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ADVANCED
General Certificate of Education
January 2014

Applied Information and Communication Technology

Assessment Unit A2 7

assessing

Unit 7: Investigating Systems

[A6J11]

TUESDAY 21 JANUARY, MORNING

MARK SCHEME

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General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what the examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The purpose of mark schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marketing of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents the final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example where there is no absolute correct response – all teachers will be familiar with making such judgements.

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QUOTATION 1: 'Doreen .... sometimes totally underestimated the time involved and recorded unrealistic completion dates'.	
Why this is a problem?	Customers will be waiting for their orders which they may require for important events/causes a backlog of orders/puts staff under pressure.
Impact on Business	Customers disappointed/angry when dresses and alterations not completed as they may need them for important events. No repeat business. Reputation of business will suffer. May claim compensation. Staff may have to work overtime to complete the work and be paid more. Lower quality of work if rushed/stressed employees.
Possible Solution	Record the time each type of work takes and use this data to predict the likely completion date. For example the average time to complete a simple wedding dress.
QUOTATION 2: 'She (Fiona) tried to create supplier orders based on what she thought was being used by the staff'.	
Why this is a problem?	Items may not be what staff need. Items will not be available for staff when they need them. Staff will have to wait and may not be utilised properly.
Impact on Business	Completion of customer orders may be delayed and they may be unhappy. They may not recommend the business. Staff may become unmotivated. Waste money.
Possible Solution	Allow staff to indicate which items they have used and link to stock levels so that Fiona can see which items need to be reordered without having to consult them. Ask the staff.
QUOTATION 3: '...there was often confusion about returns, payments and whether or not the stock item had even been returned or even existed in the first place'.	
Why this is a problem?	They may lose some stock. Customers may not have paid for the item or they may have returned it and be asked for it back.
Impact on Business	Loss of revenue for the business.
Possible Solution	Record all the returns/payments electronically and produce reports on who had paid/not paid and who has not returned items to control this.

[1] for each correct answer × 9. Any other valid answers other than those suggested will be acceptable. Ensure that different responses are provided. [9] 9

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2 **(a)** It is important to make a contract between the consultancy firm and FIONA's FASHIONS. Candidates may also refer to the importance of:

- reaching an agreement
- establishing a contract
- business vision
- purpose
- strategy
- plans for the future
- organisational structure
- project objectives
  - problems needing addressing
  - scope/constraints (ordering, stock, enquiries)
- time scales
- budget available
- resources available

[1] for each reason or valid alternative × 2 [2]

(b)

Items	
Data Flow Diagrams	✓
Algorithms	✓
Budget	
Costed Options	✓
Time Scales	
Scope of project	
Constraints	
Test Plan	✓

[1] for each correct tick [4] 6
(5 ticks [–1]; 6 ticks [–2]; 7 ticks [–3]; 8 ticks [–4])

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3 **(a)** Do not allocate mark for prototyping.

Stage	Activity
initiation	Fiona will meet with Fred to explain the business opportunity or problem and create a Terms of Reference.
analysis	Fact-finding, DFDs, Software Requirements. [Allow mark if in design]. Allow feasibility in analysis. Specification, analysis of inputs, outputs and processes.
design	System Specification Document, screen designs, data structures, data dictionaries and database design.
implementation	Coding and programming to develop fully functional system. Depending on the version of SDLC – allow installation and changeover methods. 'System will be installed': do not allocate mark. Also develop user and technical guides.
testing	Unit, System and Acceptance Testing can be performed to allow a robust system to be released.
review/ evaluation	Evaluate whether the system met the customer requirements – including non-functional requirements.
maintenance	Modify the software after release correcting errors, meeting customer requirements that were not correctly implemented, and enhance the software to meet future needs and adapt to changes that are necessary to the business.

[1] for each answer or valid alternative × 6 [6]

(b)
- The business needs the new system quickly and within a tight budget – DSDM better at delivering this (time boxing)
- A paper based system is currently being used and users will have little experience of a computerised system – Fiona won't really know what a computerised system could deliver and will find it difficult to specify requirements – prototyping will help. It would also help with training.
- FIONA's FASHIONS is a small business. The project won't be very large. DSDM uses prototyping and iteration and very large projects would be too difficult to manage.

[1] for each answer or valid alternative × 3 [3] 9

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4 **(a)** Possible reasons and examples are given below.

Reason	Example
May be out of date/not maintained properly	The stock list may not be updated when stock is used. Notebooks are not updated often.
Documentation may be missing or not stored and a process may not be apparent.	There must be some documentation associated with ordering stock from a supplier and its delivery but this does not seem to be available.
Other techniques will reveal other information about the system. Observation would allow Fred to notice unusual procedures.	Fred would be able to see that itemised bills are not always processed before a customer arrives with payment.
Documentation does not reveal important information vital to the investigation.	For example plans for future expansion.

[1] for each reason and [1] for an example associated with each reason × 2
Valid alternatives accepted. [4]

(b) **(i)** Advantages of observation may include: discovery of unusual/ unexpected events that occur; analysis of time taken on particular tasks; check if procedures are being followed; they can see things first hand.
[1] for one advantage listed above or any valid alternative. [1]

(ii) Problems that could be uncovered using observation at FIONA'S FASHIONS may include:

- noticing that when items were returned dockets were not marked off
- the amount of time spent with customers who had genuine grievances.

