

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

January 2009

**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

Information and Communication Technology

Assessment Unit AS 1

assessing

Module 1: Fundamentals of Information
and Communication Technology

[AW111]

MONDAY 12 JANUARY, AFTERNOON

**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

ISO 9001 (quality)

but apply to ICT

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

[3]

24

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]

24

- 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.

Performance Level	Criteria	Marks
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

