

**Published Mark Scheme for  
GCE A2 Information and Communication Technology**

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**NORTHERN IRELAND GENERAL CERTIFICATE OF SECONDARY EDUCATION (GCSE)  
AND NORTHERN IRELAND GENERAL CERTIFICATE OF EDUCATION (GCE)**

**MARK SCHEMES (2010)**

**Foreword**

***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 16- and 18-year-old 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 a 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.

The Council hopes that the mark schemes will be viewed and used in a constructive way as a further support to the teaching and learning processes.



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New  
Specification



*Rewarding Learning*

**ADVANCED**  
**General Certificate of Education**  
**2010**

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## **Information and Communication Technology**

**Assessment Unit A2 1**

*assessing*

**Module 3: Information Systems**

**[AW211]**

**TUESDAY 18 MAY, AFTERNOON**

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**MARK  
SCHEME**

- 1 (a) Data is transformed  
 ... by the application of a key  
 ... before data transmission  
 On receipt the data is decrypted  
 ... using the appropriate decryption key  
 Intercepted data is meaningless without the key
- [1] for each of four points [4]
- (b) There is no server/controlling computer  
 All nodes/stations/computers are of equal status  
 Nodes are both suppliers and consumers of resources  
 Each node makes some of its resources available to the other nodes  
 A node can request a resource that it needs  
 Resources include processing time, data storage, disk storage,  
 bandwidth, printers  
 Each node is in charge of its own security/administration  
 ... and decides which other nodes get access to its resources
- [1] for each of four points [4]
- (c) An extra bit is added to a group of bits/byte/or a block of data  
 ... to make the number of 1s odd (or even)  
 This bit is transmitted as part of data  
 ... and the parity is checked on receipt  
 If the data's parity bit is incorrect  
 ... an error has occurred/a bit or bits have 'flipped'  
 Only an odd number of 'flips' will be detected
- [1] for each of five points
- Error correction** With simple parity checking, it cannot determine  
 which bits have flipped  
 ... and the data will have to be re-transmitted  
 With latitudinal and longitudinal parity checks/block parity checks  
 ... if one bit is transmitted incorrectly the error can be located and  
 corrected
- [1] for each of two points Max [6]
- (d) To enable different hardware devices/computers/software/information  
 systems  
 ... to pass data/messages to one another coherently/securely/  
 compatibly  
 ... using agreed formats/rules/error handling/speeds
- [1] for each of two points [2]

(e) The OSI model consists of an abstract/basic model of networking  
 ... and a set of specific protocols  
 It defines a layered protocol/there are seven layers  
 Each layer deals with specific functionality/each layer is independent  
 of the others  
 Control is passed from one layer to the next  
 Each layer interacts directly only with the layer immediately beneath it  
 ... and provides facilities for use by the layer above it  
 Example: Name of layer Max [2]  
 ... description of layer Max [2]

[1] for each of six points

[6]

AVAILABLE  
MARKS

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2 (a) Main contents

The purpose of system  
 Contains the system objectives  
 Describes the functions provided by the system

[1] for each of two points

The system configuration  
 Specifies the minimum  
 ... hardware  
 ... and software required

[1] for each of two points

Installation guide  
 Implementation instructions  
 Describes how to install the software  
 ... and load/create initial data files

[1] for each of two points

Operating instructions  
 Describes how to operate/navigate through the system  
 ... using step by step examples/screenshots  
 Example – how to print a report

[1] for each of two points

Trouble shooting/Help section  
 Describes common problems and how to fix them  
 ... using FAQs for example

[1] for each of two points

[2] for each of three features

[6]

- (b)** It can incorporate multimedia elements such as video clips/sound clips/hyperlinks  
 It can be interactive/the user can use hyper links to navigate through the guide  
 It can be context sensitive/provide help on what the user is currently doing  
 It can provide a search facility/search engine/the user can search for specific topics by name/key words  
 As it is electronic, it can be kept up to date more effectively by updating a master copy  
 Multiple users can access a single copy of the on-line guide  
 Greater accessibility – the user can adjust screen or text sizes/zoom in and out

