BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 5 Diploma in IT

SYSTEMS ANALYSIS & DESIGN

Monday 22nd September 2014 – 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.

Case Study for both sections A and B

Golden Racquet Tennis Club

Golden Racquet 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, 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 a member decides to join a team he/she should contact a receptionist either by phone or at the club, and he/she 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 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.

Turn Over]

Section A

Answer Section A questions in Answer Book A

A1

a) List the processes and the external entities that you would include on a top level data flow diagram (DFD) of the Golden Racquet tennis club. (You do not need to draw the DFD).

(9 marks)

b) Produce an Activity diagram with swim lanes to represent the tennis 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 Golden Racquet tennis club's business processes shown in the scenario.

(9 marks)

b) Explain the difference between functional and non-functional requirements. Use examples from 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 feasibility report, and when in the system development life cycle it should be produced.

(5 marks)

b) You are preparing a feasibility report for a proposed IT system and have decided to write the contents page first to help you structure your report. Produce your contents page and describe the purpose of each section.

(20 marks)

Section B

Answer Section B questions in Answer Book B

B4

This question refers to the case study described above – Golden Racquet Tennis Club. The table below shows an example of a list of club members, their teams, and their session bookings.

Member No.: M7	**Member name:** Smith P	**Team code:** T2	**Team descr:** Local ladies..
	Session No: S12	**Session Time:** 12.00	**Session Date:** 8/10/12
	Session No: S49	**Session Time:** 17.00	**Session Date:** 14/10/12
		.....	**.....**
Member No.: M18	**Member name:** Jones T	**Team code:** T4	**Team descr:** Old Boys…
	Session No: S14	**Session Time:** 13.00	**Session Date:** 8/10/12
		.....	**....**
Member No.: M20	**Member name:** Wilson G	**Team code:** T4	**Team descr:** Old Boys…
	Session No: S13	**Session Time:** 12.00	**Session Date:** 8/10/12
		.....	.....
		……	…….

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 Golden Racquet 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 Golden Racquet 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) There are many characteristics/attributes of a good software design. List FIVE of them and provide a brief explanation of each.

(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' in the Golden Racquet 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 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 Golden Racquet system described above.

(8 marks)