GCE A2

Information and Communication Technology

January 2010

Mark Schemes

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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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General Certificate of Education
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Information and Communication Technology

Assessment Unit A2 1

assessing

Module 4: Development of Information Systems

[A2W11]

FRIDAY 22 JANUARY, MORNING

MARK
SCHEME

1 **(a)** 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

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?

[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]

(b) Observation
... of key users of the current system as they go about their normal business

[1] for each of two points

Documentation inspection
... of data collection forms/reports

[1] for each of two points

Questionnaires
... given to key users to discover details of the current system
... consisting of a set of prepared questions

[1] for each of two points

Interviews
... with key users to discover details of the current system
... using a set of prepared/ad hoc questions/structured/unstructured

[1] for each of two points

[2] for each of three methods   [6]

(c) To identify business processes/functions
... the data involved
... data flows/movements of data
... data storage
... the information being generated
... the key personnel/human roles

[1] for each of four points   [4]   16

2 **(a)** A GUI uses visual elements
... such as icons to represent objects such as applications/folders
... windows to represent separate tasks/applications

Options are chosen from drop down/pop up menus
... using a pointer controlled by a mouse/touchpad

[1] for each of four points   [4]

(b) Command line interface (CLI) [1]

Text-based commands
... are keyed in at a prompt

There is a set of valid commands
Commands may have parameters/switches

[1] for each of three points

Prompted dialogue/form driven interface [1]

The layout of the interface screens
... matches the physical forms used in the application
... with instructions/text boxes etc. in the same positions

Appropriate validation checks may be applied

[1] for each of three points

Prompted dialogue/wizard driven interface [1]

The interface guides the user through the relevant process
... by controlling the order of data entry
... providing defaults
... which the user can accept or change

[1] for each of three points

[4] for each of two interfaces   [8]   12

3 **(a)** **(i)** Coaxial cable is susceptible to electromagnetic interference
... from sources such as nearby electric circuits/the sun
The signal may be interrupted/obstructed/degraded

[1] for each of three points [3]

(ii) The copper cable is surrounded by an insulating layer
Both are surrounded by a conductive layer (a fine woven wire/thin metallic foil)
All these are covered with a thin insulating layer on the outside

[1] for each of two points [2]

(b) Fibre optic cable consists of a bundle of glass filaments/threads
... each of which can transmit a message
... in digital form/using modulation
... using light waves
The glass eliminates internal reflections
The glass threads are encased in cladding/buffer material/sheath/
outer jacket

[1] for each of four points [4] 9

4 **(a)** Stock data will be stored locally/where it is generated/needed on-line
... in each supermarket branch/store

[1] for each of two points [2]

(b) Maintaining control of the database is a major issue
Example – enforcing data integrity
... or data concurrency/consistency

[1] for each of two points

Each location must be fully resourced
... to support data storage and processing

[1] for each of two points

[2] for each of two disadvantages [4]

(c) Centralised database [1]
The database is located and maintained in one location
Users access the database using a network (WAN/Internet)

[1] for each of two points [3] 9

5 **(a)** **(i)** Transmission Control Protocol
This is the higher layer protocol
Assembles the message/file to be transmitted into packets
Reassembles received packets into the original message/file

[1] for each of three points   [3]

(ii) Internet Protocol
This is the lower layer protocol
Processes the address of each packet
... so that it reaches the intended destination

[1] for each of three points   [3]

(b) CSMA/CD - Carrier Sense Multiple Access / Collision Detection [1]
Used by Ethernet networks
Each station monitors the data line
A station can transmit if no transmission is taking place at the time
If two stations attempt to transmit simultaneously, this causes a collision
After a random time interval, the stations involved attempt to transmit again
If another collision occurs, the intervals are increased/exponential back off

[1] for each of four points   [5]   11

6 **(a)** Evolutionary prototyping
The prototype eventually becomes the final system [2]
'Throw away' prototyping
The prototype is discarded once the system requirements have been
established [2]

A first cut model/non functioning interface is developed
This is given to the end user
... who provides feedback
The model is continually refined
... and functionality added

[1] for each of four points   [8]

(b) It is a faster process than the waterfall method
The user is actively involved throughout development
The system requirements do not need to be known/defined in advance
The system requirements can be modified during development
Prototype front ends can be used for training

[1] for each of three benefits   [3]

(c) User expectations can be falsely raised
... as the front end may have no or incomplete code/functioning behind it

[1] for each of two points

Because changes to the design can be made during development
... the system's objectives may keep changing/may never be finalised

[1] for each of two points

Formal documentation may not be produced
... which complicates maintenance

[2] for each of two drawbacks   [4]   15

7   **(a)**   **(i)**   Uniquely identifies
                    ... a record in a table

                    [1] for each of two points   [2]

         (ii)   Consists of two or more key fields
                    ... each of which is a primary key in another table

