Rewarding Learning

ADVANCED
General Certificate of Education
2013

Information and Communication Technology

Assessment Unit A2 1

assessing

Module 3: Information Systems

[AW211]

MONDAY 3 JUNE, AFTERNOON

MARK SCHEME

General Marking Instructions

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 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 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.

			AVAILABLE MARKS
1	**(a)**	Software can be shared Hardware can be shared Electronic communication between users is possible Central control is possible, e.g. antivirus software, back ups, installing new software A user can log on at any terminal [1] for each of **three** advantages [3]	
	(b)	There is no server/controlling computer All nodes/stations/computers are of equal status Nodes are both suppliers and consumers of resources Each node makes some of its resources available to the other nodes A node can request a resource that it needs Each node is in charge of its own security/administration ... and decides which other nodes get access to its resources [1] for each of **three** points [3]	
	(c) **(i)**	To ensure that when a message is transmitted between two network nodes the message follows agreed rules Different technologies may be used/different manufacturers Example – different transmission speeds/parity [1] for each of **two** points	
	(ii)	The OSI model consists of an abstract/basic model of networking ... and a set of specific protocols It defines a layered protocol/there are seven layers Each layer deals with specific functionality/each layer is independent of the others Control is passed from one layer to the next Each layer interacts directly only with the layer immediately beneath it ...and provides facilities for use by the layer above it Example: Name of layer Maximum [1] ... description of layer Maximum [1] [1] for each of **six** points [6]	
	(d)	It records which users have logged on/at which terminal/for how long ... to identify which user might have done something unauthorised ... or for accounting purposes It records what software has been accessed to monitor the usage of each software package It records unsuccessful attempts at log on to detect hacking [1] for each of **four** points [4]	
	(e)	Once a virus infects one network terminal or a particular file ... it can spread rapidly to other terminals because they are all connected ... whereas a standalone computer is not connected to other computers [1] for each of **three** points [3]	19

AVAILABLE MARKS

2 **(a)** 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
If time runs out, non-essential requirements will be dropped
Formal workshops are scheduled between the developer and users
CASE tools are usually used

[1] for each of **four** points [4]

(b) Name Prototyping [1]

Description
A first cut model is created
This may be a non-functioning user interface
This is evaluated by the user/the user provides feedback to the developer
… so that an improved/refined model can be created
This process will be repeated
The prototype may evolve into the final system
This is evolutionary prototyping
The prototype may be discarded when the system objectives have been established
This is throwaway prototyping
[1] for each of **three** points

Name The waterfall model [1]

Description
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 **three** points

[4] for one alternative method [4]

(c) Graphics CASE tool [1]
This CASE tool assists the creation of DFDs, ERMs
… by providing graphical templates of standard shapes
It performs automatic validation
It may populate the DD
[1] for each of **two** points

Project management CASE tool [1]
This CASE tool assists the creation of a critical path/Gantt chart
Performs automatic critical path analysis
Automatically identifies bottlenecks/delays
[1] for each of **two** points

Code generator CASE tool [1]
Automatically produces code
… from interface design
… or module specifications
Code will be optimised
[1] for each of **two** points

DD generator [1]
Automatically populates the DD
... from data models/DFDs/ERMs

[3] for each of **three** CASE tools [9]

AVAILABLE MARKS

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				AVAILABLE MARKS
3	**(a)**	It uses windows Each window represents a different application/task These can be opened/closed/minimised by the user [1] for each of **two** points It uses icons An icon is an image which suggests an application/task The user clicks on the icon to start the application/perform the task [1] for each of **two** points It uses menus/submenus Each menu presents a series of options The user selects the required option [1] for each of **two** points It uses a pointer ... which the user moves using a mouse/tracker ball ... to select an icon/menu option/window option [1] for each of **two** points It may use metaphors for familiar objects Example: a desktop [1] for each of **two** points [2] for each of **three** features	[6]	
	(b)	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' 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 **four** points	[4]	10

			AVAILABLE MARKS
4	**(a)**	It can incorporate multimedia elements Example: video clips/sound clips [1] for each of **two** points The user can click hyperlinks ... to navigate through the guide/link to external resources [1] for each of **two** points It can provide context sensitive help ... specific to what the user is currently doing [1] for each of **two** points It can provide a search facility/search engine The user can search for specific topics using key words/criteria [1] for each of **two** points There is a master copy This **master copy** can be kept up to date more effectively/can be accessed by multiple users [1] for each of **two** points Greater accessibility for users with physical restrictions The user can adjust screen or text sizes/zoom in/out [1] for each of **two** points [2] for each of **two** advantages	[4]	
	(b)	A laser is used … to etch pits on the surface of the DVD … or to change the reflective properties of a dye/phase changes The pits/reflections represent 0s and 1s Data is written in spiral tracks/the surface is divided into sectors/tracks [1] for each of **four** points	[4]	
	(c)	The content can include multimedia components/video clips/sound/images to show the user how to perform task Example: By showing screenshots of the user interface The user can select menu options/use hyperlinks ... to choose a personal path through the material A limited amount of memory is available in the DVD player ... which can record the user's progress during the current training session In-built assessment/testing may be included [1] for each of **four** points	[4]	12

