



ASSESSMENT and  
QUALIFICATIONS  
ALLIANCE

# Mark scheme

# June 2003

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## GCE

# Information and Communication Technology

## Unit ICT5

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## GENERAL GUIDANCE NOTES FOR EXAMINERS

### Overall guidelines

1. All examples accepted should be clearly related to the subject area and should not be “generalised” examples.
2. Attention should be paid to ensure that marks are not awarded for simple restating of the question or the stem, often involving the exact same terms.
3. The answers should be providing evidence of more than “man in the streets” knowledge of ICT.
4. It should be remembered that scripts could be seen after they are marked and so consistency of approach and correct mechanics of marking are essential.
5. Rules on positioning of ticks and marks are to aid in checking and remarking of scripts.
6. Do not expect the candidate to use the exact wording given in the mark scheme. If you are in doubt as to the correctness of an answer given by the candidate, consult your Team Leader.

### Specific marking guidelines

7. The basic rule is one mark one tick. The tick to be positioned at the point where the mark is gained in the answer and definitely not in the margin.
8. The only figures in the margin should be sub-totals for parts of questions and a final ringed total for a whole question.
9. Where questions are divided into parts a, b and so on, and a mark is indicated for each on the paper, a mark should be positioned at the end of the appropriate response in the margin.
10. There should in effect be a mark in the margin at every point there is one on the question paper and a number of ringed totals, which relates directly to the number of questions on the paper.
11. Where a question has only one part, the total for that question should be written once and then again and circled. This allows for easy checking that totalling and transcription of marks is correct.
12. All zero values should be crossed through.
13. All blank spaces should be crossed through with a vertical line through the text space – not in the margin.
14. All writing must be marked as read, either by the presence of ticks or by striking through the script with a vertical line.
15. All blank pages must be crossed through.
16. Where candidates have added extra to their answers later in the script, the total mark should be indicated as including x from Page y. The total mark should be in the position where the answer starts.
17. The use of the following symbols/marks is acceptable:
  - a. BOD – where the benefit of the doubt is given for the point the candidate is making. This is generally where poor writing or English is an issue. Its widespread use should be avoided.
  - b. Underlining of subject specific terminology, which is misused or incorrect e.g. encoding rather than encryption, information rather than data.
  - c. Underlining can also be used to highlight clearly incorrect statements or the use of a generalised phrase such as quicker, user friendly and so on.

- d. An omission mark ^ should be used where the candidate has given insufficient information to gain a mark. This is particularly useful when a teacher or student looks at scripts against a mark scheme.
- e. It may be appropriate to indicate where the same point has been covered more than once by the use of brackets or an arrow or where a point has been covered in several lines of prose by the use of brackets.
- f. The use of letters associated with ticks **may** be used to indicate different areas being marked in a question, particularly to indicate the different bullet points in an essay. **THIS WILL BE OUTLINED AT STANDARDISATION.**

**18.** **NO** other symbols or comments should be used.

**19.** Markers are responsible for checking

- a. The transposition of marks to the front sheet.
- b. That all work has been marked on each script.
- c. That all marks for individual questions are totalled correctly.
- d. That the script total is transferred to the box at the top right of the script.
- e. That they **clearly** initial the script, under the total at the top right, so it is possible for the Principal Examiner to identify each markers work.

**Unit 5 Information: Policy, Strategy and Systems**

1 *Differentiate between* alpha-testing and beta-testing.

4 marks

Alpha-testing:

Performed in-house/by the developer of the software (1) using a fixed set of data to generate predicted results/ to ensure that each part of the solution does what it is supposed to do (1)

**NOT acceptance testing for alpha testing**

Beta-testing:

Performed by a select set of end-users outside of the developing organisation (1) using data/ hardware/ tasks that may not have been considered by the developers to ensure that solution works in real situations/ so end-users can provide feedback to the developers (1).

