

BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 5 Diploma in IT

SYSTEMS ANALYSIS AND DESIGN

Thursday 16th April 2026 – Morning

Answer **any** FOUR questions out of SIX. All questions carry equal marks.

Time: TWO hours

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.

Case Study for both sections A and B

CompuFix Company

CompuFix is a computer repair company operating out of a small workshop. The owner, Bob, is the only person working in the company, but he hopes to expand and employ more engineers in the near future.

At present, Bob holds much of the information about repair jobs in a filing cabinet, but this is rather disorganised and he realises that a computer system would be a better method, especially as any new members of staff would also need access to this information.

When a customer brings in a faulty computer, Bob logs the fault and the customer's details giving them an estimated date for the repair to be completed.

Every day, he checks the list of repairs and selects the jobs to be done that day. If he finds he doesn't have the required parts in stock for a repair, he places a purchase order with his supplier and reschedules the job for a later date.

When a repair is complete and the customer comes to collect the computer, Bob gives them an invoice and the customer pays immediately.

Once a week, Bob checks his stock of parts and orders any that are getting low from his supplier.

Section A
Answer Section A questions in Answer Book A

A1.

You are asked to carry out a use case analysis for CompuFix. Refer to the case study description (Page 2) for the following:

- a) Identify **three** actors. Explain briefly who they are and what their role is in relation to CompuFix.

(6 marks)

- b) Identify **five** use cases. Identify the primary actor associated with **each** use case and provide a short description of the logic of the use case.

(19 marks)

A2.

- a) For **each** of the following stages of the Systems Development Life Cycle (SDLC), explain how it could be applied to create a computerised system for CompuFix (Page 2) and describe the main activities that would take place. Outline **one** specific outcome or deliverable that would be produced for **each** stage:

- i. Requirements analysis.

(5 marks)

- ii. System design.

(4 marks)

- iii. Implementation.

(4 marks)

- iv. Testing.

(4 marks)

- v. Deployment.

(4 marks)

- vi. Maintenance.

(4 marks)

[Turn Over]

A3.

- a) For **each** of the following fact-gathering techniques, describe it and explain how it would be applied in the context of developing a system for CompuFix (Page 2).

Discuss **one** advantage and **one** limitation of using **each** technique:

- | | | |
|------|--------------------|-----------|
| i. | Interviews. | (7 marks) |
| ii. | Questionnaires. | (7 marks) |
| iii. | Observations. | (6 marks) |
| iv. | Document analysis. | (5 marks) |

Section B
Answer Section B questions in Answer Book B

B4.

- a) The table below shows an example of a list of supplier orders created by the CompuFix company described in the case study (Page 2).

Order no: 123/24	Order date: 11/05/24	Order total: £345	Supplier no: S12	Supplier name: A Wright
	Part code: CPUInt	Part name: INTEL DC E76		
	Part code: RAM	Part name: 2GB Sam BX		
				
Order no: 211/24	Order date: 23/08/24	Order total: £558	Supplier no: S7	Supplier name: ABC Smith
	Part code: FuseX	Part name: Fuse FX3CD		
				
Order no: 257/24	Order date: 24/09/24	Order total: £143	Supplier no: S12	Supplier name: A Wright
	Part code:	Part name:		
				

Normalise the table to produce a set of relations in the third normal form. You must show all of your working, explaining each step. State any assumptions you make.
(18 marks)

- b) Draw an Entity Relationship Diagram (ERD) based on the relations produced in part a).

(7 marks)

[Turn Over]

B5.

- a) Consider the following extra information about the CompuFix system described in the case study (Page 2):

CompuFix plans to employ two types of engineers: full-time engineers and part-time engineers.

The following data should be stored about each engineer: Engineer number, engineer name, address and telephone number. For full-time engineers, annual salary is also stored, while for part-time engineers, hourly rate and hours worked are stored.

An object of class computer consists of a system unit, a keyboard and a monitor.

Explain the following relationships between classes using examples from the CompuFix company system to illustrate your answers:

- i. Association.
- ii. Aggregation or composition.
- iii. Generalisation / inheritance.

(15 marks)

b)

- i. Discuss briefly the purpose of sequence diagrams.
(2 marks)
- ii. Produce a sequence diagram for the use case 'Display Supplier's Orders' in the CompuFix system described in the case study (Page 2). A brief description of this use case is given below:

A proprietor enters the Supplier Number and the system displays the supplier details. Next, the system displays details of all orders placed with this supplier.

(8 marks)

B6.

a) Explain how the following UML diagrams relate to each other:

- i. Class diagrams.
- ii. Sequence diagrams.
- iii. State machines / state charts.

(7 marks)

b)

- i. Give a brief explanation of the role state machines / state charts play in systems modelling.

(5 marks)

- ii. Produce a state machine / state chart for the class Supplier Order in the CompuFix system described in the case study (Page 2).

You may assume that objects of this class are affected by the following events specified in alphabetical order: amend an order, archive an order, cancel an order, create an order, receive an order.

Note that existing order records can only be amended once.

(13 marks)

END OF EXAMINATION