BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 5 Diploma in IT

SYSTEMS ANALYSIS & DESIGN

Wednesday 2nd October 2024 – Morning

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

Time: TWO hours

Answer any <u>Section A</u> questions you attempt in <u>Answer Book A</u>
Answer any <u>Section B</u> questions you attempt in <u>Answer Book B</u>

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

<u>Sunny Ball Tennis Club</u>

Sunny Ball is a tennis club in England. The club has a number of playing courts. Most of the members of the club are local people. The club is opened daily from 10.00am to 8.00pm.

New members are approved and registered by the club manager. When registered, a new member provides their name, address, telephone number, etc., and after the registration they are given a unique member number.

The club encourages its members to join teams. When a member decides to join a team, they should contact a receptionist who will carry out the appropriate procedure. A member can belong to one team only.

Playing sessions (one hour long) can be booked by either a team leader or by an individual member. Each session belongs to a specific price band according to its time, day of the week, etc. The session booking may subsequently be cancelled by the person who booked it. In such a case, the session will become available for rebooking.

Session records are created by the manager a few weeks in advance i.e. members have a couple of weeks to book sessions. Each session is identified by its date, time, and court number. Session records are deleted 6 months after their dates.

B5.

a) Consider the following extra information about the Sunny Ball Tennis Club described in the case study on page 2:

"There are two types of members: permanent members and visiting members. The following data should be stored about each permanent member: Member no., Member name, Member tel. no., Date of registration, Date of birth. The attributes of each visiting member are: Member no., Member name, Member tel. no., Date of registration, Expiry date, 'One off' payment.

Permanent members are required to submit their CVs. A CV consists of a header, a number of CV lines, and a member's signature."

Explain the following relationships between classes using examples from the Sunny Ball Information System (SBIS) to illustrate your answers:

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

The examples should show relevant fragments of a class diagram.

(15 marks)

b) Explain the meaning of usability of software systems and briefly discuss the main factors influencing usability of software systems.

(10 marks)

B6.

a) Explain briefly how you would check consistency between use case diagrams, sequence diagrams and class diagrams.

(5 marks)

b) Produce a sequence diagram for the use case 'Book session' at the Sunny Ball Tennis Club described in the case study on page 2. A brief description of this use case is given below.

"A member enters their number and the system displays the member's details. Next the system displays a list of all available sessions. The member selects one of the sessions and the system books this session for the member and displays the booking confirmation."

(12 marks)

c) Produce a state machine/chart for the class Session in the Sunny Ball Tennis Club described on page 2.

(8 marks)

END OF EXAMINATION

A1.

As a systems analyst, you are required to develop use cases for the Sunny Ball Information System (SBIS). You need to identify the key functionalities (use cases) of the system and describe one of them in detail.

a) Draw a simple use case diagram that includes at least **four** key use cases for the SBIS.

(10 marks)

b) Choose **one** of the use cases listed in part a). Describe the following elements for this use case:

- Use case name
- Actor(s)
- Preconditions
- Basic flow (main steps)
- Postconditions
- Alternate flows (if applicable)

(10 marks)

c) Briefly describe the role of interaction diagrams in use case realisation.

(5 marks)

A2.

When designing a user interface (UI) for the Sunny Ball Information System (SBIS) several key principles and rules should be followed to ensure that the interface is usable, efficient, and enjoyable for the users.

a) Consider each of the following topics related to interaction design. For **each**, identify specific rules and considerations that should be taken when designing the user interface for the SBIS.

   i.   Feedback.
   ii.   Accessibility.
   iii.   Responsive design.
   iv.   Personalisation.

(16 marks)

b) Identify and briefly describe **three** key steps in the process of user interface design.

(9 marks)

[Turn Over]

A3.

In the development of any information system, the roles of business analysts, systems analysts, and system architects are distinct but interrelated, each contributing significantly to the successful implementation of the system.

    a) Describe each of the following roles and explain **three** ways in which **each** might contribute to developing an information system for Sunny Ball Tennis Club.

           i.   Business analyst.
           ii.   Systems analyst.
           iii.   System architect.

(15 marks)

    b) Briefly describe the initial and ongoing costs associated with developing and running an information system for an organisation like the Sunny Ball Tennis Club.

(10 marks)

B4.

    a) This question refers to the case study described on page 2 – Sunny Ball Tennis Club. The table below shows an example of a list of club members, their teams, and their session bookings.

Member No.:	Member name:	Team code:	Team descr:
	Session No.:	Session Time:	Session Date:
	Session No.:	Session Time:	Session Date:
		.....	.....
Member No.:	Member name:	Team code:	Team descr:
	Session No.:	Session Time:	Session Date:
		.....	....
Member No.:	Member name:	Team code:	Team descr:
	Session No.:	Session Time:	Session Date:
		....	....
		......	....

Normalise the table to produce a set of relations in the third normal form. You must show all of your working, explaining **each** step.

(18 marks)

    b) Draw an entity relationship diagram (ERD) based on the relations produced in part a).

(7 marks)

[Turn Over]