

**THE BCS PROFESSIONAL EXAMINATION  
Diploma**

**April 2003**

**EXAMINERS' REPORT**

**Systems Analysis**

**General**

The standard of papers this year was very good and the pass rate one of the highest yet. Most candidates are preparing well for the first question and some very good models have been presented. However there are still some students who cannot distinguish between the different models and their use. Another poor exam technique is where candidates do not answer the question as set or do not read the question fully and miss parts, resulting in loss of marks.

**Question 1**

QUESTION 1 is mandatory and receives 50% of the total marks available for this paper.

*The Stylish Dancing School (SDS) runs classes in a variety of forms of dancing, such as ballroom, ballet, tap, salsa and so on. Clients book for a course of 10 classes, which are offered at the same time each week for 10 weeks. Each course is for dance of a particular type, such as 'ballroom for beginners', or 'advanced tap dancing'. There are many courses available for each type of dance.*

*Enquiries are received from members of the public about the availability of dancing classes. When a client wants to book for a course, their name, address, phone number and email address (if they have one) are taken. Some clients book for more than one course; each booking has a unique booking number and a note is made of the date on which the client made the booking. Occasionally a course is cancelled (for example, if not enough clients have booked for it) and the School has to contact the clients who have made bookings for it.*

*An information system is required to help manage the operation of the SDS. It is required to hold details of the types of dance classes offered, the courses that are running, the clients and the bookings they have made. A list of the clients who have booked for each course (a class list) needs to be printed off and given to the dance teachers; they will note who has attended each class. Every week the completed class lists will be used to update the system to show which clients have attended the weekly classes. Clients pay when they attend their first class; payments will not need to be handled by this information system, but it will need to record when payment for a booking has been made.*

*a) Draw a Top Level Current Logical Data Flow Diagram for the above scenario.  
(20 marks)*

**b) Produce an Entity Relationship Diagram (Logical Data Structure) and a set of normalised tables for the above scenario. You DO NOT need to show evidence of the normalisation process. (20 marks)**

**c) The models you have produced in your answers to the above parts of Question 1 represent process and data views respectively of the system.**

**Identify a model that can be drawn to represent the time, or a dynamic view of the system. Explain how that model would relate to the two models that you have produced. (10 marks)**

### **Answer pointers**

Note that for Question 1a) and b) solutions are indicative; plausible alternatives are accepted.

a) See diagram on separate sheet (other suitable notation will be accepted).  
The diagram is necessarily incomplete as the scenario has been simplified for the purposes of the time-constrained examination.

#### Marking Scheme:

Processes:	1 each up to 6
Data Stores	1 each up to 4
Data Flows	0.5 each up to 7
External Entities	1.5 each up to 3

### **Examiner's comments**

The DFD was quite straightforward and there were some very good answers, including candidates who gained full marks for this part of Question 1. A few candidates presented a Context Diagram instead of a Top Level Data Flow Diagram. A few others drew what looked more like a flow chart.

### **Answer pointers**

b) See diagram on separate sheet (other suitable notation accepted) and table types below.

#### Marking Scheme:

Entity types:	1 mark each to max of 6
Relationships with appropriate degrees & membership classes:	1 mark each to max of 6

Table types, consistency with ERD + appropriate PK:	0.5 each to max of 3
FK postings:	0.5 each to max of 3
Other attributes placed to result in well-normalised tables:	2 marks

#### Normalised Tables:

Dance Type	( <u>type_id</u> , type description)
Course	( <u>course_id</u> , type_id, day, time, start_date, end_date, cost, course_status) Assumes each course is allocated a unique id each time it is run alternative key would be <u>course_id, start_date</u> with appropriate adjustments to the tables for Class, Booking, Attendance
Class	( <u>course_id</u> , <u>class_no</u> , date)
Client	( <u>client_id</u> , name, address, tel_no, email)
Booking	( <u>booking_no</u> , client_id, course_id, date-made, paid [Boolean])

Attendance (course\_id, class\_no, client\_id, attended [Boolean])

### **Examiner's comments**

Overall this was less well answered than Question 1a). Primary Keys were often not indicated in the tables. Occasionally candidates did not provide any tables, a few did not provide an ERD nor LDS.

