

**Published Mark Scheme for  
GCE AS 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 (2009)**

**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 SUBSIDIARY (AS)  
General Certificate of Education  
January 2009

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## Information and Communication Technology

Assessment Unit AS 1

*assessing*

Module 1: Fundamentals of Information  
and Communication Technology

[AW111]

MONDAY 12 JANUARY, AFTERNOON

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# MARK SCHEME

- 1 (a) Data is raw facts  
6548 is a numeric value  
[1] + [1]

Information is data with meaning or data given a context  
6548 is the Product Number for a Right-side Engine  
[1] + [1]

[4]

- (b) (i) The check digit is calculated from the other digits in the data item  
... and becomes part of the data item  
The check digit is recalculated when the data item is input  
... and if it does not match  
an error will have occurred  
Example A transposition error will alter the place value of the digits  
[1] for each of **four** points

[4]

(ii) Data	6	5	4	8
Weightings	4	3	2	[1]
Products	24	15	8	[1]
Sum	47 [1]			
Remainder	47/11 = 3 [1]			
Difference	11 - 3 = 8 [1]			

MAX

[4]

- (c) How relevant of the information  
How accurate the information is  
How complete the information  
How well presented the information is  
[1] for each of **three** factors

[3]



**(d) (i) JPEG [1]**

This is a method of compressing full-colour or grey-scale images

It is a “lossy” compression method

The amount of compression can be altered

The greater the degree of compression, the smaller the file size

... but the greater the reduction in quality

Can handle over 16 million colours

[1] for each of **two** points

**Bitmap [1]**

This is a non-compression method

A bitmap file represents pixels in a grid

Each pixel is stored with a particular colour depth

... such as 1, 4, 8, 16, 32 or 64 bits per pixel

The more bits, the greater the resolution

... and the larger the file size

1 to 8 bits are used for grey-scale images

[1] for each of **two** points

**GIF [1]**

This is a method of compressing colour or grey-scale images

It is an 8-bit format

... which restricts the palette to 256 colours

[1] for each of **two** points

**TIFF [1]**

This is designed to transport colour or grey-scale images

TIFF files are large and of very high quality.

There are different types (baselines) of image available

... black and white/grey scale, palette/RGB (i.e. true colour)

... each with a different range of colours

TIFF files may or may not be compressed.

[1] for each of **two** points

**ZIP [1]**

The file is compressed before transmission

... and decompressed upon receipt

[1] for each of **two** points

PNG [1]  
 A lossless compression method  
 Supports indexed colours/grey-scale/RGB/millions of colours  
 Uses progressive rendering  
 ... the contents of a file become apparent earlier in the load process  
 Uses an alpha channel which enables multiple levels of opacity;  
 Uses gamma correction to control how an image will appear on different types of display  
 Includes file integrity checks to minimise problems while downloading or transferring PNG files  
 [1] for each of **two** points

[3] for each of **two** formats [6]

(ii) International Organization for Standardisation  
 It is a network of standardisation bodies from over 150 countries  
 It establishes standards which control products and services  
 ... such as quality, environmental friendliness, safety, reliability, efficiency interchangeability  
 Most ISO standards refer to specific products  
 ... e.g. Disaster recovery  
 Some are generic, e.g. [http://www.iso.org/iso/iso\\_catalogue/management\\_standards/iso\\_9000\\_iso\\_14000.htm](http://www.iso.org/iso/iso_catalogue/management_standards/iso_9000_iso_14000.htm) ISO 9001 (quality) but apply to ICT  
 [1] for each of **three** points [3]

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2 (a) **RAM**

This is temporary/volatile storage  
 It holds programs while they are being executed  
 ... and data while it is being directly processed/upon input/prior to being stored in external memory  
 [1] for each of **three** points

**Cache memory**

To allow the processor to operate at full speed  
 ... by storing data in faster memory (SRAM)  
 The cache holds data that the processor is likely to use in the very near future  
 Used by a proxy server  
 ... to store recently downloaded webpages  
 [1] for each of **three** points [6]

(b) (i) A laser beam is used to read the data

On a read-only DVD, pits are pressed onto the surface  
 These are detected by changes in the intensity of the reflected laser beam  
 On a DVD-R or DVR+R, the laser burns/heats the dye on the surface of the DVD  
 ... changing its reflectivity  
 On a non-rewriteable DVD, the writing laser is more powerful than the reading laser  
 [1] for each of **four** points [4]

