



ADVANCED
General Certificate of Education
2014

**Applied Information and
Communication Technology**

Assessment Unit A2 7

assessing

Unit 7: Investigating Systems

[A6J11]

FRIDAY 23 MAY, MORNING

**MARK
SCHEME**

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 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 marking 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 this 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.

1 FIONA'S INABILITY TO MANAGE THE BUSINESS END OF THINGS

AVAILABLE
MARKS

Example	She is poor at delegating
Problem	She should have delegated the alterations to her staff at an earlier stage.
Example	She is haphazard at recording important business information i.e. she barely wrote anything down...dates were not noted
Problem	Wedding dresses did not fit/orders were late annoying customers
Example	She is poor at prioritisation and time management
Problem	She finds it hard to meet deadlines.
Example	She is poor at managing/monitoring people
Problem	Staff often don't fill in timesheets.
Example	She is poor at controlling finance
Problem	She does not have systems to check payments are made and correct.
Example	Fiona did not trust anyone to do the work; she had great difficulty in getting everything done
Problem	The dresses took longer than anticipated and customers were annoyed at the delays
Example	Fiona changed entries in the books without telling Doreen
Problem	Duplication of data and inconsistency
Example	No note taken of borrowed stock
Problem	Loss of stock/money because.....
Example	Fiona rarely turned anyone away...she frequently took on more work than she could realistically handle
Problem	stress; pressure on staff; missed deadlines; damaged reputation
Example	Timesheets were half completed in a hurry
Problem	Calculations with wages; problems with leave
Example	Fiona often did not charge people; payments and returns were not checked
Problem	Loss of profit; financial difficulties; debt
Example	Fiona had to look through all the stock every time there was an enquiry
Problem	No-one knew what was available. There was no inventory Time consuming; customer dissatisfaction; stock lost/never returned
Example	Used to estimating requirements without asking staff
Problem	Staff do not have materials required causing delays and demotivation Customer dissatisfaction; lower quality of service

Candidates must elaborate on the answer. Must be an explanation; not a simple phrase

[1] for each correct answer × 4

Alternative valid answers other than that shown above are acceptable.

[4]

4

2 BENEFITS OF A NEW COMPUTERISED SYSTEM

AVAILABLE
MARKS

Business Area	Current Problem	Benefit of New System
Customer Enquiries	Doreen often does not remember to record enquiry details.	Easier system of recording enquiries would mean that other people with more knowledge could answer them. Could easily prioritise and highlight important unanswered enquiries. Form is easier to complete when on the telephone. Fields prompt (remind) the user to enter data and validation can occur ensuring fields are completed.
Customer Orders	There is duplication of information in the notebooks. Updates by Fiona and Doreen are inconsistent.	Data held in the database could be validated and with minimal duplication The data held in a central location would be consistent and updates handled correctly. Elimination of redundant data. Primary keys and relationships can improve integrity. Duplication can be highlighted by the use of prompts/messages.
Customer Accounts	It was difficult to cost items on the itemised receipt and create it quickly in response to a customer request.	Easy to make a report that would allow easy print out linked to information on cost of stock and requirements of each order. Automatic calculations lead to correct billing. System contains formulae to ensure correct calculations. Customers get receipts more quickly.
Supplies and Stock	Fiona tries to create supplier orders based on what she thought was used.	Stock could be automatically reordered below a certain level. Reordering would be more accurate. System can alert when stock levels are low.
Timesheets and Wages	Staff do not always complete timesheets.	Timesheets could be linked to staff payments motivating staff to complete them on time. Staff who didn't complete them could be prompted to do so. Automatic clocking in/out means they do not have to complete timesheets. Allows system to calculate wages automatically and correctly.

[1] for each correct answer × 5
Valid alternatives will be accepted

[5]

5

3 TRADITIONAL SYSTEM vs DSDM

AVAILABLE
MARKS

Characteristic	Traditional	DSDM
User Requirements	Requirements fixed in an early stage in the process. Extra time and money may be required to complete all the requirements.	Budget and time are fixed. Only higher priority features/requirements are delivered. User requirements more likely to be met due to user involvement.
Phases	Several sequential phases. The system is delivered at the end of the lifecycle.	Iterative in nature involving models and prototyping with product delivery throughout.
User Involvement	Limited user involvement at the beginning. User only see the final system at the end.	Requires full involvement of customer throughout process.
Project Management	Project Manager takes position of authority delegating tasks to the team. Gantt charts often used to plan and monitor completion of tasks.	Project manager is a facilitator, in a supportive role, encouraging collaboration between team members. Less involved. Other team members have more authority.
Typical Projects	Good for large projects with well defined unchanging requirements and where time and budget is not too restricted. Government projects.	Good for projects with poorly defined and frequently changing requirements, restricted budget and short timeframe for completion.