[1] for each of four advantages [4]

- (c)** The user group enables its members to share knowledge/exchange ideas about the ICT application  
 The user group will have an online forum/bulletin board/publish e-bulletins/produce newsletters and other publications  
 The employees could check posts/threads/blogs  
 ... to see if an answer to their problem already exists  
 ... or create a new post or thread/blog  
 ... and receive replies/feedback from other users of the application

[1] for each of four points [4]

- (d)** An-line training course  
 An interactive DVD  
 Using a video conference

[1] for naming each of three methods

An-line training course/interactive DVD can incorporate multimedia elements  
 ... which the users could use at their own pace

[1] for each of two points

A video conference can be used to simultaneously train a number of users  
 ... at a number of geographically dispersed locations  
 ... allows interaction between trainer and trainee

[1] for each of two points Max [4]

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- 3 (a) A prompt is a message/hint/place marker/indicates the point or purpose of input/is produced by the computer  
In this case: **C:\>** /the current directory or path

[1] for each of two points

A parameter refers to additional/qualifying information required for a command

In this case: **WORDPRO.EXE** /the name of the program to be executed

[1] for each of two points

[4]

- (b) An icon or shortcut representing the application  
... can be clicked/double clicked

[1] for each of two points

Navigate to the name of the application

... in a menu/submenu

... and highlighting/clicking it

[1] for each of two points

Use a hot key/shortcut/function key

... which is a combination of specific keys

... by pressing a special key

[1] for each of two points

[2] for each of two methods

[4]

- (c) An ergonomic keyboard is specifically designed  
... to be physically comfortable/natural to use  
An ergonomic keyboard may be split in two/have two parts at an angle  
... with an integrated/separate/adjustable wrist or palm support  
Some ergonomic keyboards have vertically aligned keys  
... enabling the user to type with their hands held vertically with 'thumbs up'  
An ergonomic keyboard enables a more natural posture  
... and requires less finger effort/reduces key reach  
... which can minimise fatigue/RSI/Carpal Tunnel syndrome  
... and boost productivity

[1] for each of four points

[4]

**(d) Psychological factors [1]**

This includes how humans retain and recall information  
... including long-term/short-term memory  
... and human perception  
... in which past experiences can influence how users perceive objects  
The memory load on the user should be kept to a minimum/cognitive overload should be avoided  
Examples: the use of short menus or icons/use of standard interfaces  
... the use of metaphors/suitable colour schemes  
... the use of colours to strengthen or weaken information such as 'green for go'

[1] for each of three points

[4]

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**4 (a) A rationale for the policy**

Defines the employer's rights/the employee's responsibilities regarding the use of ICT  
... including proper use of e-mail and the Internet/how e-mail and the Internet should be used for business and personal use  
... and how use of ICT such as e-mail and the Internet will be monitored and policed  
It will describe security procedures such as secure logging on and off  
It will prohibit actions which will compromise data security e.g. the use of storage devices not checked for viruses  
It will identify management and employees responsibilities relating to legislation  
It will define the disciplinary process

[1] for each of four points

[4]

Note: Answers focusing on employees, not the policy max [2]

**(b) Copyright, Designs and Patents Act [1]**

Applies the concept of intellectual property/ownership to software  
A licence is required for copyrighted software  
It is illegal to copy unlicensed software  
It is illegal to distribute unlicensed software

[1] for each of two points

Computer Misuse Act [1]

It is illegal to access computer material without permission  
... or to access materials with intent to commit or facilitate a crime  
... or to modify materials without permission

[1] for each of two points

[6]

(c) Members have access to the world's largest digital library  
...of computer/ICT literature, publications, online books, journals

[1] for each of two points

The ACM enables members to contact fellow members  
... via newsletters/at conferences/seminars/courses/special interest groups

