GCE A2

Information and Communication Technology

Summer 2009

Mark Schemes

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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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ADVANCED
General Certificate of Education
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assessing

Module 4: Development of Information Systems

[A2W11]

MONDAY 11 MAY, MORNING

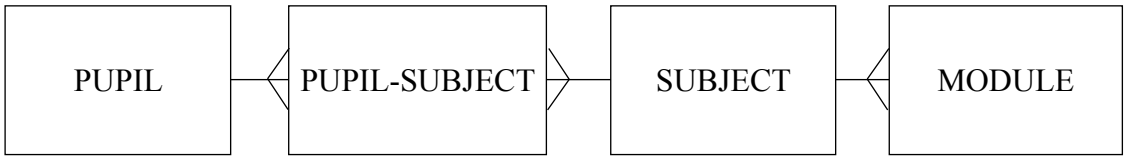
MARK SCHEME

				AVAILABLE MARKS
1	(a)	(i)	Fibre optic cable can carry much more information than co-axial cable Light is transmitted along fibre optic cable so many frequencies can be sent simultaneously Electrical signals are transmitted along co-axial cable which limits the number of frequencies which can be sent simultaneously Fibre optic has a higher bandwidth [1] for each of two points [2]	
		(ii)	Fibre optic cable is immune to interface . . . because light signals are used Co-axial cable is subject to electrical interference . . . for example from strong electromagnetic fields [1] for each of two points [2]	
	(b)		A message is broken up into small packets before being transmitted Each packet contains data . . . and a "header" . . . containing the network IP address that it needs to arrive at . . . and the IP address from which it was sent . . . and a packet number . . . and the number of packets in the message Each packet is sent individually across the network The packets may follow different routes to the destination, At the destination the packets are reassembled into the original message [1] for each of six points [6]	10
2	(a)		The software could be purchased ready made . . . "off the shelf" . . . from a computer store/specialist software shop [1] for each of two points This is a suitable method as payroll is a common/standard application and there are many payroll packages already available The software will be relatively cheap as the cost will be shared among many users [1] for one point about suitability The software could be developed "in-house" . . . by specialists within the business [1] for each of two points This would be an inefficient method as it would be expensive and take a long time as the system would have to be developed from scratch Most companies do not have the expertise to develop their own software The full cost of the software will fall on the business [1] for one point about suitability The software could be "out-sourced" . . . to specialist software developers [1] for each of two points	

				AVAILABLE MARKS
		This would be an inefficient method as it would be expensive and take a long time as the system would have to be developed from scratch The full cost of the software will fall on the business [1] for one point about suitability [3] for each of three methods	[9]	
	(b)	How well does the software meet the needs of the user? Are the system requirements met? [1] for each of two points How reliable is the software? Does it produce accurate results? Does it produce consistent results? How free of residual errors is the software? [1] for each of two points How well does it match the ICT skills levels of the users? Is the user interface intuitive Is the user interface standard/common Is help provided for inexperienced users? [1] for each of two points [2] for each of two ways	[4]	13
3	**(a)**	The system analyst leads the development The systems analyst is involved in all stages The system analyst liaises with the client . . . and organises the programming team He/she may carry out feasibility study. He/she studies the client's problem . . . and identifies their needs . . . by carrying out fact-finding He/she determines how ICT can provide a sollution . . . and identifies data capture, processing, storage and output methods [1] for each of four points	[4]	
	(b)	A first-cut solution/model is developed This may be a non-functioning front end This is evaluated by the user . . . who provides feedback to the developer The model is repeatedly refined and evaluated This stops when the user is satisfied with the system This is known as evolutionary prototyping . . . or when the user requirements have been established . . . and the system can be developed using the waterfall method This is known as throwaway prototyping [1] for each of six points	[6]	
	(c)	The time available to develop the system may be too short . . . to allow all the stages of the waterfall method to be followed [1] for each of two points		

				AVAILABLE MARKS
		The user requirements maybe difficult/impossible to determine . . . there maybe no existing system. [1] for each of two points [2] for each of two reasons	[4]	14
4	**(a)**	Perfective maintenance [1] The performance of the system can be improved Maximum use should be made of new ICT developments Processing inefficiencies should be removed [1] for one point In this case, the speed of queries should be improved [1] Corrective maintenance [1] Errors in the system are removed [1] In this case, the report should be corrected so that it produces the correct information [1] [3] for each of two relevant types of maintenance	[6]	
	(b)	The user's needs may change . . . due to new business requirements/processes . . . or external factors such as changes to legislation [1] for each of two points	[2]	
	(c)	The module should be tested in isolation . . . to ensure it meets the module specification Integration testing should be carried out . . . to ensure no regression errors have been introduced [1] for each of four points	[4]	12
5	**(a)**	The code is produced automatically . . . which increases productivity [1] for each of two points The code should be optimised/correct . . . as it is produced by computer/is not prone to human error [1] for each of two points [2] for each of two benefits	[4]	
	(b)	Modelling tool/graphics tool		