### **Answer pointers**

c) Candidates may identify either an Entity Life History or a State Diagram (State Chart).

Relationship to the models drawn:

ELH/State Diagram would be prepared for the major entity types from the ERD/LDS (e.g. Booking) to show what happens to that entity type over time.

The events on the ELH/State Diagram relate to the processes on the DFD; there needs to be a process on the latter for each event shown.

Each state of the entity type needs to be able to be recorded by the value of an attribute or attributes in the entity type's table.

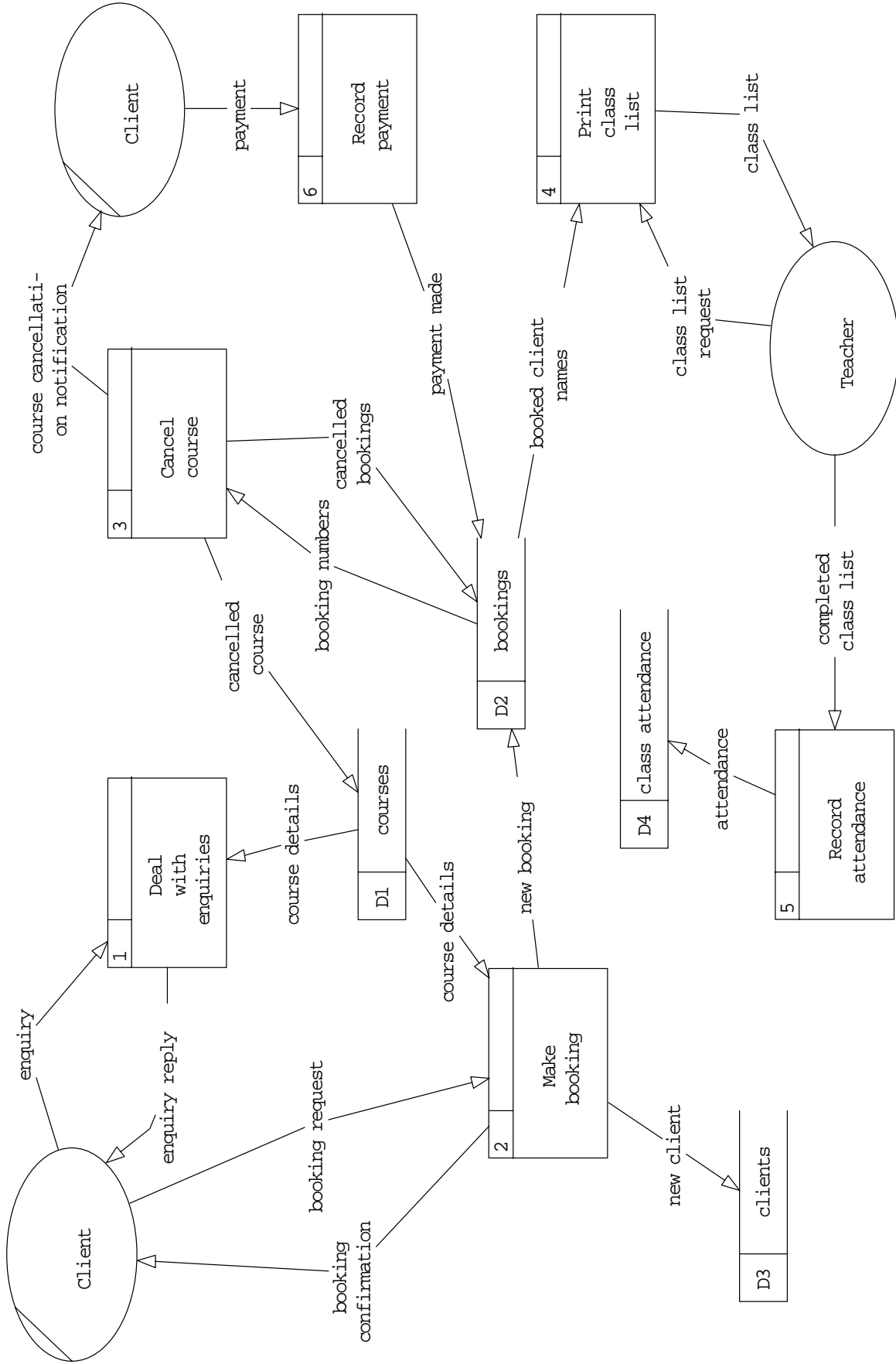
### Marking Scheme:

