BCS Certificate in Systems Modelling Techniques (ST)

NOTE:
These are sample questions, with marking guidelines, for each of the BCS Diploma certificate modules. Each sample question has been written to help candidates prepare for the module examination by providing an example of the general approach adopted by these questions. Therefore, the total marks assigned to the sample questions will vary depending upon the certificate module.

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Scenario 1

The Restricted Rail Travel Booking Company (RRTBC) has a number of issuing offices around the country using an automated ticketing system. These issuing offices are each staffed by a Booking Clerk who can issue a limited range of rail tickets to personal callers. The range of tickets that can be issued through the Issuing Office are:

Open Tickets – valid for all journeys.

Season Tickets – valid for a month or a year; monthly season tickets are for specific seats on specific trains. Annual season tickets allow travel on any train. The system also holds the number of free days due on an annual season ticket as a result of rail companies breaking agreements on punctuality. This information is used when an annual ticket is renewed.

Tickets issued by the Booking Clerk have to be paid for immediately. Payment may be by cash, by credit card or by personal cheque and may cover more than one ticket. A receipt is issued per payment.

RRTBC also offers a business saver ticket facility to registered business users. Through their own employees business users book such tickets over the Internet. Each business user has to set up an account. This is done by the Business Account Consultant who enters and maintains business account details. Business users make contact with the Business Account Consultant to open/ maintain accounts.

Employees of business users book business saver tickets over the Internet and the system automatically issues an e-ticket to the business user. No details of individual employees are retained. At the end of each month, payment for all business saver tickets issued that month is automatically taken by direct debit. A confirmation of the payment taken is issued electronically to each relevant business user.

The Chief Administrator of RRTBC maintains details about the Issuing Offices (booking clerk, office name and location) when informed by management of any changes and, separately, the number of free days due per annual season ticket. Details of "free days" are also received from management.

Quarterly, a report is prepared for management analysing ticket sales by:

▪ Business user for saver tickets
▪ Issuing office for all other tickets

Separate electronic files are maintained as follows:

▪ Tickets issued, inclusive of payments; covering ALL types of ticket
▪ Issuing offices
▪ "Free Days" for annual season tickets
▪ Business user accounts

Note that up to 2 marks can be deducted per question for factually incorrect or irrelevant answers and incorrect use of notation.
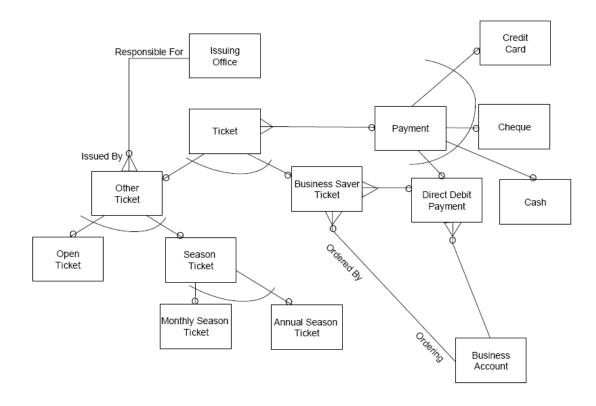
1   Draw an entity model for the RRTBC ticketing system. Show all optionality and name **two** relationships in both directions. Maximise the use of sub-types.

[24 marks]

Marking Guidelines

An illustrative answer is given below. Credit will be given for other reasonable answers backed up by stated assumptions. Note that:

■   Optionality may be shown using dotted lines
■   Sub-types may be shown with boxes within boxes

½ mark per entity/ sub-type   7 marks
½ mark per relationship, inclusive of sub-types   7½ marks
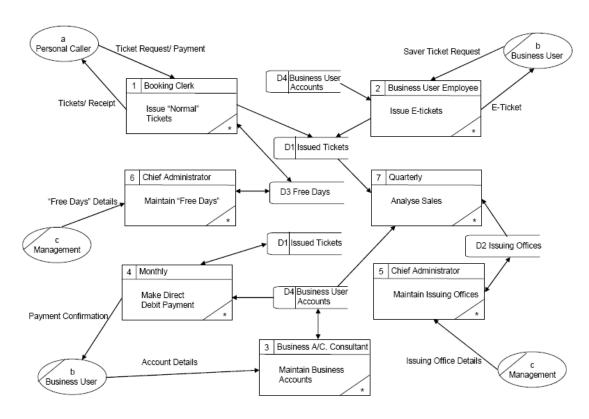½ mark per correct set of relationship cardinality   7½ marks
1 mark per pair of relationship names   2 marks

2   Depict the described scenario as a first level physical dataflow diagram.

[22 marks]

Marking Guidelines

An illustrative answer is given below. Credit will be given for other reasonable answers backed up by stated assumptions.

1 mark per process	7 marks
1½ marks for showing all (appropriate) processes as elementary	1½ marks
½ mark for showing ALL datastores	½ mark
1 mark per external	3 marks
½ per dataflow suitable named, where necessary and applicable	10 marks

[Total 46 marks]