

IMIS DIPLOMA QUALIFICATIONS

**Information Systems Development
(D6)**

June 2014

DURATION: 3 HOURS

Marking Scheme

Candidates should answer ALL the questions in Part A and THREE of the five questions in Part B. Part A carries 40% of the marks available and Part B carries 60%. Candidates should allocate their time accordingly.

No reference material of any kind may be taken into the examination.

[Turn over]

Part A: Answer all of the following 8 questions (5 marks each)

1. Identify five general skills that members of a systems development team should possess.

Six skills are identified in the course texts. 1 mark for each identified. They are: Technical skills (knowledge of how to employ technology in development system solutions); Business skills (knowledge of how to apply IT to business problems to achieve a valuable solution); Analytical skills (ability to solve complex problems); Interpersonal skills (oral and written communication skills with both technical and non-technical audiences); Management skills (ability to manage others and cope with an uncertain environment); Ethical skills (ability to deal with others honestly and ethically).

2. What are the four major components of a dataflow diagram?

1 mark for each identified plus 1 mark at examiner's discretion (e.g. if examples are provided). DFDs represent the following: 1. External devices sending and receiving data; 2. Processes that change that data; 3. Data flows themselves 4. Data storage locations.

3. What is meant by the term "levelling" as applied to a set of dataflow diagrams?

DFDs can be expressed as a series of levels (1). The outermost level (Level 0) is concerned with how the system interacts with the outside world (1). Subsequent levels examine the system in more detail and use the same symbols and syntax as with Level 0 (1). Each process in a DFD can be expanded into a separate diagram which must be balanced with the higher level process (1) (i.e. the dataflows going in and out of the higher level process are all accounted for in the lower level diagram) (1).

4. How should a systems analyst begin to develop an entity relationship model once a complete set of dataflow diagrams has been developed?

The key to developing an ERM from a set of DFDs is to recognize that all system data must be accounted for on each type of diagram (1). The ERM shows the system data 'at rest,' while the DFD shows the flow and use of data in the system (1). Generally, all of the data entities shown on the ERM will correspond to data stores on the DFDs (1). In addition, the attributes that are a part of the data model should be used somewhere in the flows (1) and stores (1) of the process models.

5. How is the object approach different from the data and process approaches to systems development?

The object approach seeks to combine data and processes that are related to each other into self-contained units called objects (2). The traditional development approach separates the data from the processes that use the data (2), which some feel is a more cumbersome way of looking at the system (1).

6. What are three fundamental parts of most user interfaces?

The three fundamental parts described (un-controversially) in the course text are: An Input mechanism - the way in which the system captures information (2); an Output mechanism - the way the system provides information to the user or to other systems (2) and a Navigation mechanism - the way the user gives instructions to the system and tells it what to do (1).

7. How could a use case scenario be used in the design of a user interface?

The use case scenario will describe a pattern of actions that the user will perform to achieve a goal (1). The user interface must permit the user to enact the use cases quickly and smoothly (1). The course text recommends the development of an interface structure diagram that shows all the screens, forms, and reports in the system, how they are related, and how the user moves from one to another whilst working through a Use Case (2). This is an important early step in developing simple paths through the most common activities performed in the system (1).

8. What does “prototyping” mean in the context of systems development?

Prototyping is building a system, which may be partially complete, in order to explore some aspect of the system requirements - normally this would be the user interface (2). The basic idea is that instead of freezing the requirements before a design or coding can proceed, a throwaway prototype is built to understand the requirements (1). This prototype is developed based on the currently known requirements (1). By using this prototype, the client can get an “actual feel” of the system, since the interactions with prototype can enable the client to better understand the requirements of the desired system (1).

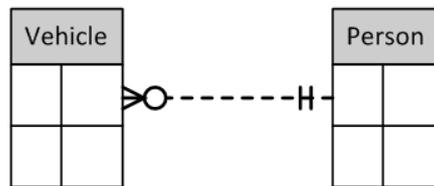
Part B: Answer 3 of the following 5 questions (20 marks each)

1. The following questions relate to the development of entity relationship models for database design.

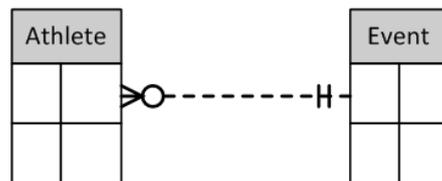
i) Draw entity relationship diagrams to represent each of the following situations:

In the following answers different notations will be accepted – 2 marks for identifying the correct entities and 2 marks for the relationships.