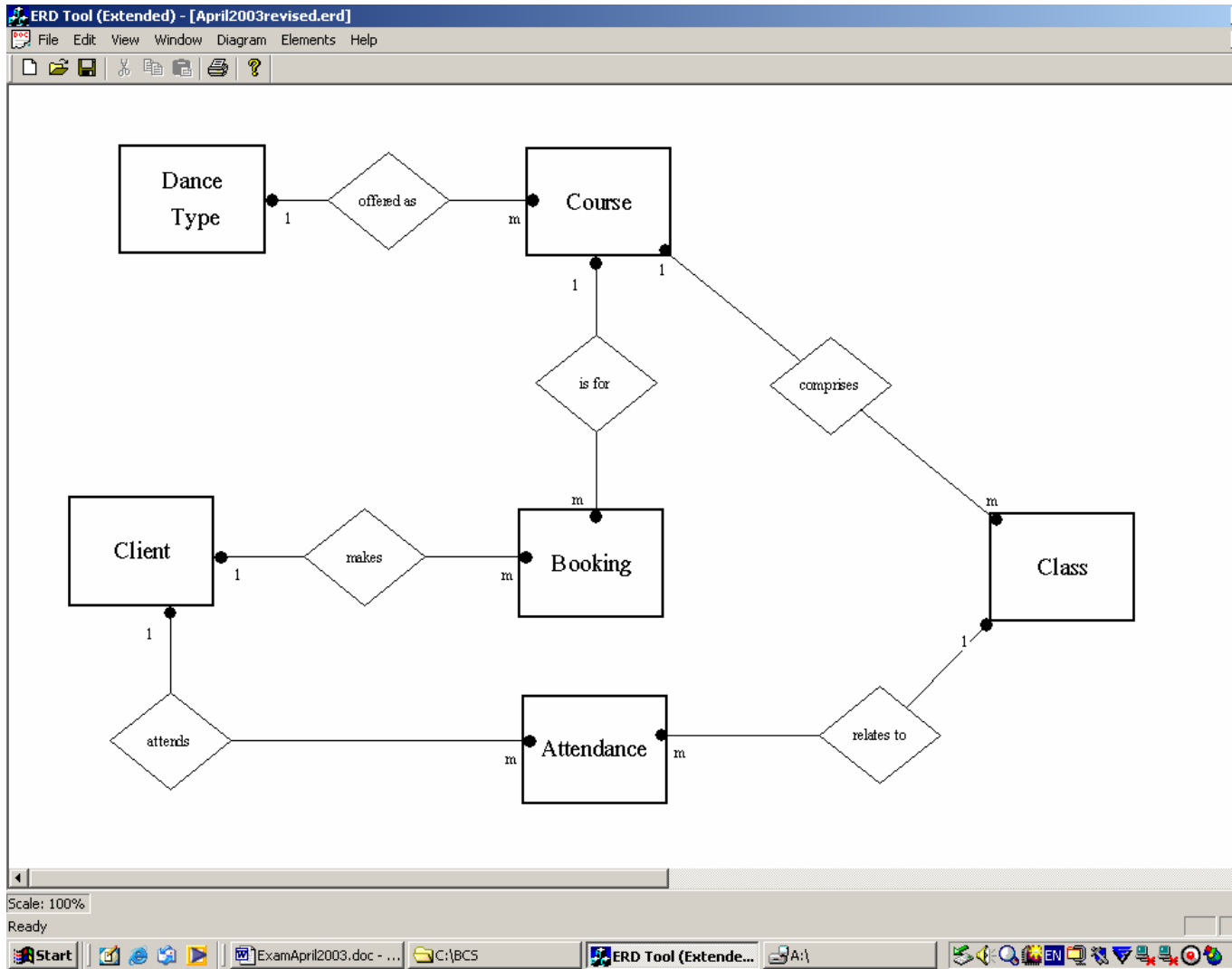
For identifying an appropriate model: 1 mark