[1] for each problem or valid alternative × 2 [2] 7

5

	Categories			
Item	**Data Flow**	**Entity**	**Process**	**File**
staff				✓
manage payroll			✓	
staff payslip	✓			
manage stock			✓	
van driver		✓		
telephone notebook				✓
invoice details	✓			
delivery description	✓			

[1] for each correct row × 8 [8] 8

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6 **(a)** **(i)** Importance of context diagram in analysis phase:
[1] for it shows the entire system and its interaction with the external environment; [1] for identifies all entities or data going in or out of the system [1] for each answer or valid alternative × 2 [2]

(ii) Purpose of Level 1 DFD: [1] for
Shows how the system is divided into sub-systems/processes; decomposition/development;
shows flow of data between various parts of the system.
[1] for elements contained in a level one: must mention processes or stores or internal data flows [2]

(iii) Fiona [1]

(b) **(i)** no id for 'suppliers'

(ii) process id should be numeric

(iii) process name should commence with a verb

(iv) 'hire details' should be 'stock details'

(v) there should not be three stripes on stock file

(vi) supplier file should be open ended

(vii) file connections are not permitted

(viii) 'fancy dress hire details' should be 'supplier delivery note details' [8] 13

Also allow:
- stock list should not be duplicated
- supplier should be singular
- M15 should be fancy dress
- M5 should be hire.

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7 Students may discuss a range of issues which may include some of the following:

Problems with Manual Data Storage	**Example**	**Benefit of Electronic Data Storage**
Data is stored in more than one place and data may be inconsistent.	Telephone for Zips&Bits stored twice in Stock and Supplier List.	Information is usually only stored in one place (unless a relationship is implemented).
Missing Information.	The Supplier called the Satin Mill has no telephone number; many items in the stock list have no cost price entered.	Can check that all fields are entered by users.
No automatic sorting so it is hard to find items.	It would be better to order the supplier list alphabetically in some way but all the information would have to be rewritten.	Easy to automatically order items in a list and to have a query facility.
No proper link between Supplier and Stock List	We do not know where many items in the stock list have originated from and it would be difficult to reorder them.	Relationships between data can be represented.
Hard to update information.	Old information is scored out. Messy!	Data can be easily modified.
Hard to generate reports without a lot of time consuming work.	Hard to see what level of stock there is for reordering.	Easy to generate reports.
Records may be entered twice.	The Satin Mill Supplier is entered twice.	Unique identifiers can be used to ensure that records are not duplicated.

Mark Band ([1]–[2])
Candidate provides a basic answer showing limited knowledge and understanding of the problems of manual/paper based systems and benefits of electronic data storage/databases.

- Few relevant examples of problems with the stock and supplier list are described.
- A limited range of problems with the paper/manual based system and benefits of benefits of electronic data storage/databases are discussed.
- Links between problems, examples and benefits are rarely provided.
- Basic level of written communication.

Mark Band ([3]–[4])
Candidate provides a competent answer showing knowledge and understanding of the problems of manual/paper based systems and benefits of electronic data storage/databases.

- Some relevant examples of problems with the stock and supplier list are described.
- A range of problems with the paper/manual based system and benefits of benefits of electronic data storage/databases are discussed.
- Links between problems, examples and benefits may be provided.
- Appropriate level of written communication.

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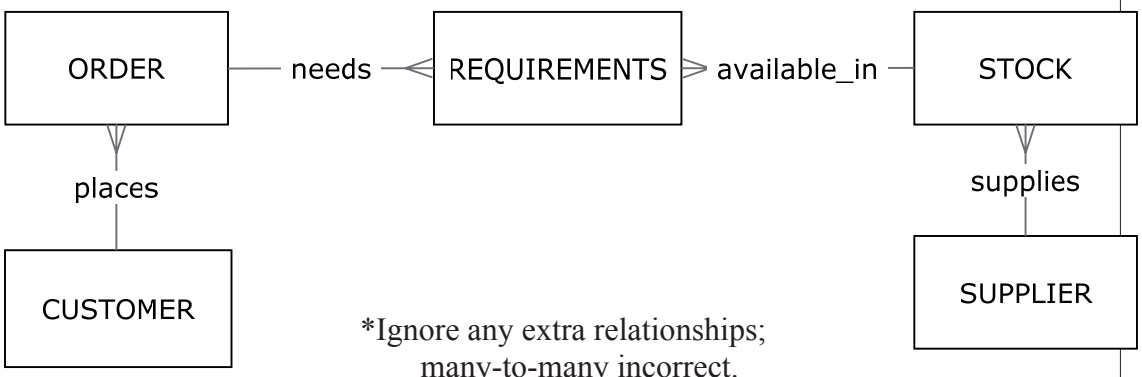
Mark Band ([5]–[6])
Candidate provides a very competent answer showing good knowledge and understanding of the problems of manual/paper based systems and benefits of electronic data storage/databases.