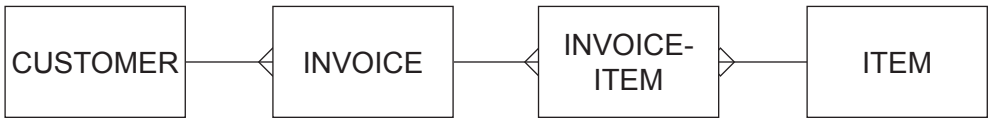
				AVAILABLE MARKS
5	(a)	(i)	The Act applies the concept of intellectual property/ownership ... to software products A licence is required for copyrighted software It is illegal to copy unlicensed software It is illegal to distribute unlicensed software [1] for each of **four** points [4]	
		(ii)	Data users 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 **four** points [4]	
	(b)		Defines the employer's rights/the employee's responsibilities regarding the use of ICT ... including proper use of e-mail and the Internet/how e-mail and the Internet should be used for business and personal use ... and how use of ICT such as e-mail and the Internet will be monitored and policed It will describe security procedures such as secure logging on and off It will prohibit actions which will compromise data security, e.g. the use of storage devices not checked for viruses It will identify management and employees responsibilities relating to legislation It will define the disciplinary process [1] for each of **four** points [4]	
	(c)		Membership of the world's largest educational and scientific society ... specifically for computing/ICT professionals [1] for each of **two** points Access to a wide range of digital resources ... ICT publications/books/newsletters [1] for each of **two** points Access to special interest groups ... attending conferences/accessing specialist publications/activities [1] for each of **two** points Access to professional development courses ... validates courses/provides certification ... and career advice/information about job opportunities [1] for each of **two** points Contact with online forum groups ... communicating with fellow professionals throughout the world [1] for each of **two** points [2] for each of **three** benefits [6]	18

AVAILABLE MARKS

6 **(a)** Data may be inconsistent
A particular attribute may have more than one value in the database/a change to a data value may not be implemented throughout the database
[1] for each of **two** points

Some data may be redundant
A particular attribute may be held in more than one table/row in the database/
This uses unnecessary storage space/
Data retrieval/searching may not be efficient as it could be
[1] for each of **two** points [4]

(b)



[1] for each of **four** entities
[1] for each of **three** relationships [7]

(c) 1NF

INVOICE1
InvoiceID InvoiceDate CustomerID CustomerName CustomerAddress InvTot
INVOICE-ITEM1
InvoiceID ItemID ItemDescription UnitPrice Quantity
[1] for each of **two** entities

2NF

INVOICE1
InvoiceID InvoiceDate CustomerID CustomerName CustomerAddress InvTot
INVOICE-ITEM2*
InvoiceID ItemID Quantity
ITEM*
ItemID ItemDescription UnitPrice
[1] for each of **two** modified entities

3NF

INVOICE2*
InvoiceID InvoiceDate CustomerID InvTot
INVOICE-ITEM2
InvoiceID ItemID Quantity
ITEM*
ItemID ItemDescription UnitPrice
CUSTOMER*
CustomerID CustomerName CustomerAddress
[1] for each of **two** modified entities

Alternative 1NF

INVOICE-ITEM
InvoiceID InvoiceDate InvoiceTotal ItemID Quantity CustomerID CustomerName CustomerAddress InvTot
ITEM
ItemId ItemDescription UnitPrice
[1] for each of **two** entities [6]

			AVAILABLE MARKS
(d)	A user interface [1] The user keys in facts about the problem ... and receives a solution and reason/explanation [1] for each of **two** points A knowledge/rule base [1] 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 [1] Applies the rules using the user's input ... and draws conclusions Can apply fuzzy logic [1] for each of **two** points [3] for each of **three** components	[9]	26

		AVAILABLE MARKS
7 **(a)**	Advances in broadband/fibre optics ... enable employees to access their organisation's database/single point software/applications ... using the Internet ... usually via an intranet ... irrespective of location/so they can work as effectively from home/do the same work at home Employees can communicate with managers/colleagues ... using electronic bulletin boards/emails ... or using web cams/videoconferencing [1] for each of **five** points [5]	
(b)	<u>Impact on circulation</u> Vastly increased potential readership as anyone with an Internet connection is a potential reader. Internet users could be directed to the newspaper's website via search engines. There may be fewer readers of the complete newspaper as readers can use navigation links/searches. [1] for each of **three** substantive points, one positive, one negative, plus conclusion. <u>Economic implications</u> Reduced printing/distribution costs in producing on-line version. Minimal production costs to keep on-line version up-to-date compared to a new print run. It has proved to be difficult to raise revenue from on-line versions of newspapers. [1] for each of **three** substantive points, one positive, one negative, plus conclusion. <u>Report structure</u> [0]/[1]/[2] [8]	13
	Quality of written communication	5
	Total	**120**

Quality of Written Communication (QWC) in GCE Mark Schemes.

AVAILABLE MARKS

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