For the points above, or similar: up to 3 marks each

### **Examiner's Comments**

This was the least well-answered part of Question 1. Quite a number of candidates did not attempt it at all. This could have been due to poor time management, having spent too long preparing the models for parts 1a) and 1b). Many answers simply named a model, for which credit was given, and/or drew an example of the model (which was not required), however credit was given for the provision of a relevant diagram. Credit was given even where the model, although dynamic, was a model for an Object-Oriented approach (e.g. a Sequence Diagram). Many candidates appear to have anticipated some reference to object orientation in this part of Question 1 and answered the question they had expected rather than the actual question. Very few candidates answered the question that was actually asked.





**Question 2**

a) Explain the main principles and activities of Soft Systems Methodology. (17 marks)

(17 marks)

b) List four advantages and four disadvantages of Soft Systems Methodology. (8 marks)

(8 marks)

**Answer pointers**

a)

<p><b>The main principles of SSM:</b></p> <ul style="list-style-type: none"> <li>Human activity emphasis</li> <li>SSM is an enquiry/learning process</li> <li>User views important</li> <li>Messy situations</li> <li>Meaningful action</li> <li>Subjectivity</li> <li>Systems world .v. Real world view</li> <li>Purpose is to generate discussion</li> </ul>	<p><b>Activities:</b></p> <ul style="list-style-type: none"> <li>Rich Pictures</li> <li>CATWOE</li> <li>Root definition</li> <li>Conceptual model</li> <li>Identify and agree desirable and feasible changes</li> <li>Action changes</li> </ul>
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Basic principles of SSM – 2 marks for each identified and explained to a max' of 8 marks  
 SSM activities – 2 marks for each identified and explained to a max' of 8 marks  
 Overall good structure of the answer 1 mark

**Examiner's Comments**

The underlying principles and activities/stages of soft systems methodology (SSM) were explained well by many candidates but a significant number focused on the stages and did not include any of the underlying principles. Candidates that provided extensive, correct and detailed answers of this type were given extra credit over the 8 marks that were available. Candidates must try to address all parts of questions; if the question asks for an explanation of 'principles' and 'activities' then an explanation of both should be attempted.

Many candidates provided answers that focused on the role of RAD, JAD, prototyping and OO development approaches as examples of SSM methodologies. Candidates that did this often went on to explain the 'soft' aspects of these approaches as SSM activities. Credit was given when these activities were also SSM activities and when the related to SSM principles.

**Answer pointers**

b)

<p><b>Advantages include:</b>          Focus on human systems          Focus on subjective meaning          Can support structured/top down methods          More effective requirements analysis in unclear situations.          Allows for conflict identification and resolution.          Etc</p>	<p><b>Disadvantages include:</b>          Limited application to problem identification and understanding          Does not provide tools for whole systems development          Technical aspects of analysis and design are not covered          Requires a management and organisational context that is sensitive to learning, openness and collaboration.          Etc</p>
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1 mark for each listed to a max' of 4 marks for Adv and 4 marks for Disadv' to a max' of 8 marks

**Examine's Guidance Notes**

Answers to this question were generally good and clear lists were presented that included most or all of the suggested solution. Other valid suggestions were given due credit and many interesting suggestions were forthcoming. Many candidates attempting this section were awarded the maximum marks available.