- Many relevant examples of problems with the stock and supplier list are described.
- A wide range of problems with the paper/manual based system and benefits of benefits of electronic data storage/databases are discussed.
- Links between problems, examples and benefits are provided.
- Excellent level of written communication. [6] 6

8



*Ignore any extra relationships; many-to-many incorrect.

(a) Relationship between ORDER and REQUIREMENTS which is 1 to many and has relationship name. [2]
Relationship between STOCK and REQUIREMENTS which is 1 to many and has relationship name. [2]

(b) **(i)**

DATA ITEMS	
Unit	
Quantity Used	
Order Description	✓
Cost Per Unit	
Customer No	✓
Order Type	✓
Customer Name	
Stock No	
Order Number	✓

[1] for every tick (5 ticks [–1]; 6 ticks [– 2]; 7 ticks [–3]; 8/9 ticks [–4]) [4]

(ii) Order Number [1]
Explanation of role of primary key: Unique identifier [1]
No duplication/relationship formation [1]

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(c) Total Cost and Overall Cost
[1] for each field identified × 2 [2]

(d) Order Date, Staff Number/Name, Stock Levels. Allow customer fields not already on form such as contact details, colour, supplier details.
Valid alternatives acceptable
[1] for each of two fields identified × 2 [2] 15
DO NOT ACCEPT: – Delivery address, Payment Information

9 **(a)** Roles of the analyst and programmer throughout the life cycle may be discussed such as fact finding, DFDs, system testing for analyst; coding software and unit testing for programmer.
Candidates may discuss for the job of programmer: qualifications in computing/mathematical/analytical subject areas, experience of programming/testing, ability to work within a team, working to deadlines, accuracy and attention to detail; and for the job of a systems analyst: additional skills of communication/listening/managing people and, collaboration, experience of design and project management methodologies.

Mark Band ([1]–[2])
Candidate provides a basic answer showing limited knowledge and understanding of the roles of analyst and programmer.
- Basic descriptions of either role are provided.
- Few, if any, comparisons are made between the roles of programmer and analyst.
- Basic level of written communication.

Mark Band ([3]–[4])
Candidate provides a competent answer showing knowledge and understanding of the roles of analyst and programmer.
- Good descriptions of each role are provided.
- Comparisons are made between the roles of programmer and analyst.
- Appropriate level of written communication.

Mark Band ([5]–[6])
Candidate provides a very competent answer showing good knowledge and understanding of the roles of analyst and programmer.
- Excellent descriptions of each role are provided.
- Good comparisons are made between the roles of programmer and analyst.
- Excellent level of written communication. [6]

(b)

STATEMENT	TRUE/FALSE
The total project duration is 13 days.	FALSE
Activity E is dependent on activity B and D	TRUE
The float available in activity E is 1 day.	FALSE
The critical path is given by the activities A, C, D, F, G, H and I.	TRUE
If activity B is delayed by 3 days the project could still be on time.	TRUE
According to the plan Fred will book the interview room before he selects the candidates.	FALSE

[1] for each correct answer [6] 12

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10 (a)

Field	Test ID	Test data that will raise an error
StockNo	1	No StockNo entered.
	2	StockNo duplicated.
	3	Stock Number longer than 7 characters.
SupplierID	4	No SupplierID entered.
	5	SupplierID does not exist in Supplier Table.
UnitCost	6	UnitCost is either text or less than zero.
Unit	7	Units longer than 10 characters.
Description	8	Description has more than 40 characters.
QuantityInStock	9	QuantityInStock less than zero.
	10	QuantityInStock is not a number – it is text.

[1] for each answer or valid alternative × 7 [7]

(b)
- To test incorrect data cannot be added.
- To test validation code is correct.
- To test error messages appear appropriately.
- To ensure the system handles errors without crashing.

[1] for each reason or valid alternative × 2 [2] 9

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11 Candidates may discuss many issues and solutions in the areas of maintenance and customer support. An example is shown below.

Area	Issue	Solution
Maintenance	What would happen if we wanted to upgrade our system?	We can offer a maintenance contract for the next year and we will provide software upgrades.
Customer Support	How can we contact you about a problem?	There are several options we could offer at different levels of cost: for example we have a dedicated help line, on-line diagnostic help or you could look up a bulletin board.

Mark Band ([1]–[2])
Candidate provides a basic answer showing limited knowledge and understanding of issues discussed in relation to future maintenance and customer support.
- A limited range and variety of issues are discussed.
- Poor descriptions of each issue provided.
- Few examples, if any, of solutions provided.
- Basic level of written communication.

Mark Band ([3]–[4])
Candidate provides a competent answer showing knowledge and understanding of issues discussed in relation to future maintenance and customer support.
- A range and variety of issues are discussed.
- Descriptions of each issue provided.
- Some examples of solutions provided.
- Appropriate level of written communication.

Mark Band ([5]–[6])
Candidate provides a very competent answer showing good knowledge and understanding of issues discussed in relation to future maintenance and customer support.
- A wide range and variety of issues are discussed.
- Good descriptions of each issue provided.
- Good examples of solutions provided.
- Excellent level of written communication. [6] 6

Total **100**

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