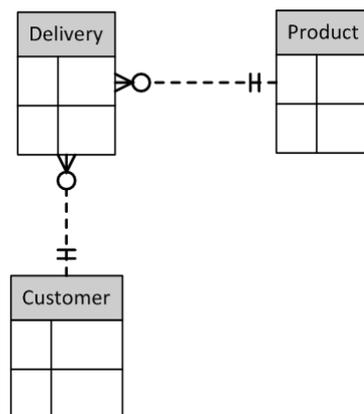
a) Each vehicle is owned by one person (4 marks)



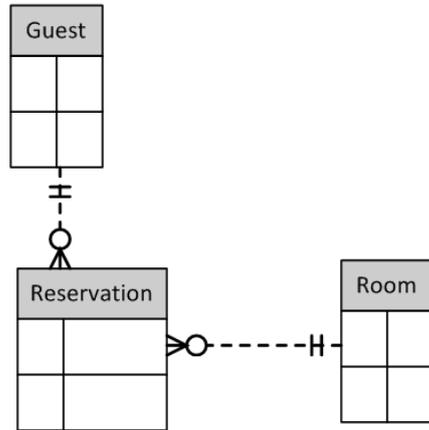
b) Each athlete can take part in only one event (4 marks)



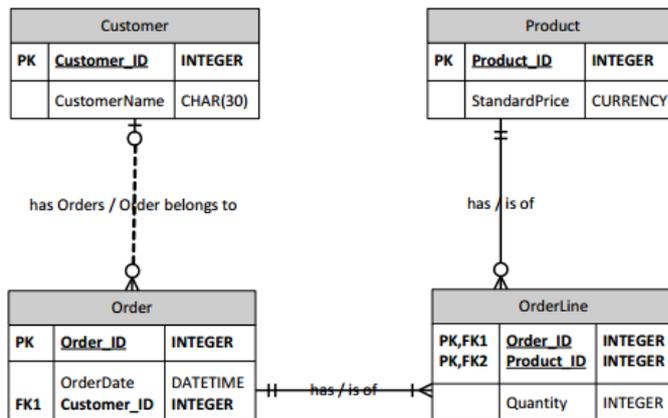
c) Each "Delivery" is a single product dispatched to just one customer. (4 marks)



d) Each reservation in a hotel is for just one room and will be made for just one guest. (4 marks)



ii) Identify four business rules from the entity relationship model below (4 marks):



1 mark for each business rule identified. Examples include: A customer can place many orders but each order must have come from just one customer; each order-line must be part of just one order; an order-line relates to the purchase of just one product; a product can appear in many order-lines and so on.

2. Describe the main responsibilities for each of the following members of a development team.

i) **Business analyst (4 marks).**

Emphasis on the business issues addressed by the system. For example: value of new system (1); identification of problems and opportunities (1); revision of business processes (1) and policies(1)

ii) **Systems analyst. (4 marks).**

Emphasis on IS issues of the system. For example how IT can be used to support business processes (1); design of new business process (1) and IS (1) and enforcement of IS standards (1).

iii) **Infrastructure analyst. (4 marks).**

Emphasis on technical issues associated with integrating new system components to existing technical infrastructure (2) this may include use of object wrappers to surround non-object oriented legacy systems with an interface that makes them appear object oriented (1) and other techniques for system integration (1).

iv) **Change management analyst. (4 marks).**

Emphasis on facilitating organizational adaptation to new system (1). Helping to identify and overcome resistance to change (1) and assuring adequate training (1) and documentation of new system (1).

v) **Project manager (4 marks).**

Emphasis on ensuring that progress is made on the project (1); time schedules and budgets are met (1); supervision of project team (1); and manage relations with project sponsor and users (1).

3. The following questions relate to the requirements determination stage in system development.

- i) **What is the value of producing a requirements definition and having the project sponsor and key users review and approve it? (4 marks)**

The sponsors and users have an interest in the project because they are (or will be) affected by its progress or by its results (1). If they are not consulted a number of problems could accrue. For example the wrong problems can be addressed (1); wider issues might be ignored (1). Importantly users change their minds when they discuss and think about the possibilities (1).

- ii) **Explain what is meant by “functional requirement”. You should identify two types of functional requirement and give two examples of each. (8 marks)**

A functional requirement relates directly to a process the system has to perform (process-oriented) (2) or information it needs to contain (information-oriented)(2) . Examinee examples will vary (2 for each of two examples).