(ii) **Advantage**

The format was developed for high-definition video (HD) and for storing large amounts of data  
 ... permitting high definition audio and video/providing clearer pictures with improved colour and vividness.  
 [1] for each of **two** points

**Disadvantage**

Blu-ray is a new/emerging technology  
 ... and players and discs are still relatively expensive  
 ... the range of films is restricted  
 [1] for each of **two** points [4]

- (c) (i) To manage resources such as hardware, software, data  
To provide an interface with the user  
[1] for each of **two** functions [2]
- (ii) It supports the creation of a web site ... and site navigation  
It provides templates/a toolbox ... and a WYSIWYG editor  
It automatically creates HTML code ... which the user can edit  
Pages can be viewed in a browser  
[1] for each of **four** features [4]
- (iii) **Advantage**  
The source code is available and can be modified without restriction  
... so the software can be improved or fine tuned  
... so the software can be ported to different hardware platforms  
[1] for each of **two** points
- Modifications and improvements to the code can be distributed  
... so software can be shared by many users  
... encourages groups of developers to contribute to open source projects  
[1] for each of **two** points
- [2] for **one** advantage
- Disadvantage**  
There is no guarantee that project development will continue  
You may be left with an application containing bugs, with no-one to fix them  
[1] for each of **two** points
- There may be a lack of support  
With commercial software, the vendor has an obligation to support the user, especially with serious/security bugs  
With an open source application, you may not get support without paying for it  
[1] for each of **two** points
- [2] for **one** disadvantage [4]

- 3 (a) Hardware resources can be shared  
 Software resources can be shared  
 Data can be shared  
 Electronic communication between users is possible  
 A user can use any computer on the network  
 Centralised control is possible  
 [1] for each of **three** advantages [3]
- (b) The network consists of a number of hubs  
 ... each of which is configured as a star network  
 The hubs are connected together along a bus connection  
 ... known as the “backbone”  
 ... which has terminators at each end  
 Typically, the hubs are located on different floors in a building  
 ... where the backbone uses fiber optic cable  
 ... and the workstations are wired to the hub with UTP (unshielded twisted pair) cable.  
 A common example is a large Ethernet network with multiple hubs  
 [1] for each of **six** points [6]
- (c) (i) An IP address is a unique number assigned to each computer connected to the Internet  
 It consists of 32 bits  
 An IP address consists of two parts  
 ... one identifying the network  
 ... and one identifying the node or host  
 [1] for each of **four** points [4]
- (ii) They could communicate by e-mail  
 ... using a shared address book  
 ... using contact groups  
 ... to multiple recipients  
 ... using attachments  
 [1] for each of **three** points
- Using an Internet forum or message board  
 The managers could register as members  
 ... and submit/contribute to topics (threads)  
 ... or communicate via messages visible to all members (posts)  
 [1] for each of **three** points
- Videoconferencing  
 Each manager would need a webcam  
 ... and a microphone  
 [1] for each of **three** points
- [3] for each of **two** methods [6]

- (d) Bluetooth communicates using radio frequencies  
... thereby replacing physical cable connections  
It was designed to connect a range of portable devices/laptops/PDAs/mobile phones  
A common use of Bluetooth is to connect desktop computers and printer  
A device has to be "Bluetooth enabled" i.e. contain a Bluetooth chip  
The range can be from 10m to 100m (Class 3 and 1)  
The range can be affected by obstacles, e.g. furniture, walls etc.  
[1] for each of **four** points

[4]

