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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[AW211]

WEDNESDAY 27 JANUARY, AFTERNOON

MARK SCHEME

			AVAILABLE MARKS
1	**(a)**	Defining/maintaining/modifying ... the database structure ... tables/attributes/keys/relationships/schema/data dictionary Controlling access to the database E.g. assigning access rights/allocating user names & passwords /creating 'user views' Designing/modifying standard queries/reports/macros Identifying new user query and report requirements/liaising with users Keeping users informed of changes relevant to the user e.g. additional reports Managing on-going user training Managing/monitoring back ups Ensuring compliance with legislation e.g. the DPA [1] for each of four points [4]	
	(b)	<u>Data consistency</u> A particular attribute has only one value at a particular time/throughout the database A change to a data value is implemented throughout the database ... because it is held in only one table [1] for each of two points <u>Data integrity</u> Refers to the validity/correctness/accuracy of data ... which can be affected by input errors ... and processing errors Minimised by data verification/validation [1] for each of two points [4]	
	(c)	A user interface The user keys in facts to the expert system about the problem ... and receives a solution and reason/explanation [1] for each of two points A knowledge/rule base Contains information/heuristics, rules about the problem domain /expert knowledge Represents the knowledge of human experts [1] for each of two points An inference engine/mechanism Applies the rules using the user's input ... and draws conclusions Can apply fuzzy logic [1] for each of two points [6]	14

AVAILABLE MARKS

2 **(a)** Attack from viruses/spyware
... attached to emails or other files/from infected sites/from non secure sites
... leading to data loss/modification

[1] for each of two points

Unauthorised external access
... from programmers/hackers
... leading to unauthorised use of data/fraudulent use of data
/corruption of data/deletion of files

[1] for each of two points [4]

(b) Each user/group is allocated an access level
... which controls the access they have to specific data files
Example: Read only
Access rights to a data file are held in a table
Enforced by username/password system
When a user tries to access a data file, the computer uses the table
... to check that they have appropriate the appropriate level of access
If they do not, access is denied

[1] for each of four points [4]

(c) A RAID is often used
An exact copy
... called a mirror image
... of all data/transactions is kept
All transactions are recorded on both systems simultaneously

The copy is stored at a remote/secure/separate location

[1] for each of four points

If the live system fails
... there is instant switch over
... to the backup system

[1] for each of two points [6]

(d) <u>Client server network</u>
There is a controlling computer/network server
... which handles processing requests from the other computers on the network

[1] for each of two points

<u>Peer to peer network</u>
All the computers on the network are equal/there is no controlling computer
Each computers makes some of their resources (processing power,
disk storage) available to other computers

[1] for each of two points [4] 18

AVAILABLE MARKS

3 **(a)** Mobile phone network

Radio frequency waves are used for communication information
When a mobile phone connects to a network it communicates with the nearest base station
The area covered by a base station is known as a cell
Each cell is usually split into three sectors
... which overlap with the sectors of neighbouring cells
... to create an uninterrupted network
When people travel, the signal is passed from one base station to the next
... and usually never has to travel further than the nearest base station
Cells are connected to cellular telephone exchange switches
... which are connected to the public telephone network /other exchange switches

[1] for each of four points

Wireless LAN

This connects computers together within a small geographical area
All network computers/stations/devices are wireless enabled
... equipped with wireless network interface cards (WNIC)/dongle
Access points act as base stations/hubs for the wireless network
... which transmit and receive radio signals for stations to communicate with
Wireless devices can be laptops, PDAs, IP phones or fixed desktops /workstations

[1] for each of four points [8]

(b) Parity bit

An additional bit calculated from the other bits
... in a byte of data
... set to make the total number of bits odd (or even)
The parity bit is checked after data transmission
If the parity bit is not correct, a transmission error has occurred

[1] for each of three points

Checksum

Calculated by adding together all the bytes/applying an algorithm
... in/to a block of data
... of 256 bytes for example
The checksum is recalculated
... after data transmission
If the checksum is incorrect, the data is very likely to be in error
Some types of checksum may automatically correct the error

[1] for each of three points

			AVAILABLE MARKS
	Echo checking The receiving device sends the received data ... back to the transmitting device The transmitting device can compare this data with the original ... and make corrections as appropriate/retransmit the data [1] for each of three points	[9]	
(c)	Developed as part of the Open Systems Interconnection initiative ... by the International Organization for Standardization (ISO)/ANSI Consists of an abstract/basic model of networking ... and a set of specific protocols Consists of seven layers Each layer deals with specific functionality Each layer interacts directly only with layer immediately beneath it ... and provides facilities for use by the layer above Example: Name of layer ... and description of a layer [1] for each of six points	[6]	23
4 **(a)**	Waterfall method There is a sequence of distinct stages Example: Analysis One stage must be completed before next stage commences Deliverables are produced at end of each stage Example: system specification at the end of the analysis stage If an error is found during one stage ... a previous stage may have to reworked [1] for each of four points		
	RAD An iterative development process (continuous/cyclical) A preliminary data model is developed ... and a prototype/user interface developed ... providing the business processing/functionality The prototype helps the analyst and users to verify the requirements ... and to refine the data model ... and implement the required processing There are strict deadlines set for each refinement User requirements/system functionality are prioritised/categorised ... as essential/non essential Formal workshops are scheduled between the developer and users The JAD methodology is often used CASE tools are usually used [1] for each of four points	[8]	

