BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 5 Diploma in IT

SYSTEMS ANALYSIS & DESIGN

Thursday 27th September 2018 – Afternoon

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

Flying Feathers Badminton Club

Flying Feathers is a badminton 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, new members provide 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, although each member can only belong to one team. When member decides to join a team he/she should contact a receptionist either by phone or at the club. The receptionist will carry out the appropriate procedure.

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 which case, the session will become available for rebooking.

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

[Turn Over]

Section A

Answer Section A questions in Answer Book A

A.1

    a)   List the processes and the external entities that should be included on a top-level data flow diagram (DFD) of the Flying Feathers Badminton Club. (You do not need to draw the DFD).

(9 marks)

    b)   Produce an activity diagram with swim lanes to represent the badminton club's activities and processes.

(9 marks)

    c)   Explain the differences between a DFD and an activity diagram. Use your answers to parts (a) and (b) to illustrate your points. (You should not compare the notation).

(7 marks)

A2.

    a)   Produce a list of requirements for a system to support the Flying Feathers Badminton Club's business processes shown in the scenario.

(9 marks)

    b)   Explain the difference between business, user and functional requirements. Use examples related to part (a) to illustrate your answer.

(6 marks)

    c)   Describe a technique for prioritising requirements and explain why it may be helpful to the development of a system to prioritise requirements.

(10 marks)

A3.

    a)   Explain the purpose of a Requirements Definition and when in the system development life cycle it should be produced.

(5 marks)

    b)   Systems analysts use a variety of techniques to search for requirements. Identify FOUR of these techniques and explain any strengths and weaknesses they may have.

(20 marks)

Section B

Answer Section B questions in Answer Book B

B4

This question refers to the case study described on p.2 – Flying Feathers Badminton Club. The table below shows an example of a list of playing courts, corresponding playing sessions and members who booked these sessions.

Court No.: C1	Court Info.: outdoor				
	Session No: S23	Session Time: 11.00	Session Date: 12/4/16	Member No.: 17	Member Name: Smith John
	Session No: S68	Session Time: 13.00	Session Date: 11/5/16	Member No.: 62	Member Name: Jones Adam
		.....	.....		
Court No.: **C2**	Court Info.: indoor				
	Session No: S45	Session Time: 14.00	Session Date: 1/5/16	Member No.: 17	Member Name: Smith John
		.....	....		
Court No.: **C3**	Court Info.: indoor				
	Session No: S12	Session Time: 10.00	Session Date: 25/3/16	Member No.: 35	Member Name: Davis Bob
	Session No.: S97	Session Time: 15.00	Session Date: 27/5/16	Member No.: 42	Member Name: Baird Tom
		……	…….		

a) 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)

B5

a) Consider the following extra information about the Flying Feathers system described above:

"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, a member's signature."

Explain the following relationships between classes using examples from the Flying Feathers system (based on the original scenario and the extra information above) 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) Discuss briefly the similarities and differences between Class Diagrams and Entity-Relationship Diagrams (ERDs).

(10 marks)

B6

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

(5 marks)

b) Produce a sequence diagram for the use case 'Cancel session booking' in the Flying Feathers system described above. A brief description of this use case is given below:

"*A member enters his/her number and the system displays the member's details. Next, the system displays a list of all sessions booked by this member. The member selects one of the sessions, and the system then cancels this session's booking and displays the corresponding confirmation message.*"

(12 marks)

c) Produce a state machine/chart for the class Session in the Flying Feathers system described above.

(8 marks)