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- 4 (a) Increased accuracy/speed over manual systems  
 The barcode is read electronically/it is a direct data capture method/there are no transcription errors  
 [1] for each of **two** points
- More up to date prices  
 Once a price is changed in the database it will be immediately used when/if the barcode on the corresponding product is scanned  
 [1] for each of **two** points
- [2] for each of **two** benefits [4]
- (b) (i) Radio Frequency IDentification  
 Data relating to a product is stored on an RFID tag attached to the product  
 An RFID tag carries data programmed into a small computer chip  
 The tag is activated by radio waves emitted from an RFID reader/wirelessly  
 The tag sends the data stored in its memory back to the reader  
 [1] for each of **four** points [4]
- (ii) There is no line of sight requirement  
 A barcode must be clean and the reader and label must be properly oriented with respect to each other  
 RFID tags can be read from a greater distance, even in harsh environments  
 [1] for each of **two** points
- The information stored in a barcode is fixed and cannot be changed  
 RFID tags can be dynamically updated  
 [1] for each of **two** points
- Human intervention is usually required in order to scan a barcode ... whereas data from an RFID tag can be read without the need for someone to properly align the tag with the equipment that reads the data  
 [1] for each of **two** points
- Barcodes must be visible on the outside of a product's packaging ... whereas RFID tags can be placed inside either the packaging or the product itself.  
 [1] for each of **two** points
- More data can be stored in an RFID tag than on a barcode ... and RFID tags have both read/write capability, whereas barcodes are read-only and cannot be reused  
 [1] for each of **two** points
- [2] for each of **two** advantages [4]

(c) The supermarket must ensure that the data collected about loyalty customers  
 ... is processed fairly and lawfully  
 [1] for each of **two** points

The supermarket must ensure that the data collected about loyalty customers  
 ... is processed for the specified and lawful purpose, and not further processed in any way that is incompatible with the loyalty scheme  
 [1] for each of **two** points

The supermarket must ensure that the data collected about loyalty customers  
 ... is adequate, relevant to the loyalty scheme and not excessive  
 [1] for each of **two** points

The supermarket must ensure that the data collected about loyalty customers  
 ... is accurate and customer details are kept up to date  
 [1] for each of **two** points

The supermarket must ensure that the data collected about loyalty customers  
 ... is kept for no longer than is necessary  
 [1] for each of **two** points

The supermarket must ensure that the data collected about loyalty customers  
 ... is kept secure  
 [1] for each of **two** points

The supermarket must ensure that the data collected about loyalty customers  
 ... is not transferred outside the European Economic Area  
 [1] for each of **two** points

[2] for each of **four** measures [8]

(d) It describes how critical operations will be restored  
 ... after a natural or human-induced disaster.  
 ... including plans for coping with the unexpected or sudden loss of communications  
 ... and key personnel  
 ... and backup and recovery procedures  
 [1] for each of **four** points [4]

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- 5 (a) Hardware costs  
 Purchasing/leasing computer equipment/consumables  
 [1] for each of **two** points
- Software costs  
 Purchasing operating system/application software/licences  
 [1] for each of **two** points
- Personnel costs  
 Expert/developer/programmers/operators  
 [1] for each of **two** points
- [2] for each of **two** costs [4]
- (b) Project manager  
 To oversee/manage the development of the new system  
 To identify the tasks or stages  
 To schedule the project/set time scales  
 To manage the budget  
 To allocate resources – human, hardware, software  
 To monitor progress  
 To identify/respond to risk  
 To report to management  
 [1] for each of **three** points
- Programmer  
 To write program code  
 ... to meet module/system specification  
 To plan testing of code  
 To test code  
 To document code  
 To debug/maintain code  
 [1] for each of **three** points [6]
- (c) Application testing  
 Carried out by the developer/in house  
 The system is tested against the systems specification/systems testing  
 Modules are tested against module specifications/module testing  
 Modules are tested working together/integration testing  
 Test schedules/test data will be used  
 [1] for each of **three** points
- Acceptance testing  
 Carried out when the application is ready to be released/after it has undergone application testing  
 A group representing a cross section of end users tests the application.  
 ... using real scenarios/data  
 ... and reports back to the system developers  
 Alpha, beta testing may be used  
 [1] for each of **three** points [6]

- (d) (i) The new system is implemented wholly  
... and the old system is discontinued  
[1] for each of **two** points [2]
- (ii) Parallel running  
The old and the new system are operated together  
until the new system has been proven  
[1] for each of **two** points
- Phased changeover  
A part of the new system is used,  
and when it has been proven, another part of the system is  
implemented and so on  
[1] for each of **two** points
- Piloting  
The new system is tried by part of an organisation, e.g. a single branch  
... and if proven, it is then introduced throughout the organisation  
[1] for each of **two** points
- [2] for **one** method [2]

QWC

**Total**

**AVAILABLE  
MARKS**

20

5

**120**

## 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

