THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATION
Certificate

INFORMATION SYSTEMS

17th October 2000 – 10.00 a.m. – 12.00 p.m.
Time: 2 hours

SECTION A

Answer TWO questions out of FOUR from this section. All questions carry equal marks.

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

1.   A motor spares company, which services all its dealers from one central warehouse, has decided to update its systems. This update will include the use of the Internet for both sending orders to suppliers and receiving replenishment orders from the dealers.

    a)   You will have the responsibility for planning the investigation and implementation of the above system. Using a structured systems methodology with which you are familiar, describe the stages and techniques you would use within the project. Show how you would manage the project.   **(20 marks)**

    b)   Discuss **THREE** methods which could be used to move from the old to the new system. Which method would you choose? Give reasons for your choice.   **(10 marks)**

2.   Prototyping is often used as a method for developing application software.

    a)   Explain what is meant by prototyping and describe **THREE** different approaches.   **(10 marks)**

    b)   Give examples, preferably based on your own experience, of where prototyping may be appropriate.   **(5 marks)**

    c)   With the aid of examples, preferably based on your own experience, give reasons why prototyping was chosen as a method of system design.   **(5 marks)**

    d)   What are the main problems of prototyping?   **(10 marks)**

3.   *a)*   Discuss the main differences between hierarchical, network and relational database management systems. Give examples of each showing a typical physical implementation.   **(18 marks)**

    b)   Give an overview of the main responsibilities of a Database Administrator (DBA).   **(12 marks)**

4. *a)* Information flows through an organisation from the top management level to the bottom level and from the bottom level to the top management. Each level of management requires different types of system.

Describe what is meant by the following, and give examples, indicating what level of management would typically use them:

Management Information Systems (MIS)
Executive Information Systems (EIS)
Transaction Processing Systems (TPS) **(3 x 5 marks)**

b) Modelling techniques are used throughout the system development life cycle. Briefly explain the difference between process modelling and data modelling. **(6 marks)**

c) Explain the terms of *entity*, *relationship*, and *attribute* and provide **THREE** examples describing the different degrees of relationship. **(9 marks)**

NOW PLEASE ANSWER QUESTIONS FROM SECTION B OVERLEAF ➔

Answer FIVE questions out of EIGHT from this section. All questions carry equal marks.

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

5. With the aid of simple examples, *diagrammatically* show how you would model the following:

a) A one to one relationship with mandatory participation on both sides
b) An instance relationship between entities
c) A part key functional dependency

Define the symbols you have used and give examples.   **(3 x 4 marks)**

6. Explain how the security of sensitive data stored in a local area network may be compromised by access from WITHIN the network. Outline the measures that can are taken to maintain the integrity of the data.   **(12 marks)**

7. Explain the following terms, which spell the acronym **ACID,** when applied to transaction processing involving data input or output:

a) Atomicity
b) Consistency
c) Isolation
d) Durability   **(4 x 3 marks)**

8. For **TWO** of the following pairs of terms, write short notes contrasting each pair of terms.

a) Redundant and Non-Redundant Data duplication
b) Natural Language and SQL
c) OLAP (on line analytical processing) and OLTP (on line transaction processing)   **(2 x 6 marks)**

9. To create a new order in a typical On-line Order Entry application requires input of data by a user controlled by a forms-based user interface. Assume the following fields are used to process a new order:

Orderno	- unique number identifying a new order
Orderdate	- the current date and time
Customername	- one of 30 customers who has placed an order before.
Ordereditem	- an existing item held in the file containing 1000 entries; there may be many items on each order
Item_qty	- the amount required for a particular item; depends on items in stock

With the aid of a sketch of the user interface, explain how the user would process a new order ensuring the highest possible accuracy of input data.   **(12 marks)**

[Turn over

10. State very concisely the differences between **THREE** of the following pairs of related terms used in the deployment of a web-based information system:

a) Internet and Extranet
b) XML and HTML
c) ASP and ISP (A = application, I = Internet, SP = Service Providers)
d) FTP and HTTP   **(3 x 4 marks)**

11. There are many different standards for file types used in information systems. Identify and describe the range of file types required to satisfy the following:

a) Display still images of photographs that appear on a web page
b) Display the representation of scale drawings on a Computer Aided Design application
c) Present high quality music input from a CD using a sound card
d) Present a 30 second downloaded video clip showing the goals of your favourite soccer match.
                                                              (4 x 3 marks)

12. Define job functions for the following personnel. Assume they are employed in a large computer centre servicing and co-ordinating all the computer needs of a large organisation such as a university.

a) Database Administrator
b) Web master
c) IT help desk co-ordinator   **(4 x 3 marks)**