**Question 3**

**The Requirements Analysis module in SSADM consists of two stages:**

- **investigation of current environment, and**
- **business systems options.**

**a) List four activities that would be undertaken in each of these stages.**

**(8 marks)**

**b) Explain why these two stages are important in requirements analysis.**

**(17 marks)**

**Answer pointers**

a) Activities in each stage are expected to include some or all of:

<b>Investigation of current environment</b>	<b>Business systems options</b>
Establish analysis framework Investigate and define requirements Investigate current processes Investigate current data Derive logical view of current services Assemble investigation results	Review PID, requirements catalogue and other stage 1 documentation Develop range of BSO. Explore different BSO with regard to distribution of the systems, boundaries, levels of automation and their implications, CBA, limitations and impact analysis. Possibly develop skeleton BSO to aid the selection of favoured options for full consideration. Present between 2 and 6 options. User selects favoured options.

A list of activities in each stage is required.

Award 1 mark for each valid activity listed to a max' of 4 for each stage

8 marks

**Examiner's comments**

Responses to this question were either very knowledgeable or generally poor; there was very little in between. Many candidates clearly knew the answer to the question and attained full marks, others were strong in one of the stages and 'guessed' a response to the other stage. This is an acceptable examination strategy and credit was given whenever possible. Many candidates identified four fact-finding techniques as four separate activities in the 'Investigation of current environment' stage. These candidates often went on to develop the focus of their answers on the fact-finding technique itself rather than on the underlying (SSADM stage) activity that the fact-finding was supporting. Credit was given to answers of this type but not full marks unless the fact-finding focus included the identification of the output, ie, 'Interview to discover processes'.

## Answer pointers

b)

<p><b>Explanation of importance of stage 1 expected to include a consideration of (1-5 from Goodland and Slater p10/11):</b> Analyst to learn the terminology, language and purpose of the users environment. Old system may form the basis of the new Allow for data analysis Provides the user with good intro to techniques Set boundary Allows for process analysis Allows for working relationship to develop between SA and users Discover working and management practices Explore nature of existing systems</p>	<p><b>Explanation of importance of stage 2 expected to include a consideration of (from Goodland and Slater p10 &amp; 135):</b> To explore different systems options to meet requirements. No- technical consideration. Provides a fresh view of possible solutions to business needs. Details what the system is required to do, not how. Provides tentative insights into design options. Provides a detailed view of systems inputs and outputs. Represents a 'break away' from the current system. Provides users with an insight into a range of options each with their own Adv' and Disadv'. Provides a clear user responsibility with regard to selecting an option.</p>
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Explanation of why the stages are important within requirements analysis required.

Award 2 marks for each item identified and explained to a max' of 8 marks for each stage.

16 marks

1 Mark for overall structure of the answer

1 mark

### Examiner's comments

This section was answered with considerable authority by many candidates and most attempting this section gained good marks. Most of the reasons listed above were included and often candidates enhanced their answers with considerable emphasis on the 'soft' and intangible benefits of these stages; this was pleasing to see.

Candidates that provided very strong answers to one stage and weaker or no answer to the other stage were given credit in excess of the 8 marks originally intended.

### Question 4

**a) Identify three different groups of people other than the users that may be involved in an Information Systems Development project and briefly explain their role.**

**(9 marks)**

**b) Explain the importance of involving user groups in an Information Systems Development project. Discuss, with reference to any appropriate methodologies, some of the ways in which user involvement can be achieved.**

**(16 marks)**



### **Answer pointers**

- a) Groups might include:
- Team(s) of development personnel
  - Management
  - Administrative staff
  - Customers/clients
  - Public at large
  - Specialist contractors

Answers MUST be for distinct groups rather than three roles within one group unless the distinction is explicitly made clear and justified.