					AVAILABLE MARKS
			[1] DFDs/ERDs can be drawn . . . and validated . . . using templates [1] for each of two points Data dictionary generator [1] The data dictionary is populated automatically . . . from DFDs/ERDs . . . and validated Documentation can be added [1] for each of two points Project management software [1] The project plan can be entered Gantt charts can be generated automatically Automatic critical path analysis can be performed [1] for each of two points [3] for each of three CASE tools	[9]	13
6	**(a)**	**(i)**	To monitor the activities of users . . . such as the identity of each log on . . . the log on/log off times . . . the location/terminal . . . the software/files accessed . . . to that unauthorised activities can be detected [1] for each of three points	[3]	
		(ii)	To monitor the use of resources . . . such as hard disk space/printers/consumables/software/processor time/internet use . . . for billing purposes . . . to comply with licensing restrictions . . . to help predict future HW requirements . . . to assist the allocation of resources [1] for each of three points	[3]	
	(b)	**(i)**	Ergonomic factors determine the optimum design of computer interfaces/environments . . . such as a split keyboard/adjustable keyboard/use of a wrist rest . . . to reduce the risk of RSI . . . or height-adjustable chairs . . . to reduce posture problems [1] for each of three points	[3]	
		(ii)	Psychological factors take into account huyman characteristics/ behaviours . . . such as human perception . . . of sights/sounds/colours		

			AVAILABLE MARKS
	. . . and memory . . . including long-term and short-term memory . . . and how humans acquire new skills . . interface should be familiar/consistent [1] for each of three points	[3]	12
7	**(a)** One-to-one [1] One-to-many [1]	[2]	
	(b) PUPIL [1] SUBJECT [1] MODULE [1] PUPIL-SUBJECT [1] [1] for each of three entities	[3]	
	(c)  [1] for each of four entities [1] for each of three relationships	[7]	12
		QWC	4
		Total	**90**

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

Rewarding Learning

ADVANCED
General Certificate of Education
2009

Information and Communication Technology

Assessment Unit A2 2

assessing

Module 5: Uses of Information Systems

[A2W21]

FRIDAY 15 MAY, MORNING

MARK SCHEME

				AVAILABLE MARKS
1	**(a)**	A data processing system deals with day-to-day transactions . . . upon which a business depends . . . which represents the core business of the organisation Any relevant example, e.g. invoice processing [1] for each of two points A MIS takes data from a data processing system . . . and from external sources . . . and turns it into useful/relevant information [1] for each of two points	[4]	
	(b)	The data upon which it relies may be incorrect . . . or out of date . . . or not completely relevant [1] for each of two points The MIS may not be designed correctly It may not meet the needs of the user The information it produces may not be what is required [1] for each of two points May prevent managers using intuition/ common sense . . . which may be needed to resolve unexpected situations [1] for each of two points [2] for each of two limitations	[4]	
	(c)	It contains a knowledge base . . . a rule base . . . an inference engine . . . a user interface It attempts to replicate the behaviour/reasoning . . . of a human specialist [1] for each of four points	[4]	12
2	**(a)**	Accept <u>once only</u> 24/7 Use of multimedia to show users how to use the system All users can access the same training Users can work at their own pace/individually Users can determine their own training paths Training can be passive or interactive **(i)** Internet-based/Internet-supported Users follow a link/URL to a web site/page E support available, e.g. email Progress/training history can be recorded centrally The material may be available only for/at a specific time Synchronous e-learning is possible ... through videoconferencing		

				AVAILABLE MARKS
	(ii)	The video will be on electronic media – CD/DVD which users can playback using any PC A single copy of the video may be provided in electronic form, e.g. as .mov files and made available to network users [1] for each of six points	[6]	
(b)	**(i)**	The user is provided with a special telephone number/link The user can talk to a person who has experience of using the system . . . or who has access to a databank of common problems The user can be talked through the specific problem The helpdesk operator may be able to take control of the user's PC/screen . . . in an attempt to resolve the problem [1] for each of three points	[3]	
	(ii)	A group of users may be formally organised . . . as a self-help group . . . to support one another in solving common problems They may use a public contact point . . . such as an Internet site/bulletin board/forum . . . to which other users can subscribe . . . and post problems . . . or read FAQs [1] for each of three points	[3]	12
3	**(a)**	Numerical data can be entered into cells Labels can be used to document the spreadsheet Automatic calculations can be performed Special purpose functions are provided Cells can be formatted as currency Formulae can be replicated Lookup tables can be used [1] for each of four features	[4]	
	(b)	The relevant summary data from each year's sales figures . . . can be copied to a new work sheet/region . . . for direct comparison The relevant data can be highlighted . . . and used to populate a suitable graph . . . such as a bar chart . . . to compare the sales figures graphically Different types of graph can be produced . . . and annotation added/legends/labels [1] for each of four points	[4]	