**2 x (2,1,0) marks**      4 marks

**2** *A soft drinks manufacturer uses a particular hardware, operating system and applications package combination throughout its organisation. One department finds that this particular set-up does not suit its needs. The manager of this department decides to purchase different hardware and operating system, alongside the specialist applications that he requires.*

(a) *Describe **two** reasons why the manager's action may not be advisable.*

*4 marks*

(b) *A large organisation will have an Information Technology Management Policy.*

*Give **two** reasons why such a policy is necessary.*

*2 marks*

**(a) One mark is awarded for what the problem is, and one mark is awarded for why it is a problem.**

- Portability of data
- Training
- Organisational support
- Cost
- Morale
- And others

**The following are examples only.**

Transfer of documents may be a problem to/ from this department (1) as there may be no common data format for transfer (1)

Maintenance contracts may be compromised (1) separately purchased hardware may cause problems not covered under contract (1)

Software licensing may be compromised (1) e.g. as the organisation may have agreements with particular software providers (1)

Support within the organisation may be an issue (1) as support teams may not have the expertise with these new systems/ the cost of providing the specific support may be beyond the organisation's resources (1)

Staff morale within/ outside this department may be compromised (1) + relevant reason (1)

**2 x (2,1,0) marks** 4 marks

**(b) Answers that are related to code of practice issues will not be accepted, i.e. issues relating to staff usage.**

To have procedures for compliance with legislation (1)

To ensure that systems are introduced that are of benefit to the organisation (1)

To identify backup procedures (1)

To identify the type/ content of data that is stored in a particular fashion (1)

To identify what information should be passed to whom (1)

To ensure correct training provision (1)

To ensure consistency of hardware and software (1)

Maintenance and support (1)

**Max 2 marks** 2 marks

**3** *A school has approached you for advice as it plans to develop a computer-based learning environment for its pupils aged 6 to 10.*

(a) *Describe **two** factors the school should consider whilst designing the interface for the computer system.* *4 marks*

(b) *State, with a reason:*

(i) ***one** example of a suitable input device that could be used by pupils;* *2 marks*

(ii) ***one** example of a suitable output device that could be used by the pupils.* *2 marks*

a) **First mark is for what the factor is, second mark is for why this factor is important within the context.**

**Do not accept answers to do with any form of disability**

Use of colour (1) plus reason (1)

Navigation around the system needs to be simple (1) so pupils can get to the necessary areas without getting confused/ bored (1)

Amount/ size/ type of text (1) plus reason (1)

Use of appropriate language (1) as it needs to be understood by the pupils (1)

Help/ error messages/ error handling (1) + reason (1)

Use of graphics/ buttons/ icons/ pictures/ moving images/ sounds (1) + reason (1)

**2 x (2,1,0) marks** 4 marks

b)

(i) Input device (1) with a justification in context(1)

Example answer:

Trackball (1) as young children may not have the motor skills to use another device (1)

**Max 1 x (2,1,0) marks** 2 marks

(ii) Output device (1) with a justification in context(1)

Example answer:

Colour inkjet printer (1) so that pupils can take away exact hard copy of their work (1)

**Max 1 x (2,1,0) marks** 2 marks

- 4 *A large international corporation uses an extensive wide area network, linking all the offices around the world to exchange data and information.*

*Describe **four** ways in which the company can use its computer network to support the exchange of data and information.*

8 marks

**One mark is for what the company can use, one mark is for how (the way) this supports data/ information exchange.**

Example answers:

Distributed databases (1) so that all areas of the organisation have access to the same data at the same time (1)

Centralised database (1) so that data can be added from across the organisation (1)

Intranet (1) so that communication can be delivered to the desktop/ workstation/ everybody gets the information at the same time (1)

E-mail (1) so that communication can be delivered to all staff within the organisation (1)

Tele/Video-conferencing (1) so that meetings can be arranged without the need for travel (1)

Collaborative software (1) Ability to work on the same document/ project (1) so that workers in different areas of the company can collaborate (1)

Hot desking (1) Ability to work in any part of the company/ still be able to access your own work areas (1)

**Do not credit Internet as a response to this question.**

**Max 4 x (2,1,0) marks** 8 marks

**5** *A travel company is reviewing the current disaster recovery plan for its computer-based booking system. Bookings come into the company by various means, including via post, over the telephone and via the Internet.*

(a) *State, with a different reason for each one, **three** possible weak points in the booking system.* 6 marks

(b) *Besides the frequency and content of the backups, and the media used, describe **two** other issues that should be considered when reviewing the backup strategy.* 4 marks