2 marks each for discrete groups identified to a max' of 6 marks  
1 each for an explanation of their role 3 marks

### **Examiner's comments**

Good answers were provided to this question and pleasingly many candidates sought to identify and justify groups that were not suggested in the list above. Groups such as project steering group, suppliers, contractors, auditors and specialist training personnel were often suggested. Several candidates presented answers within the traditional management hierarchy of Strategic, Tactical and Operational. Often these answers suggested the three groups as being Strategic Managers, Tactical Managers and Operational Managers. Few answers of this type differentiated the different level of managers sufficiently to justify their presentation as three separate groups. Answers of this kind were given credit but rarely attained full marks.

### **Answer pointers**

- b) *Important issues include:*

Need to ensure that user requirements are fully understood; cannot be done without reference to user groups;  
Involvement of users in design (e.g. evaluation of prototypes) will ensure more usable system;  
Involvement will help users take ownership of, and responsibility for the success of, the new system

User groups might be involved via an Information Systems strategy group, or by membership of a Steering Committee for a particular project or set of projects.

Candidates are expected to refer to at least one participative methodology (e.g. ETHICS or a RAD approach) and note that these methodologies actively involved users in design groups (JAD sessions, in the case of RAD).

2 marks for each relevant issue identified, to a maximum of 6 6 marks.  
Up to 2 marks each for mentioning/describing IS strategy group and Steering committee. 4 marks  
Up to 6 marks for discussion of user involvement in a participative methodology. 6 marks

### Examiner's comments

Many good answers to this question were forthcoming showing that a clear and broad level of knowledge exists regarding the important contribution users can make in the systems development process. Good answers were generally structured with a review of importance of users followed by a discussion of more than one method that involves the user. Prototyping, RAD, DSDM, SSM, ETHICS were the most frequent methods explained with some candidates attempting to highlight the user role of Multiview and SSADM. The roles of Steering Groups and IS strategic management were frequently explained.

### Question 5

**Explain, with an example of each, FIVE of the following terms as used in systems analysis:**

- |    |   |                  |
|----|---|------------------|
| a) | <b>Structured walkthrough</b>                       | <b>(5 marks)</b> |
| b) | <b>Structured English</b>                           | <b>(5 marks)</b> |
| c) | <b>Decision table</b>                               | <b>(5 marks)</b> |
| d) | <b>Systems documentation</b>                        | <b>(5 marks)</b> |
| e) | <b>State transition diagrams</b>                    | <b>(5 marks)</b> |
| f) | <b>&lt;&lt;extends&gt;&gt; use case association</b> | <b>(5 marks)</b> |
| g) | <b>Inheritance</b>                                  | <b>(5 marks)</b> |

### Answer pointers

Specific definitions are not given for these basic terms to avoid lengthy answer pointers. Definitions can be found in the recommended textbooks for this subject.

All answers are expected to include:

A definition and or explanation of the term.

An example of usage to which the item would be put, ie. an explanation of how it would be used or an example of the model.

An illustration of the model, concept or document.

For each item attempted:

Definition and explanation	2 marks
An example of usage	2 marks
Supported by example of model or documentation	1 mark

### Examiner's Comments

Many good explanations were presented to this question and high marks were frequently awarded.

Many candidates were unable to explain the nature of the '<<Extends>> use case'; indeed, many candidates simply gave an explanation of use cases in general. Structured Walkthroughs were well understood and the contribution they make to systems quality was prominent.

In some cases however, answers lacked explanation and were little more than a definition. Some candidates failed to provide an example. Some brief and some incomplete answers were provided to parts or all of this question and this may reflect the fact that candidates were running out of time and perhaps they only felt confident about a selection of the five they were required attempt. It was not uncommon for candidates to get maximum marks for 2 or 3 sub-sections and 0 or 1 mark for the other parts. This is a reasonable examination strategy.