- iii) **Explain what is meant by “non-functional requirement”. You should identify two types of non-functional requirements and give two examples of each. (8 marks)**

A non-functional requirement refers to behavioural properties that the system must exhibit. Types of non-functional requirements include: Operational (1), Performance (1), Security (1), and Cultural and Political (1). Examinee examples will vary (2 for each of two examples).

4. This question relates to the strategies that are available to obtain a new system.

i) Describe the four primary functional components of a software application (5 marks).

The four general functions of any application are: data storage - storage of the system's data (1) data access logic - providing access to the system's data (1); application logic - the system's processing functions (1); and presentation logic (1) - the appearance of the system to the user and the method used to give the system commands (1).

ii) Explain what circumstances would favour each of the following ways of obtaining a new system:

a) Custom development (5 marks)

The custom development strategy is appropriate when several conditions are met. First and foremost, there should be a unique business need which is unable to be fulfilled by a purchased, pre-written solution (1). Second, there should be functional, technical, and project management skills available in-house (1), and there should be a desire to build and enhance these skills (1). The organization should have a proven track record of development, and should have an established systems development methodology (1). Finally, the project timeframe should be flexible enough to accommodate the uncertainty of a custom development project (1).

b) Purchasing a packaged system (5 marks)

Packaged software is an excellent design strategy when the organizational business functions are fairly common and/or the time to implement requirement is short (1). Accounting practices, inventory control, customer record keeping are all examples of common business functions (1). If the organization has no specialized business needs, the packaged software option should be the first consideration (1). The organization still has need of personnel with functional experience and project manager experience to facilitate the integration (1); however, highly technical developers are not required with the integration of packaged software. Additionally, the time frame to acquire this type of software can be extremely short as vendors can acquire the software with little or no delay (1).

c) Outsourcing (5 marks)

Outsourcing is a good design strategy when the organization does not have the experience or resources itself to do the development in-house (1), or when it wishes to focus its own resources on other more strategic efforts (1), and wishes to let an outsourcer handle a less strategic project (1). It is not a good idea to outsource projects of high strategic value to the organization because the organization does not enhance its own capabilities if the work is outsourced (1). A very capable project manager is needed to help ensure the success of an outsourcing arrangement (1).

5. The following questions relate to requirements gathering techniques.

i) Discuss the five major steps involved in setting up and conducting interviews to elicit requirements (5 marks).

The five major steps discussed in the course text are:

- *Selecting interviewees - determine who should be interviewed, why they should be interviewed (what contribution will they make to the project?), and develop a schedule for conducting the interviews.*
- *Design the interview questions - depending on who is being interviewed and the type of information desired, the analyst needs to design the interview session with the appropriate structure and question type.*
- *Prepare for the interview - review related material; review interview plan; review interview questions and plan for any anticipated problem areas; inform interviewee about interview agenda.*
- *Conduct the interview - establish rapport with the interviewee; explain purpose of interview; ask interview questions; record information from interviewee.*
- *Prepare post-interview report - summarize the interview in an interview report.*

1 mark for each step identified – the examiner should use their discretion if an examinee does not identify all 5 steps but discusses some of them in more depth.

ii) Discuss the reasons why questionnaire design is so difficult. (5 marks).

Questions on questionnaires need to be very carefully stated in order to avoid misunderstanding by the recipient (1). If a question is misunderstood during an interview, the misunderstanding can be immediately detected and the question clarified but this is not the case with a questionnaire (1). A poorly worded question on a questionnaire may confuse the recipient, causing him/her to answer with incorrect information (1), or may antagonize the recipient (1), causing him/her to forego completing the questionnaire (1).

iii) What is meant by “document analysis”? Why is the technique so important to gaining insight into the way an organisation works? (5 marks)

Document analysis focuses on existing documentation of the current system, forms and reports that are a part of the current system (1), plus any personal forms, reports, or files that have been developed informally by the end users (1). By studying this material the analysts can gain insight into the existing system (1), how it is used (1), and possibly also aspects of the system that are not being used (1).

iv) What precautions could you take to make sure that findings based on observation are reliable? (5 marks)

The following precautions are recommended in the course text:

1. *Keep a low profile (1)*
2. *Do not interrupt employees at work (1)*
3. *Do not influence those being observed (1)*
4. *Keep in mind that what you observe may not be normal day-to-day behaviour (1)*
5. *Gather clues from working environment (1)*

A Questions	LO1	LO2	LO3	LO4	LO5	LO6
1	✓					
2		✓				
3		✓				
4		✓			✓	✓
5			✓			
6				✓		
7			✓	✓		
8					✓	✓
B Questions						
1		✓			✓	✓
2	✓					
3					✓	✓
4						✓
5					✓	