(a) **One mark is for what is the weak point, one mark is for why it is a weak point.**

**Answers must refer to weak points which must result in the need for disaster recovery, not simply additional security measures.**

Physical issues (1) plus reason (1)  
 Document issues (1) plus reason (1)  
 Hardware issues (1) plus reason (1)  
 Communications issues (1) plus reason (1)  
 Software issues (1) plus reason (1)  
 Data transfer (1) plus reason (1)

**Do not accept the same reason for vulnerability more than once, e.g. only credit 'sensitive data is stored' as a reason for one area.**

**Max 3 x (2,1,0) marks** 6 marks

(b) **One mark is for what should be considered, and one mark for why it needs to be considered.**

Where should backup media be stored/ RAID be situated in relation to the live system (1) backup is no use if it is as vulnerable as the live system to attack/ disaster (1)  
 Log to be kept of backup activity (1) e.g. so if the system breaks down, the point at which it broke down can be established/ time of last backup can be established (1)  
 Planned testing of recovery (1) so that if recovery is necessary the organisation can be sure that it can be carried out (1)  
 Assignment of responsibility for procedure (1) so organisation can be sure that the procedure is being carried out (1)

**Max 2 x (2,1,0) marks** 4 marks



- 6 *There are several types of human/computer interface.*
- (a) (i) *Describe one feature of a command line interface.* 2 marks  
(ii) *Name, giving one reason, one application where this interface would be appropriate.* 2 marks
- (b) (i) *Describe one feature of a menu driven interface.* 2 marks  
(ii) *Name, giving one reason, one application where this interface would be appropriate.* 2 marks
- (c) (i) *Describe one feature of a graphical user interface.* 2 marks  
(ii) *Name, giving one reason, one application where this interface would be appropriate.* 2 marks
- (a)
- (i) Text only input (1); user has to know exactly what the command is they want to execute (1);  
Faster execution (1) as the CPU has less to do to support the interface (1);  
Minimal requirement in terms of input and output devices (1); so able to function on simple hardware (1)  
‘Small’ when compared with other interface types/ take up less room on host storage devices (1) so more storage/ memory available for tasks (1).  
**Max (2,1,0) marks** 2 marks
- (ii) Initial setup of a system (1); e.g. availability of sophisticated hardware cannot be guaranteed;  
Configuration of hardware/ machinery control (1); e.g. command structures are text by nature (1)  
Credit any reasonable application suggestion (1) and reason (1)  
**Max (2,1,0) marks** 2 marks
- (b)
- (i) Limited options (1) so user is less likely to make errors (1);  
Hierarchical nature (1); have to navigate through the different levels of menus until required option is reached (1);  
Only requires a simple input device(1); e.g. a set of buttons (1);  
Guides/ controls user through the system (1); so user IT literacy not an issue (1).  
**Max (2,1,0) marks** 2 marks
- (ii) ATMs/ mobile telephone/ printers (1); e.g. displays a restricted set of relevant options (1).  
Credit any reasonable application suggestion (1) and reason (1).  
**Max (2,1,0) marks** 2 marks
- (c)
- (i) Use of icons/ pointers/ drag and drop (1) makes operations simpler to perform (1);  
Not based on language use(1), so suited to different native tongues/ can use the same interface is different countries (1);  
Ability to provide shortcuts to often used applications/ functions (1); so tasks are carried out more efficiently (1);

Heavy use of machine resources (1), e.g. hard disk space, memory space (1);

Ability to make use of several different input devices (1); so special needs of particular users can be met (1).

**Max (2,1,0) marks**      2 marks

(ii) Interface with personal computers (1); e.g. easily understood interface that gives access to many varied tasks (1)

Credit any reasonable application suggestion (1) and reason (1)