				AVAILABLE MARKS
	(c)	The relevant graph(s) can be imported/linked . . . into a slide(s) Relevant graphics/images could be inserted/sound file inserted Explanatory text could be inserted Different slide transitions can be chosen Timings can be set Speaker's notes can be added Handouts can be printed [1] for each of four points	[4]	12
4	**(a)**	Costs such as van drivers' wages/van running costs . . . so that economic charges can be set for home deliveries [1] for each of two points Geographical spread of warehouses/supermarkets . . . so that delivery costs can be minimised/the most efficient routes can be established [1] for each of two points Stock levels in warehouses . . . so that sufficient stock for home delivery is available [1] for each of two points [2] for each of two relevant internal sources	[4]	
	(b)	Demographics . . . so that demand for home delivery can be predicted [1] for each of two points Information about competitor supermarkets' home delivery services/charges . . . so that the supermarket can remain competitive [1] for each of two points [2] for each of two external sources	[4]	
	(c)	**(i)** It will assist the directors/senior management of the supermarket . . . in long term planning . . . such as when/where to expand the home delivery service [1] for each of two points	[2]	
		(ii) It will assist departmental heads/managers . . . in medium term planning . . . such as when to purchase additional vans [1] for each of two points	[2]	
		(iii) It will assist staff working in the store room It will assist staff in decision making It will assist staff deciding the number of vans required [1] for each of two points	[2]	14

			AVAILABLE MARKS
5	**(a)**	Data protection is a body of law which protects personal information from misuse It places restrictions on organisations and people who handle personal information The main legislation is known as the Data Protection Act 1998 Registration with the DPR is required Personal data must be fairly and lawfullly processed . . . for limited purposes . . . be adequate, relevant and not excessive . . . be accurate . . . and not kept for longer than is necessary It must be processed in line with the data subject's rights It must be held securely It must not be transferred to countries without adequate protection [1] for each of five points	[5]	
	(b)	The Computer Misuse Act identified three new offences and appropriate punishments Unauthorised access to computer material . . . with a penalty of up to six months in prison and/or a hefty fine This offence covers using someone else's password to log onto their user area and even looking at their files Unauthorised access with intent to commit or facilitate a crime . . . with a penalty of up to five years in prison and/or a hefty fine This offence covers gaining access to someone else's system with the sole purpose of doing something illegal Unauthorised modification of computer material . . . with a penalty of up to five years in prison and/or a hefty fine This offence also covers purposely introducing a virus into another person's computer system [1] for each of five points	[5]	
	(c)	This Act protects the copyright of individuals who have created original pieces of work . . . including software developers It makes software piracy illegal The penalties include up to two years in prison and unlimited fines [1] for each of two points The software licences owned by one college . . . may not cover the use of the software by the other college The partnership will have to carry out a software audit . . . to ensure it complies with the Act [1] for each of two points	[4]	14

				AVAILABLE MARKS
6	**(a)**	It will identify the information that should be available across the organisation . . . which the organisation needs to be effective . . . and define the structure of this information . . . and the access users will have . . . and the restrictions It will identify key staff . . . and their responsibilities . . . and the training required It will identify the ICT resources required . . . such as hardware and software standards/specifications [1] for each of five points	[5]	
	(b)	It should ensure that all parts of the new company . . . have the same controlled access . . . to the same information . . . relevant to each section's needs The information should be of a suitable standard/fit for purpose . . . with regard to its accuracy, relevancy, consistency, completeness All users should receive training . . . exactly/appropriate to their needs Data security should be enforced . . . across the entire organisation . . . HW + SW should be consistent [1] for each of five points	[5]	10
7	**(a)**	There will be redundancies The employees on the assembly line will have less manual/heavy work to do . . . for example, moving/positioning car parts . . . or welding parts together Their work will be safer/less hazardous . . . as cars will be painted by robots They will have less repetitive work to do These manual/repetitive tasks will be performed by robots [1] for each of four points	[4]	
	(b)	They should have access to more accurate information . . . about productivity/throughput/results of test . . . as the whole process becomes more automated . . . through the use of sensors They will have fewer interventions to make/errors to respond to . . . due to increased consistency They will see an improvement in quality statistics/standards [1] for each of four points	[4]	

			AVAILABLE MARKS
(c)	Customers should benefit . . . from better quality cars . . . more consistently built/reliable cars . . . as human error in their assembly has been eliminated/minimised Prices should be reduced . . . as labour costs are reduced Prices might initially increase . . . due to the high initial investment costs involved [1] for each of four points	[4]	12
		QWC	4
		Total	**90**

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