                    [1] for each of two points   [2]
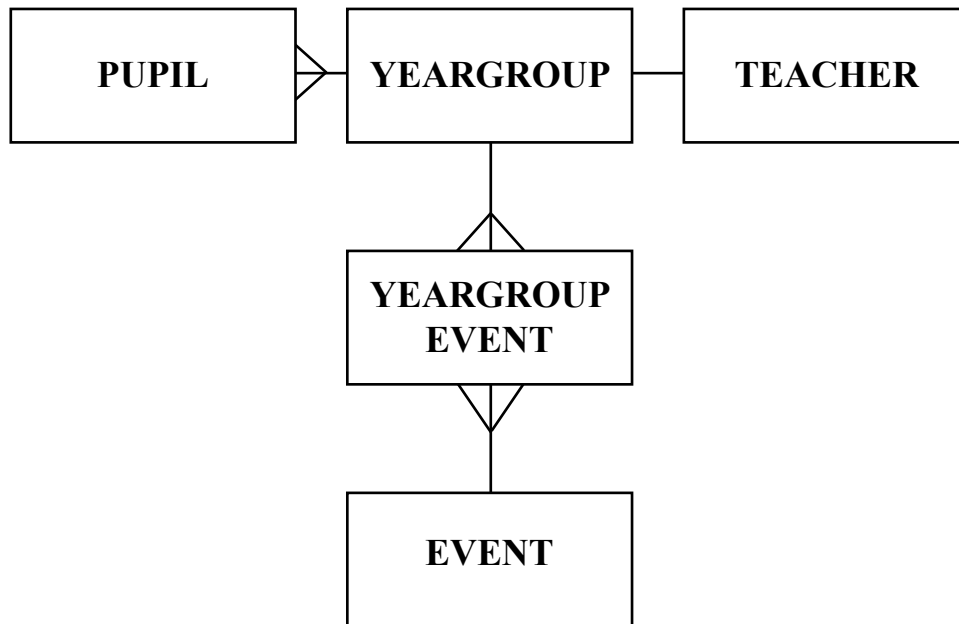
         (iii) A key field which is not a primary key in the table
                    ... but which is a primary key in another table

                    [1] for each of two points   [2]

(b)


```
  ┌─────────┐        ┌─────────────┐        ┌──────────┐
  │  PUPIL  │───────▷│  YEARGROUP  │────────│  TEACHER │
  └─────────┘        └─────────────┘        └──────────┘
                            │
                      ◇─────┴─────◇
                    ┌──────────────┐
                    │  YEARGROUP   │
                    │    EVENT     │
                    └──────────────┘
                      ◇─────┬─────◇
                            │
                    ┌──────────────┐
                    │    EVENT     │
                    └──────────────┘
```

[2] for YEARGROUP-EVENT entity (or acceptable alternative name)
[1] for each of four correct relationships
[1] for all of PUPIL & YEARGROUP & EVENT & TEACHER entities
[1] for overall quality as a correct ERD   [8]

+ Standard QWC criteria   [4]   14

                                                           Total   **90**

ADVANCED

General Certificate of Education

January 2010

Information and Communication Technology

Assessment Unit A2 2

assessing

Module 5: Uses of Information Systems

[A2W21]

WEDNESDAY 27 JANUARY, AFTERNOON

MARK
SCHEME

1   (a)   Each slide could contain multimedia content
        ... such as photographs/video clips of the fashion items
        Standards templates are available
        A suitable template can be designed
        Different transition effects are available between slides
        Different timings effects are available between slides
        Different animation effects are available for individual components of slides
        A soundtrack/music/commentary can be added
        Speaker notes can be added to assist the narrator
        The slide show can be set to run automatically
        The slide show can be presented on a large screen using a data projector
        Handouts can be printed

        [1] for each of eight points   [8]

    (b)   Hardware costs
        The cost of buying/leasing
        ... processors/monitors/keyboards etc.

        [1] for each of two points

        Software costs
        The cost of buying software/software licences
        Application software/operating system

        [1] for each of two points

        [2] for each of two costs   [4]   12

2   (a)   An incremental backup saves only the data/data files
        ... that have changed
        ... since the last backup.
        Performed at regular intervals
        The backup files consist of an initial (or regular) full backup
        ... plus all incremental backup files
        ... to enable a complete restore

        [1] for each of four points   [4]

    (b)   Mirror image backup
        An exact/real time copy of the data
        ... is stored on a second disk drive/RAID
        ... preferably at a remote location
        An instant switchover can take place

        [1] for each of four points   [4]   8

3 **(a)** A decision support system is software/a computer application
... which analyses/models
... large volumes of (business) data
... to identify trends/patterns
... to enable managers
... to select business solutions/strategies

[1] for each of four points [4]

(b) Details about the customer's bank/savings account(s)/credit rating with the bank
The amount the bank has available for lending
The criteria the bank uses when making decisions about loans
The bank's interest rates/loan packages