[1] for each of two points

The ACM provides career guidance/a Career and Job Centre section  
... which is an electronic meeting place for job seekers and employers in the computing/IT industry  
They provide online courses  
... enabling members to keep abreast of the latest development in ICT  
They provide accreditation for qualifications/courses

[1] for each of two points

[2] for each of two advantages

[4]

(d) Advances in telecommunications

... such as broadband  
... enable employees to access their organisation's database  
... and software/applications  
... using the Internet  
... usually via an intranet  
... irrespective of location  
... so they can work as effectively from home/do the same work at home  
Employees can communicate with managers/colleagues  
... using electronic bulletin boards/emails  
... or using web cams/videoconferencing

[1] for each of six points

[6]

20

5 (a) Data redundancy

The same (non-key) data is stored more than once/in multiple tables  
... causing the database to use up more storage space than required  
This can lead to data inconsistency

[1] for each of two points

Data independence

Data is kept separate  
... from the programs/software which uses/processes it

[1] for each of two points

[4]



- 6 (a) A first-cut solution/model is developed  
 This may be a non-functioning front end/dummy user interface  
 This is evaluated by the user  
 ... who provides feedback to the developer  
 The model is repeatedly refined and evaluated  
 The user interface is modified  
 Functionality is added  
 The iteration stops when the user is satisfied with the system  
 ... i.e. evolutionary prototyping  
 ... or when the user requirements have been established  
 ... and the system can then be developed using the waterfall method  
 ... i.e. throwaway prototyping

[1] for each of six points [6]

- (b) It is immediately available for use  
 The cost will be shared among many users  
 It should be fully tested/should contain few errors  
 There should be support available from other users, e.g. via user groups  
 Training materials should be already available

[1] for each of four points [4]

- (c) Improved software quality  
 CASE tools such as DFD generators provide automatic validation  
 ... ensuring that validation is carried out accurately/completely  
 ... reducing the risk of errors/eliminating human error  
 Code is produced automatically by a code generator  
 ... and should be error-free/free from human error  
 Code will be optimised  
 ... so it will be efficient/execute faster  
 A project management tool supports the organisation of a software project  
 ... reducing the risk of the system not meeting its objectives

[2] for each of two relevant arguments ([1] for relevant features/  
 use of CASE tool and [1] for how this improves quality or shortens  
 development time)

Reduced development time

Code is produced at electronic speeds  
... which is faster than a human programmer could  
Code generators produce consistent/standard code  
... which requires less testing  
Templates such as DFD shapes can be 'dragged and dropped'/  
reused  
... without having to be drawn from scratch  
Graphics tools such as DFD generators automatically populate the  
data dictionary  
... so this stage does not have to be performed by the designer/  
developer  
CASE tools produce electronic output  
... which can be saved and re-used for other systems  
A project management tool automates CPA/Gantt charts/timelines  
... ensuring development will progress to schedule

[2] for each of two relevant arguments ([1] for relevant features/  
use of CASE tool and [1] for how this improves quality or shortens  
development time)

Max [2] for describing features/use of CASE tools relevant to quality/  
development time but not justified as such.

Example: 'Code from an interface generator will be optimised.'

Report structure

Title/Introduction/Two sections/Summary or conclusion  
[0] [1] or [2] for structure

max [9]

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Quality of written communication

[5]

5

**Total**

**120**

AVAILABLE  
MARKS

## Quality of Written Communication (QWC) in GCE Mark Schemes.

The assessment of quality of written communication.

Marks are to be allocated to QWC in accordance with the following criteria.

<b>Performance Level</b>	<b>Criteria</b>	<b>Marks</b>
Threshold	Candidates spell, punctuate and use the rules of grammar with reasonable accuracy; they use a limited range of specialist terms appropriately.	0, 1
Intermediate	Candidates spell, punctuate and use the rules of grammar with considerable accuracy; they use a good range of specialist terms with facility.	2, 3
High	Candidates spell, punctuate and use the rules of grammar with almost faultless accuracy; deploying a range of grammatical constructions; they use a wide range of specialist terms adeptly and with precision.	4, 5