				AVAILABLE MARKS
	(b)	Alpha testing Performed by the developer The system is tested against the system/module specifications Includes module testing/integration testing/system testing Test schedule/plan produced Test data is used [1] for each of four points Beta testing Performed after alpha testing System given to selected groups of potential users Known as pre-release testing ... for use in a realistic environment with real data/real volumes of data The users evaluate the system/provide feedback to the developer [1] for each of four points	[8]	16
5	**(a)**	A GUI is not text based Uses windows ... pull-down menus ... buttons ... scroll bars ... icons ... wizards ... mouse, ... multimedia elements (audio/sound clips, video clips) WYSIWYG [1] for each of four points	[4]	
	(b)	Allows user to interact using written 'human' language ... or spoken commands ... instead of computer language and commands/associated with specific tasks Verbs or phrases are used ... to instigate functionality ... such as creating, selecting, modifying data [1] for each of four points	[4]	

		AVAILABLE MARKS
(c)	It can be difficult to implement effectively/accurately ... due to unpredictability of natural language ... and ambiguity of natural language ... or variations in a person's voice patterns It can be time-consuming to initialise/calibrate the system The user may have to keep repeating words/phrases until they are recognised It has to be calibrated for one user at a time/it may only work with a single user May not function accurately in a noisy environment ... commands may be misunderstood due to background sounds [1] for each of two points [2]	
(d)	Human perception Past experience can influence how humans perceive objects Use of metaphors/colour association/sound association Example – 'red for danger' 'use of muted colours to encourage calm' [1] for each of three points Human memory How humans store, retain, recall information Long term memory versus ... ... short term memory Example – Limit to menu depths/provision of standard interfaces [1] for each of three points [6]	
(e)	The design of general office furniture ... such as adjustable chairs ... to minimise the risk of back pain [1] for each of two points The design of computer equipment ... such as split keyboards ... to minimise the risk of RSI [1] for each of two points [4]	20

				AVAILABLE MARKS
6	**(a)**	Online/cashless shopping Customers can purchase goods (on the Internet/in stores) using credit/debit cards Increased risk of fraud/wider choice/no need to carry cash/24/7 [1] for each of three points [Use of ICT/Benefit/Drawback] On-line banking Customers can check balances/transfer funds/set up DDs and SOs Increased risk of fraud/identify theft/24/7 [1] for each of three points [Use of ICT/Benefit/Drawback]	[6]	
	(b)	An on-line course/tutorial Employees log on and complete the course individually [1] for each of two points An interactive DVD Employees place DVD in drive and complete the course individually [1] for each of two points Video conference Employees at a number of locations follow the same course [1] for each of two points [2] for each of two methods	[4]	10
7	**(a)**	<u>Organisation</u> Data users must register ... and comply with the DPA's eight principles Must appoint a DP officer Must identify what data will be stored ... and the purpose for which it is being processed/the processing performed Relevant staff must be informed and trained Procedures must be set in place to ensure compliance Example - The data user must implement good information practice specifying how data is kept secure/kept up to date [1] for each of three points from the <u>organisation's perspective</u>		

			AVAILABLE MARKS
	Members of public These are the data subjects Confidence that data held about them is accurate/up to date ... Data subjects have the right to see the data held about them ... and have any errors corrected There are cost implications – a fee can be charged Compensation may be available if their rights are contravened [1] for each of three points from the data subject's perspective	[6]	
(b)	Role of BCS It is the Chartered Institute for IT/represents IT & Computing specialists/ the IT sector Promotes wider social, economic progress through the advancement of IT science and practice Brings together industry, academics, practitioners, government to share knowledge, promote new thinking, inform the design of new curricula, shape public policy, inform the public [1] for the 'target audience' represented by the BCS [1] for the aims of the BCS [1] for each of two methods the BCS uses to achieve its aims All points stated using appropriate technical language	MAX [3]	
	Professional advantages Contact with other IT professionals - over 70,000 members (practitioners, businesses, academics, students) in the UK and worldwide Delivers a range of professional development tools for practitioners Offers a range of widely recognised professional and end-user qualifications for beginners, home users, professionals/validates a range of qualifications Members can keep up to date with developments in IT Members can avail of up to date training in IT tools/techniques/CASE tools [1] for each of three benefits to the IT professional stated using appropriate technical language		
	Report structure A focused report directed at the target audience – the IT professional Title/two sections/section headings [0]/[1]/[2]	[8]	14
	+ Standard QWC criteria [5]		5
		Total	**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, puntuate and use the rules of grammar with reasonable accuracy; they use a limited range of specialist terms appropriately.	0, 1
Intermediate	Candidates spell, puntuate and use the rules of grammar with considerable accuracy; they use a good range of specialist terms with facility.	2, 3
High	Candidates spell, puntuate 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