[1] for each of two appropriate sources [2]

(c) The customer's credit rating with other banks/lenders
Lending patterns/strategies/special offers of competing banks

[1] for each of two appropriate sources [2]

(d) The (expert system) designer will use special expert system software/expert system shell
The banking staff experienced in making loan applications will be questioned
... about how they decide when/when not to authorise loans
The bank's lending criteria/policies will be analysed
A set of rules/knowledge base will be established
... representing the expert's knowledge/intuition/decision making
An inference engine will be designed
... to apply the rules/knowledge for a particular loan application
An appropriate user interface will be designed

[1] for each of six points [6] 14

4 **(a)** Anyone processing personal information must make sure that it is
Fairly and lawfully processed
Processed for limited purposes
Adequate, relevant and not excessive
Accurate and up to date
Not kept for longer than is necessary
Processed in line with the data subject's rights
Kept secure
Not transferred to other countries without adequate protection

[1] for each of six principles [6]

(b) Some organisations/types of personal data are exempt
E.g. data used for crime detection/prevention or tax/duty collection

[1] for each of two points

It can be difficult for the data subject to find out what personal data is being held about them
... and by whom

[1] for each of two points

The Act permits a fee to be charged for fulfilling a subject's access request
... this is typically about £10 per request

[1] for each of two points
[2] for each of two limitations   [4]

(c) Computer Misuse Act   [1]
Unauthorised access to computer material is against the law
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 is against the law
This offence covers gaining access to someone else's system with the sole purpose of doing something illegal
Unauthorised modification of computer material is against the law
This offence also covers purposely introducing a virus into another person's computer system

[1] for each of three points

Copyright, Designs and Patents Act   [1]
Gives the creators of literary/dramatic/musical/artistic works/sound recordings/broadcasts,/films
... rights to control the ways in which their material may be used
... including broadcast and public performance, copying, adapting, issuing, renting and lending copies to the public
The Copyright (Computer Programs) Regulations 1992
... extended the Act to include computer programs

[1] for each of three points   [8]   18

5 (a) The data may be out of date
... so the information may not reflect the current situation
Example – a customer may have changed address

[1] for each of two points

The data may not be accurate
... so there may be errors in the information
Example – a price may have been keyed in incorrectly

[1] for each of two points

The data/information may not be relevant
... so the information may not match the application/user requirements
Example – a sales report showing stock availability

[1] for each of two points

The data/information may be incomplete
... so key parts of the information may be missing
Example – critical fields missing from a report

[1] for each of two points

The information may not be presented effectively
... so the information might be misinterpreted/not properly understood
Example – a yearly report showing daily sales figures

[1] for each of two points
[3] for each of two factors   [6]

(b) It will identify the information that should be available across the organisation
... and define the structure of this information
... and the access users will have
... and the restrictions on users
It will identify key staff
... and their responsibilities
... and the training required
It will identify the ICT resources required
... such as hardware standards/specifications
... and software standards/specifications

[1] for each of six points   [6]

(c) To make the most effective use of developments in ICT
Because the organisation's aims/goals/objectives might change
Technology will have changed since the last strategy was established. There
will be cheaper/faster processing power, memory and media
The information needs of the user will have changed because of reorganisation,
restructuring and mergers, increased expectations, improved use of ICT
The information currently available might be of poor quality, it might be out
of date, incomplete, poorly presented or irrelevant
Security policies need to be updated due to risks of security breaches

[1] for each of two points   [2]   14

6   (a) During installation
... the HW and SW configuration will be used
[1] for each of two points

By the end users while operating the system/training to use the system
... the user guide will be used
[1] for each of two points

By an end user trying to solve a problem
... the troubleshooting section will be used
[1] for each of two points

For training purposes
...the user guide can be incorporated into training materials
[1] for each of two points
[2] for each of three ways   [6]

(b) Technical documentation   [1]
This includes the system requirements/objectives
... design documentation such as DFDs, ERMs
... module architecture
... module specifications
... program code/listings
... test plans/data/results
... HW & SW specifications

[1] for each of three points   [4]   10

7   (a) It consists of a number of discrete stages
... such as analysis/design ...
Each stage must be complete before the next can start
Each stage has defined deliverables/should be tested
It is an iterative approach
... an earlier stages may have to be reworked if an error is discovered

[1] for each of four points   [4]

(b) The user is involved in the analysis stage
... when the system requirements are established
The end user is involved in acceptance testing
... before the system is 'handed over'
The user is involved during review
... by providing feedback

[1] for each of two points   [2]

(c) When the user requirements are difficult to establish
... for example, if there is no existing system
... or the user does not know/cannot articulate the requirements

[1] for each of two points

When the development time available is too short
... to allow all the stages of the waterfall method to be followed

[1] for each of two points
[2] for each of two reasons   [4]
+ Standard QWC criteria   [4]   10

Total   **90**