**Max (2,1,0) marks**      2 marks

- 7 *A car insurance company needs to replace the computer application that it uses to provide quotations. The company decides to look at several software packages that may provide this replacement.*
- (a) (i) *Why should evaluation criteria be established before comparing the packages?* 1 mark
- (ii) *“Functionality” and “User Friendliness” have already been established as important criteria for success. Name **two** other criteria that could also be used in this situation. For each criterion, describe why it is relevant to this company.* 6 marks
- (b) *The company decides that there is no readily available application that exactly fulfils its needs. It therefore decides to employ an external development team to provide a bespoke software solution.*
- (i) *State **one** advantage of this approach.* 1 mark
- (ii) *State **one** limitation of this approach.* 1 mark
- (c) *What is the purpose of using a team to develop a software solution rather than just one individual?* 2 marks
- (a)
- (i) So that developer and end-user understand the requirements of the system/ agree on how to establish if the proposed system will be successful (1) 1 mark
- (ii) Give one mark for a relevant criterion and two for a reasonable description up to a maximum of 2 criteria and 2 descriptions. Description marks are dependant upon criterion marks. Description must reflect the context in order to gain the third mark.
- | <b>Criterion</b> | <b>Reason</b>  |         |
|------------------|--|---------|
| Robustness       | The company will be dealing with vast quantities of data (1) and the software will have to deal without crashing (1).  |         |
| Performance      | The company will require results to be produced in a reasonable time (1) so the software package must be more efficient than current methods (1).              |         |
| Support          | The company will require access to support initially as training (1), but also in future if things go wrong (1).   |         |
| Portability      | The company may use other software to print the final quotations (1), and so this package must have an export function (1).                                    |         |
| Transferability  | Any existing data the company holds with regard to insurance groups, customer details etc. need to be available (1) without the need for re-entering data (1). |         |
|                  | <b>Max 2 x (3,2,1,0) marks</b>   | 6 marks |
- (b)
- (i) No need to employ permanent team for this one-off project (1)  
 Solution should exactly fit with end-user requirements (1)  
 Documentation provided should be exact and of high quality (1)  
 Etc.
- Max 1 mark** 1 mark

- (ii) Expensive option compared with others (1)  
Time from inception to solution can be long (1)  
Availability of support is restricted (1)  
Possibility of sharing sensitive data with outside workers (1)  
Etc.
- Max 1 mark**      1 mark
- c) Able to split the task and give each part to those with the skills to tackle those parts (1);  
can use a modular approach to reduce the time to completion of the project (1);  
changes to any part of the system do not affect other parts (1);  
Allow a good expansion of one point for a second mark
- Max 2 marks**      2 marks

- 8** *A large supermarket chain is about to introduce a website so that customers can purchase their shopping on-line.*
- (a) *During testing, it is discovered that the site cannot be viewed correctly using certain browser software.  
Describe why this may be a problem for the supermarket.* 2 marks
- (b) *This system will involve extensive financial transactions. The retailer is aware that security is an issue.  
Describe **two** measures that can be taken to ensure that this facility is secure.* 4 marks
- (c) *In addition to a computer fitted with a modem, and a knowledge of the site address, give **two** items that are necessary for the customer to be able to connect to the retailer's website.* 2 marks
- (d) *Explain how protocols and addressing mechanisms are used to support the World Wide Web.* 3 marks
- (a) Users of this browser cannot access the supermarket's website (1) so they will go somewhere else/ custom/ money will be lost (1)  
**Max 1 x (2,1,0) marks** 2 marks
- (b) **One mark is for what the measure is, one mark is for how this is effective**  
Use encryption/ secure protocols like https (1) so that if communication is intercepted, it is not understandable (1)  
Ensure that access rights on the server are set correctly (1) so that only authorised users have access to sensitive data i.e. credit card numbers (1)  
Keep a record of transaction details e.g. originators IP address (1) so that if transactions are fraudulent, these should be traceable to the originating system (1)  
Keep a record of customer payment details (1) to avoid unnecessary transmission of sensitive data (1)  
Use access restrictions to the system by users, e.g. require login to the server/ registration to the service (1) to deter casual access to the site (1)  
Use of third party service providers (1) plus expansion (1)  
Credit any sensible answer (1) plus expansion (1)  
**Max 2 x (2,1,0) marks** 4 marks
- (c) Physical connection to the network – telephone line/ DSL line/  
Broadband cable (1)  
Service provision/ ISP (1)  
Browser software (1)  
**Max 2 marks** 2 marks
- (d) Protocols are the rules that define how network devices communicate (1)  
A unique addressing mechanism is required so that source and destination devices can be identified (1) so that communication is sent to the required recipient(s) (1)  
URLs are used as an easy to understand mechanism for remembering addresses on the World Wide Web (1)  
Allow one mark for naming more than one protocol used on the World Wide Web e.g. IP, TCP, HTTP (1)  
**Max 3 marks** 3 marks

