasons, an example of an information system where that method of user interaction would be preferred over the other method.

(2 x 4 marks)

Method 1: "GUI/Windows"

where the user interacts using a mouse and a Graphical User Interface using controls such as command buttons and drop down lists.

Method 2: "Menu Line Activations"

where the user interacts with a text-based interface using only keyboard Function Keys and the TAB and ESCAPE keys.

12. Describe the characteristics of the types of files you would choose to store the following information in computer files. Your files must be portable and as the files may be made available over the WWW they must be economical in storage space.

- a) 100 bit mapped images of photographs which need to be scanned at a resolution of 300 dpi (dots per inch).

(4 marks)

- b) A collection of transparencies/OHP slides used for a lecture to university students. The OHP slides have been produced using presentation software.

(4 marks)

- c) A script that contains commands which create and populate a database.

(4 marks)