

**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 (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.



## CONTENTS

	<b>Page</b>
AS 1: Module 1	1



New  
Specification



*Rewarding Learning*

**ADVANCED SUBSIDIARY (AS)  
General Certificate of Education  
January 2010**

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## **Information and Communication Technology**

### **Assessment Unit AS 1**

*assessing*

**Module 1: Components of ICT**

**[AW111]**

**THURSDAY 14 JANUARY, AFTERNOON**

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# **MARK SCHEME**

- 1 (a)** Data consists of raw facts or figures  
 In this case, 1435 (or 1438) is just a meaningless number  
 [1] for each of two points
- Information is data which has been processed to give it meaning  
 In this case, 1435 (or 1438) is an EmployeeID/identifies a specific employee  
 [1] for each of two points [4]
- (b)** Transposition error [1]  
 The order of the two digits 4 and 3 has been switched [1] [2]
- (c)** Length check  
 The number of characters in a field must be a set length  
 A valid EmployeeID should have 4 characters/digits  
 [1] for each of two points
- Range check  
 The value of a field must lie within a specified range between a max and min  
 A valid EmployeeID may have to lie in the range 1000 to 5000, for example  
 [1] for each of two points
- Lookup table  
 All valid values of a (key) field  
 are held in an electronic list/stored list  
 An EmployeeID can be checked to see if it exists in the list  
 [1] for each of three points [7]
- (d)** A human operator/the person keying in the data  
 ... performs a visual check on  
 proofreads what has been entered  
 The data subject is asked to confirm the details  
 [1] for each of two points [2]
- (e)**
- |             |               |    |   |    |     |
|-------------|---------------|----|---|----|-----|
| Digits      | 1             | 4  | 3 | 5  |     |
| Weightings  | 5             | 4  | 3 | 2  | [1] |
| Product     | 5             | 16 | 9 | 10 | [1] |
| Sum         | 40            |    |   |    | [1] |
| Remainder   | 40/11 = 3 R 7 |    |   |    | [1] |
| Check digit | 11 - 7 = 4    |    |   |    | [1] |
| Max         |               |    |   |    | [4] |



(f) The information might be out of date (age)  
 Eg. An employee's change of address was not implemented  
 [1] for each of two points

The information might not be complete  
 Eg. Overtime hours not shown  
 [1] for each of two points

Not all the information might be relevant  
 The payslip may contain details not relating to that week's pay  
 Eg. Last year's taxable income  
 [1] for each of two points

The information might not be presented effectively  
 Some figures relating to pay may not be labelled correctly  
 [1] for each of two points

[2] for each of three ways [6]

2 (a) A special document/form is used to collect the data  
 This has specific areas/boxes representing the user's choices/answers  
 /selections  
 ... which the user shades in/fills in  
 ... perhaps using a specific grade of pencil/using a HB pencil  
 The document is scanned using light  
 The reflected light is analysed  
 ... and the positions of the user's answers/choices determined  
 ... against a template  
 [1] for each of four points [4]

(b) Human error is eliminated  
 The answers can be read at electronic speeds reducing the processing time  
 [1] for each of two benefits [2]

(c) (i) The camera could be connected directly to the computer  
 ... using a USB cable/connection  
 [1] for each of two points

The camera's memory card could be removed  
 ... and placed in a media card reader connected/built in to the computer  
 [1] for each of two points

The photograph could be sent wirelessly to the computer  
 ... using a Bluetooth connection  
 [1] for each of two points

[2] for each of two methods [4]

<p><b>(c) (ii)</b> JPEG/JPG</p> <ul style="list-style-type: none"> <li>... uses image compression</li> <li>... to reduce the file size</li> <li>... at the possible expense of image quality/lossy compression</li> <li>The degree of 'lossiness' can be varied</li> <li>[1] for each of two points</li> </ul> <p>BMP/Bitmap</p> <ul style="list-style-type: none"> <li>Each pixel in the photograph</li> <li>... is represented using 8/16/24/32 bits (the colour depth)</li> <li>... for grayscale/coloured images</li> <li>All detail in the image is stored/no compression</li> <li>... resulting in large file sizes</li> <li>[1] for each of two points</li> </ul> <p>TIFF/Tagged Image File Format</p> <ul style="list-style-type: none"> <li>Stores information about the image in a header</li> <li>Supports multiple formats</li> <li>Virtually no compression</li> <li>[1] for each of two points</li> </ul> <p>PNG</p> <ul style="list-style-type: none"> <li>Open-source format</li> <li>Supports true color (16 million colors)</li> <li>Lossless/no compression</li> <li>[1] for each of two points</li> </ul> <p>GIF</p> <ul style="list-style-type: none"> <li>Bitmap image format</li> <li>Supports 256 colours</li> <li>Uses compression for colour depth</li> <li>Stores pixel data</li> <li>[1] for each of two points</li> </ul> <p>[2] for each of two formats</p>	<p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[6]</p>
<p><b>(d)</b> Data to be processed is grouped/held in bundles</p> <ul style="list-style-type: none"> <li>... until a suitable quantity/processing time is reached</li> <li>Then the entire batch is processed in one go</li> <li>... usually at an 'off peak period'/overnight</li> <li>All data undergoes the same processing</li> <li>... without human intervention</li> <li>Validation by control/batch total is used</li> <li>[1] for each of four points</li> </ul>	<p>[4]</p>