[1] for each correct answer × 6
Valid alternatives will be accepted

[6]

6

4 DEVELOPMENT AND IMPLEMENTATION OF SYSTEMS ROLES

AVAILABLE MARKS

Role	Characteristic	Activity
Project Manager	Good at planning and managing resources. Good at motivating the team. Leadership, authority. Organisational communication skills.	Motivating/managing team members. Recruitment of team members. Project Planning. Scheduling/estimation. Supervision/delegation. Team resource management.
Analyst	Good listener and communicator. Creative problem solver. Business knowledge. People Person. Team worker. Creative skills.	Feasibility study. Analysis of business. Design new system. System Testing. Training Users. Fact-finding. Writes Systems Specification. Creates Test Plan. User guide; technical guide. Uses algorithms.
Programmer	Technical/Logical and Mathematical Ability.	Writing Code. Unit Testing. Designs and uses algorithms
Technician	Good at installing and fixing hardware. Troubleshooting ability.	Installing hardware. System Backups. Software Upgrades Helps users solve problems. Fixes any problems. Checks faulty equipment. Makes sure system is operational, maintained, repaired, updated.

[1] for each correct answer × 8
Valid alternatives will be accepted

[8]

8

5 (a)

Question	Suitable for the questionnaire? Yes or No	Reason
Q1. Was your wedding dress delivered on time? <ul style="list-style-type: none"> • Yes • No 	Yes	Simple question that will allow some management feedback.
Q2. Describe your experience as a customer at FIONA'S FASHIONS?	No	Possibly wordy, unacceptable answers.
Q3. How does Fiona manage costume hire in the shop? <ul style="list-style-type: none"> • She counts all the items • She checks all returns • She files delivery docket 	No	Customers probably won't have this level of detail about FF.

AVAILABLE MARKS

Each correct answer = [1] × 6 [6]

- (b)
- Put onto internet as a web page – could send letter to inform them of website link.
 - Could actually read them out to customers and mark in answers for them by visiting them – but more expensive – used often in street surveys to improve response rate.
 - Could send them by email but probably don't have the customer's email recorded in the old system and so unlikely.

[1] for method; [1] for description [2]

(c) **Advantages**

- Customers can respond at their own convenience.
- Relatively inexpensive compared to other methods.
- Anonymous; more honest answers
- Most questions may be relatively easy to tabulate and analyse.
- Target a large group of people at one time
- Little supervision

[1] for each correct answer. Valid alternatives will be accepted.

Disadvantages

- Low response rate.
- May be little elaboration on answer.
- Open questions are difficult to analyse.
- No non-verbal communication.
- Clarification of answers cannot be easily sought.
- Hard to design.

[1] for each correct answer. Valid alternatives will be accepted. [2]

(d) INTERVIEWING AS A FACTFINDING TECHNIQUE

How List of questions prepared, arrange room, time and date, select people;

Why Face to face; direct; elaboration; flexible, follow on questions, open-ended questions

People Fiona, Francis, Doreen

Information Objectives of business, opinions, strategic information, size of project, goals, problems, future, time, budget

Mark Band ([1]–[2])

Candidate provides a basic answer showing limited knowledge and understanding of interviewing and the people to be interviewed.

- Poor and limited information on how the interview is organised and conducted and/or why the technique should be used (benefits and advantages)
- Identification of few relevant people in FF for interview
- Poor description of information that could be obtained.
- Basic level of written communication.

Mark Band ([3]–[4])

Candidate provides a competent answer showing knowledge and understanding of interviewing, its benefits and people who are interviewed

- Limited information on how the interview is organised and conducted and/or why the technique should be used (benefits and advantages)
- Identification of some relevant people in FF for interview
- Description of some information that could be obtained
- Appropriate level of written communication.

Mark Band ([5]–[6])

Candidate provides a very competent answer showing good knowledge and how to use interviewing, their benefit and all the people who should be interviewed.

- Some information on how the interview is organised and conducted and/or why the technique should be used (benefits and advantages)
- Specific identification of some relevant people in FF for interview
- Description of important information that could be obtained
- Excellent level of written communication.