- 9 *A charitable organisation needs to coordinate all the data that it holds at several locations across the world. They have discovered that there is often conflicting data held in different sites, and time is wasted in reconciling them. A consultant has recommended that they use a relational database management system. The organisation has accepted this advice and is now advertising for the post of database administrator. In the advertisement it states that each applicant should write a supporting letter. You have decided to apply for this post.*

*Write a letter in support of your application, paying particular attention to:*

- *the role of a database administrator;*
- *how a relational database management system can help with this problem;*
- *the advantages of a client/ server solution to this problem.*

*Quality of written communication will be assessed in your answer.*

*20 marks*

*The role of database administrator (R marks)*

**Allow marks for up to three points only, with the second mark available for a good expansion.**

Design of the database (1) setting up appropriate tables, relationships, fields, naming conventions etc. (1)

Maintain the data dictionary (1) i.e. the data structure, aliases etc. (1)

Monitoring performance of RDBMS (1) and making appropriate adjustments to deal with problems as they arise e.g. system taking too long to produce a report (1)

Notifying user of changes made (1) so that they can make changes to the way they use the database appropriately e.g. availability of new reports/ queries (1)

Allocation of access to users (1) including access rights, providing user names etc. (1)

Provide training to the users as appropriate (1) so new users learn how to use the system, and existing users get updates as necessary/ DBA will have to create remote learning materials in this context and be available to help with any queries that arise (1)

In charge of the backup procedure (1) ensuring that the database is available to users at the times that they need it (1)

Allow point to do with being an effective ICT professional (1) plus valid expansion (1)

**Max 3 x (2,1,0) marks**

*Application of a relational database management system (A marks)*

**Allow marks for up to three points only, with the second mark available for a good expansion.**

Provides a buffer between the user and the underlying structure of the database (1) so the user is not concerned with the structure of the database, just with making relevant use of the data (1)

Can be used to create a consistent database with a consistent interface (1) so if users move from one location to another they already know how to use the system (1)

RDBMS will control access to data (1) so all places will see the most up to date data (1)

In event of disaster, RDBMS should help with disaster recovery (1) e.g. provide ability to consolidate data and roll back to a known correct state (1) RDBMS may provide improved security to the system (1) so that there is less chance of inexperienced users inadvertently changing data/ malicious attempts to corrupt data succeeding (1)

**Max 3 x (2,1,0) marks**

*The advantages of a client/ server solution to the problem (C marks)*

Centralised store of data (1) so there is control over the data itself; must be consistent across all users (1)

Control over access (1) this can be monitored and restrictions set up as necessary (1)

Lower level of equipment needed as clients (1) as processing and storage is dealt with centrally (1)

Network traffic issues (1) only requests and results are sent over the network, not entire tables of data (1)

Clients do not need all the software to run the database (1) they only need software to access the database, not the rest of the RDBMS (1)

**Max 3 x (2,1,0) marks** *16 Marks  
max for  
content*

**Quality of written communication**

- 4 marks** The candidate has expressed complex ideas clearly and fluently. Sentences and paragraphs follow on from one another smoothly and logically. Arguments will be consistently relevant and well structured. There will be few, if any, errors of grammar, punctuation and spelling.
- 3 marks** The candidate has expressed moderately complex ideas clearly and reasonably fluently through well-linked sentences and paragraphs. Arguments will be generally relevant and well structured. There may be occasional errors of grammar, punctuation and spelling.
- 2 marks** The candidate has expressed straightforward ideas clearly, if not always fluently. Sentences and paragraphs may not always be well-connected. Arguments may sometimes stray from the point or be weakly presented. There may be some errors of grammar, punctuation and spelling, but not such as to suggest a weakness in these areas.
- 1 mark** The candidate has expressed simple ideas clearly, but may be imprecise and awkward in dealing with complex or subtle concepts. Arguments may be of doubtful relevance or obscurely presented. Errors in grammar, punctuation and spelling may be noticeable and intrusive, suggesting weaknesses in these areas

With these type of criteria, a best fit approach is taken.

4 marks