- 3 (a)** All the computers are close enough together  
 ... to be physically/wirelessly connected together  
 [1] for each of two points [2]
- (b) Bus**  
 The new computer is connected directly/by its own cable  
 ... to the bus backbone  
 [1] for each of two points
- Star  
 The new computer is connected directly/by its own cable/wirelessly  
 ... to the central/controlling computer  
 [1] for each of two points
- Ring  
 An existing connection between two nodes must be split  
 ... and the new computer connected between these existing connections  
 [1] for each of two points [6]
- (c)** WiFi enables two or more devices to connect (wirelessly) for data sharing  
 A computer with a wifi network card  
 ... can connect wirelessly to a wireless router  
 ... over a limited distance (60m/90m)  
 A wifi networks can either be “open” (anyone can use them)  
 ... or “closed” (a password is needed)  
 An area with wireless access is called a wireless hotspot.  
 [1] for each of four points [4]
- (d)** No cabling is required  
 This saves installation cost and time  
 [1] for each of two points
- Computers on the network are not restricted to a physical location  
 They can be used anywhere there is network coverage  
 [1] for each of two points
- [2] for each of two benefits [4]

(e) TCP layer

- Supports the transfer of files between computer systems
  - Controls security/permission issues
  - It can handle file transfer between different computers (different character sets, end of line conventions...)
  - Splits data into packets
  - Allocates an address to each packet
- [1] for each of three points

IP layer

- Is responsible for transferring packets of data from node to node.
  - Forwards each packet using its address
  - Is responsible for verifying the correct delivery of data
  - Detects errors or lost data
- [1] for each of three points [6]

(f) The proxy server intercepts all requests to the Internet

- ... to see if it can meet the request
  - If not, it forwards the request to the Internet
  - It stores recently used pages in (cache) memory
  - ... to increase access speeds
  - The proxy server may be used to filter requests/monitor requests.
  - ... to prevent employees from accessing specific Web sites
- [1] for each of four points [4]

4 (a) Input

The cash card is inserted  
 The PIN is entered  
 A menu choice is selected  
 An amount is entered or selected  
 [1] for each of two points

Output

Instructions/menu choices are displayed on the ATM screen  
 A receipt may be printed  
 A sum of money is issued  
 [1] for each of two points

Processing

The customer's data is retrieved from the bank's database  
 The PIN is validated  
 The amount is checked against the customer's balance  
 The amount is deducted from the customer's balance  
 [1] for each of two points

Storage

Customer data is stored in the cash card  
 Customer details are stored in the bank's database  
 Details of the transaction are stored in the bank's database  
 [1] for each of two points

Feedback

The amount is instantly deducted from the customer's balance  
 If the card is invalid/the PIN is incorrect/the withdrawal amount is not possible an error message appears on the ATM screen  
 [1] for each of two points [10]

(b) Identity fraud

Personal/banking details keyed in during a transaction may be intercepted and used for unauthorised purchases/keystroke logging  
 [1] for each of two points

Phishing/fraudulent emails

User asked to supply personal/banking detail by a bogus email  
 [1] for each of two points

Viruses

... may be downloaded while using on-line banking  
 [1] for each of two points

[2] for each of two risks [4]

- (c) Use antivirus software, updated regularly  
Do not open suspicious emails  
Do not visit dubious websites  
Use passwords on wireless networks  
Block pop-ups  
Always log off interactive websites  
Delete Internet cookies  
Set browser security levels  
[1] for each of four points

[4]

5 (a) Observation

Benefit

The working of the system can be studied at first hand

[1] for one benefit

Drawback

Users may 'act up' under observation

It may be difficult to select the users to observe

[1] for one drawback

Questionnaire

Benefit

The same set of questions can be given to a large cross section of users at the same time

The anonymous process may elicit honest answers

[1] for one benefit

Drawback

The questions are set beforehand and a question cannot be changed in the light of the user's response

[1] for one drawback

Interviews

Benefit

The interview can be fine-tuned for the particular user/follow up questions can be asked

[1] for one benefit

Drawback

Users may 'act up' under the pressure of an interview

It may be difficult to select the users to interview

[1] for one drawback

[6]

**(b)** The technological feasibility of the system  
 Is the hardware/software/ICT required for the IS available?  
 [1] for each of two points

The economic feasibility of the system  
 Is the IS affordable?  
 Will the benefits of the IS outweigh the costs?  
 [1] for each of two points

Additional factors

The social feasibility of the new system  
 What will be the impact on the public/customer  
 Eg. they might have to apply online  
 [1] for each of two points

The legal feasibility of the system  
 Will the IS be able to comply with relevant legislation (e.g. the DPA)?  
 [1] for each of two points

The operational feasibility of the system  
 Will the impact of the IS on people's working lives be manageable?/  
 retraining/redundancy  
 [1] for each of two points

The 'schedule' feasibility of the system  
 Can the IS be implemented within the desired time-frame?  
 [1] for each of two points

[2] for each of three factors [6]

**(c)** To provide a visualisation/graphical presentation  
 ... of a system at different levels  
 ... of how a system interacts with external entities  
 It identifies processes/data stores  
 [1] for each of two points [2]

**(d)** Technician  
 To install hardware  
 To install and configure software  
 To maintain ICT systems  
 To liaise with/support users  
 To troubleshoot/monitor ICT systems  
 To perform backup  
 [1] for each of four points

Programmer

To write the program code  
... from the module specifications

To test the code

To debug the code

To document the code

To maintain the code

[1] for each of four points

[8]

**(e)** Direct changeover

The new system replaces the old system 'overnight'

[1] for each of two points

Parallel running

Both systems run side by side until the new system is proven

[1] for each of two points

Pilot running

The new system is used in one section/department until it is proven when it is introduced throughout the organisation

[1] for each of two points

Phased changeover

The change takes place in stages/one at a time

[1] for each of two points

[2] for each of two methods

[4]

**+ Standard QWC Criteria**

**[5]**



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