[6]

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6 GANTT CHARTS, NETWORK DIAGRAMS and PRECEDENCE CHARTS as project management tools

AVAILABLE
MARKS

Gantt Chart Contains activities in sequence/time order
Start and end time/duration
Horizontal bar chart
Length of bar proportional to duration
Tasks on y axis: Time on x axis
Easy to understand

Net work chart Duration of task
ES, LS, EF, LF
Dependencies explicitly shown
good for identifying slack/float
Critical path

Use by Project Manager How long each task lasts
What tasks follow one another (or are concurrent)
Delays affect schedule
Monitor progress
Plan – overview
How to rectify and correct

Mark Band ([1]–[2])

Candidate provides a basic answer showing limited knowledge and understanding of the charts and diagrams.

- Few features of GANTT charts are given.
- Few features of NETWORK DIAGRAMS are given.
- Limited information provided about how the project manager would use either of these tools.
- Basic level of written communication.

Mark Band ([3]–[4])

Candidate provides a competent answer showing knowledge and understanding of most of the charts and diagrams mentioned.

- Some features of GANTT charts are given.
- Some features of NETWORK DIAGRAMS are given.
- Examples, with simple descriptions, showing how the project manager would use either of these tools.
- Appropriate level of written communication.

Mark Band ([5]–[6])

Candidate provides a very competent answer showing good knowledge of and how to use all the diagrams and charts as project management tools..

- Several features of GANTT charts are given.
- Several features of NETWORK DIAGRAMS are given.
- Examples provided, with good descriptions, showing how the project manager would use either of these tools.
- Excellent level of written communication. [6]

6

- 7 (a) When constructing a Data Flow Diagram the context diagram is a **HIGH** level diagram that represents an overall view of a system. It contains **ONE** process that describes the overall function of the system. It contains all external **DATAFLOWS** and all external entities. The context diagram is the **FIRST** diagram in a set of diagrams. The **ENTITIES** have an alphabetic id. The **LEVEL-1** diagram contains a range of processes which have a **NUMERIC-ID**. The diagram contains all the external dataflows and external entities contained in the context diagram. It also contains the **FILES** in the system. They have an **ALPHANUMERIC-ID**. The **LEVEL-2** diagram develops processes contained in the **PRECEDING** (or **LEVEL 1**) diagram.

Each correct word = [1] × 11

[11]

(b)

	Entity	Data flow	Process	File	None
customer	✓				
stock records				✓	
itemised bill		✓			
add customer			✓		
customer address details		✓			
technician					✓
timesheet		✓			
costing					✓

Each correct answer = [1] × 8

[8]

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8 (a) Customer No, Order Type, Offer Applied, Appt. Date/Time, Estimated Completion Date, Discount Offered

[1] for each correct answer × 3 [3]

- (b) • Only show appointment date and time entry boxes if order is of type Household or Wedding.
- Grey out area where data entry not required – prevent access.
 - Link to order forms on the system like materials required, stock system.
 - Could automatically add today’s date as default for Order Date.
 - Could reference the Five Family and Friends that are included in the offer.
 - Automatic calculation of cost after discount.
 - Any other valid answer.

[1] for each correct answer × 2 [2]

(c) Estimated Cost after Discount [1]

(d) **PROTOTYPING**

FEATURES: Demo, early model, final system different, changed, improved; iteratively/repeatedly, concept/idea, trial, see/visual, appearance, feedback end user, types (throwaway and evolutionary)

ADVANTAGES

- Difficulties/misunderstandings/missing information can be identified and resolved early in process.
- Model available for demonstration to user good for determination of customer requirements – more likely to be acceptable.
- Prototype can be tested and same tests used in final system.
- Dynamic and Flexible.
- Can help with training.

DISADVANTAGES

- Requires software skills
- Time-consuming.
- Can raise user expectations.
- May be difficult to manage.

Mark Band ([1]–[2])

Candidate provides a basic answer showing limited knowledge and understanding of different types of prototyping.

- Few features of prototyping identified
- Few advantages identified.
- Few disadvantages identified
- Basic level of written communication.

Mark Band ([3]–[4])

Candidate provides a competent answer showing knowledge and understanding of different types of prototyping.

- Some features of prototyping identified
- Some advantages identified.
- Some disadvantages identified.
- Appropriate level of written communication.

