

BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 4 Certificate in IT

INFORMATION SYSTEMS

Thursday 3rd October 2024 - Afternoon

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 provide personal and health details to allow them to be registered. 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 and 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.

Outline what is meant by the following database related terms.

- a) Compression.
- b) Encryption.
- c) Data warehouse.
- d) Data mining.

(12 marks)

B6.

Fact finding can result in either quantitative or qualitative information.

- a) Define what **each** term means using an example for both.
- b) Describe the advantages and disadvantages of questionnaires that gather either quantitative or qualitative information.

(4 marks)

(8 marks)

B7.

From the following selection of numbers, calculate the following and include your workings.

9,5,3,3,3,2,1,5,5,4

- a) Mean.
- b) Median.
- c) Mode.

(12 marks)

B8.

BCS has a code of conduct for computing professionals. Outline the essential elements of that code of conduct.

(12 marks)

B9.

Discuss software and screen designs that could be implemented to ensure that a blind person can successfully use a web page. (Focus only on software, there are no marks for discussing hardware related solutions).

(12 marks)

B10.

Outline the processes and stages that a company should follow to migrate from an internally based computer system to one that is entirely located in a third-party cloud provider.

(12 marks)

B11.

The use of multimedia is often seen as essential to the success of many websites. Discuss the guidelines you would recommend for use of **three** different types of multimedia.

(12 marks)

B12.

Internet of Things (IOT) sensors can be used as a source for gathering data.

- a) Define what is meant by 'Internet of Things'.
- b) By using either a medical or commercial example, describe the type of sensors that could be used and the type of data that could be collected.

(4 marks)

(8 marks)

END OF EXAMINATION