

BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 4 Certificate in IT

INFORMATION SYSTEMS

Thursday 6th May 2021 - Morning

Time: TWO hours

Section A and Section B each carry 50% of the marks.
You are advised to spend about 1 hour on Section A (30 minutes per question)
and 1 hour on Section B (12 minutes per question).

**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 2 questions (out of 4). Each question carries 30 marks.

A1.

A new dental practice requires an information system to be developed. An online appointment system and stock ordering system is required. Before a patient can use the system, they need to contact the practice to be registered providing personal and health details. An initial appointment would then be made, and the patient allocated to one of the dentists. To make further appointments, the patient will be provided with access details. After attending appointments, the patient will be charged the appropriate fee. The system will also deal with cancellations and non-attendance. If an appointment is not cancelled within twenty-four hours a charge is made and an invoice sent to the patient. If a patient fails to turn up for an appointment a charge is also made. The stock order system will deal with ordering and paying for items of stock from suppliers. Several items could be included on the same order.

- a) Draft a context and high-level dataflow diagram depicting the dental practice.
(10 marks)
- b) Identify the main entities and relationships and draw **TWO** entity relationship models; one for the appointment system, and the other for the stock ordering.
(8 marks)
- c) Give examples and a brief overview of the main features in the following:
 - i) An object-oriented development using UML;
 - ii) A soft system approach to analysis;
 - iii) A prototyping method.(12 marks)

A2.

- a) Explain why a preliminary survey needs to be carried out when developing a large complex computer-based system.
(3 marks)
- b) Briefly describe **FOUR** fact-finding techniques you would use in the analysis phase, giving examples of **EACH**.
(12 marks)
- c) Discuss how the development of a large information system should be managed. Include project management techniques.
(15 marks)

A3.

At the dental practice referred to in question A1, the receptionist was asked to describe the process of following up on unpaid invoices. She said that she checked the unpaid invoice list every Friday. She looked up the patient's name, checked the record to ensure the payment had not been made since last Friday. If a payment had been made, she crossed the name off her list. If a payment had not been paid, she checked how many days it was overdue. If it was less than 30 days, she made no action. If it was between 30 and 60 days, she sent out a reminder letter and made a note on the patient record. If it was over 60 days, she sent a reminder letter and put a stop on the patient record preventing the patient from making another appointment.

- a) Express this procedure using both a narrative specification language and a graphical specification language.
(10 marks)
- b) State the purpose of normalisation and describe the stages required to produce third normal form (3NF).
(6 marks)
- c) What are the main functions of a modern database system and why is it an improvement on using separate files?
(14 marks)

A4.

- a) Testing should take place throughout the development of a system. Describe testing methods that **COULD** be adopted to ensure a system is thoroughly tested before it is implemented.
(12 marks)
- b) Apart from testing and transferring data, what other aspects need to be taken into consideration when implementing a large computer system?
(6 marks)
- c) Briefly describe security measures which **COULD** be taken to protect a company's data, hardware, and internet access.
(12 marks)

[Turn Over]

SECTION B

Answer 5 questions (out of 8). Each question carries 12 marks.

B5.

Explain your reasons for choosing, and illustrate the type of chart or graph you would use for:

- a) Probability; (4 marks)
- b) Comparisons; (4 marks)
- c) Correlations. (4 marks)

B6.

Define the following terms:

- a) HTML; (3 marks)
- b) Hypertext; (3 marks)
- c) Hypermedia; (3 marks)
- d) WEB 2.0. (3 marks)

B7.

With reference to Human Computer Interaction, state the advantages **AND** disadvantages of using the following input devices:

- a) Keyboard; (4 marks)
- b) Touch screen; (4 marks)
- c) Microphone. (4 marks)

B8.

A company is considering moving all its computing resources to a cloud provider.

Explain what is meant by a cloud provider and what advantages there are for the company. (12 marks)

B9.

Big Data can use the following types of information flows. Define what is meant by **EACH**, giving examples:

- a) Unstructured data; (4 marks)
- b) Semi Structured Data; (4 marks)
- c) Structured Data. (4 marks)

B10.

Explain, using examples, what is meant by the following terms:

- a) Strategic data; (4 marks)
- b) Operational data; (4 marks)
- c) Tactical data. (4 marks)

B11.

Using data examples, outline what functions the following database related terms perform:

- a) Primary Key; (3 marks)
- b) Foreign Key; (3 marks)
- c) Not nulls; (3 marks)
- d) Check constraints. (3 marks)

B12.

BCS has a code of conduct for computing professionals.

Outline the essential elements of that code of conduct. (12 marks)

End of Examination