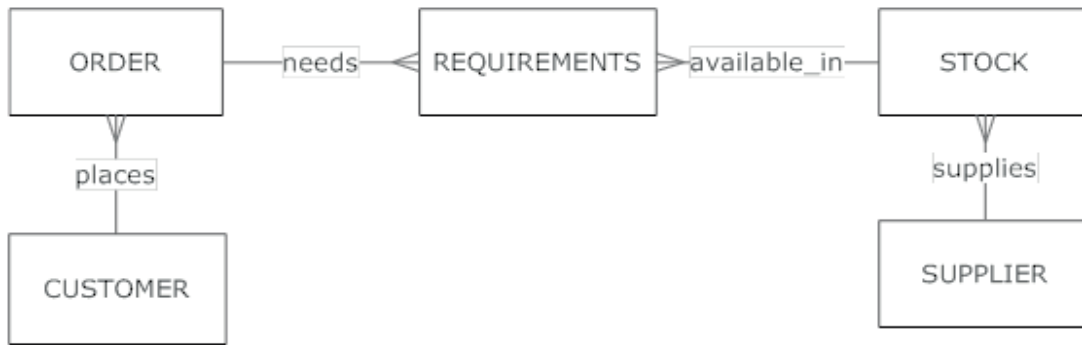
Mark Band ([5]–[6])

Candidate provides a very competent answer showing good knowledge of prototyping.

- Several features of prototyping discussed showing some understanding of the prototyping process
- Several advantages identified.
- Several disadvantages identified.
- Excellent level of written communication. [6]

12

9 (a)



[1] for each relationship and [1] for each appropriate name on the relationship × 2 [4]

(b)

Field	Data Type	Example
Estimated Cost	Currency	£200
Estimated Completion Date	Date/Time	13/04/2014
Offer Applied	Text	Five Family and Friends
Discount Offered (%)	Number	10

[1] for each correct answer × 4 [4]

(c) Primary key is Order No. [1]

(d) Foreign Key is Customer No. [1]

(e) Order No in ORDER table is foreign key in REQUIREMENTS table. [2]

AVAILABLE MARKS

12

10 Range of tests

Unit/Program/Module; Integration, System, Acceptance

AVAILABLE
MARKS**Nature of each test:**

- Unit:** Individual independent units
Algorithms/code examined
Input and output
Meets detailed design specification given by analyst
- Integration:** Subsystems; associated units
Use high level design spec.
Test collaboration between units
How they work together
- System:** Entire system meets user specification
Meets user spec.
Test functional/non-functional requirements
Test inputs and outputs (black box – no knowledge of code required)
- Acceptance:** Approval, sign off, usability
Real life
Mimics real environment
User data
Meets business needs

Responsibilities for tests:

- Unit:** Programmer
- Integration:** Analyst (at high level)
- System:** Usually analyst but independent person
Not the programmer
- Acceptance:** User
Sign-off client

Mark Band ([1]–[2])

Candidate provides a basic answer showing limited knowledge and understanding of different types of tests, how they may be applied and by whom.

- A narrow range of tests are identified.
- The nature of the tests are poorly defined and described
- Limited identification of people responsible for any test
- Basic level of written communication.

Mark Band ([3]–[4])

Candidate provides a competent answer showing knowledge and understanding of different types of tests, how they may be applied and by whom.

- A range of tests are identified
- The nature of the tests are well defined and described
- Identification of people responsible for some tests
- Appropriate level of written communication.

Mark Band ([5]–[6])

Candidate provides a very competent answer showing good knowledge of different types of tests, how they may be applied and by whom.

- A wide range of tests are identified.
- The nature of several tests are well defined and described
- Identification of people responsible for several tests
- Excellent level of written communication.

[6]

**AVAILABLE
MARKS**

6

11 CHANGEOVER METHODS

AVAILABLE MARKS

Direct: switch off old and switch on new
old discarded and new put in immediately

Parallel: run along with old system
Old gradually faded out of use
Side by side
Run simultaneously
Run two systems at once

Mark Band ([1]–[2])

Candidate provides a basic answer showing limited knowledge and understanding of the different types of changeover methods.

- The features of parallel changeover and/or direct changeover are poorly defined
- Few advantages and/or disadvantages of parallel changeover are identified
- Few advantages and/or disadvantages of direct changeover are identified
- Basic level of written communication.

Mark Band ([3]–[4])

Candidate provides a competent answer showing knowledge and understanding of different types of changeover.

- The features of parallel changeover and direct changeover are defined
- Some advantages and/or disadvantages of parallel changeover are identified
- Some advantages and/or disadvantages of direct changeover are identified
- Appropriate level of written communication.

Mark Band ([5]–[6])

Candidate provides a very competent answer showing good knowledge of the different changeover methods.

- The features of parallel changeover and direct changeover are well defined
- Some advantages and disadvantages of parallel changeover are well identified
- Some advantages and disadvantages of direct changeover are well identified
- Excellent level of written communication. [6]

Total

6

100