



ASSESSMENT and  
QUALIFICATIONS  
ALLIANCE

# Mark scheme January 2003

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## GCE

**Information and  
Communication Technology**

## Unit ICT5

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

### 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 street’s” 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.
7. Where one-word answers are acceptable this will be indicated on the question paper.

### Specific marking guidelines

8. 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.
9. The only figures in the margin should be sub-totals for parts of questions and a final ringed total for a whole question.
10. 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.
11. 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.
12. 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.
13. All zero values should be crossed through.
14. All blank spaces should be crossed through with a vertical line through the text space – not in the margin.
15. All writing must be marked as read, either by the presence of ticks or by striking through the script with a vertical line.
16. All blank pages must be crossed through.
17. 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.

18. 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 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.
19. **No** other symbols or comments should be used.
20. 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 marker's work.

- 1 a) Explain what is meant by a relational database management system. 3 marks  
b) A successful relational database will have undergone normalisation. Describe what is meant by normalisation. 2 marks

- a) A collection of programs/ layer of software (1) that
- is between the user and the data structure (1)
  - allows manipulation of data/ use of query functions (1)
  - allows definition of data dictionary (1)
  - where the data is stored in separate tables that are related through linked fields (1)
  - can dynamically generate new tables from old (1)
- 3 × 1 mark**
- b) Process of breaking down complex data structures into simpler forms. (1) + expansion/example (1)  
**2 × 1 mark**

**Total 5 marks**

- 2 Give **four** reasons for producing an evaluation report when considering alternative software solutions to a particular problem. 4 marks

- To present the overall findings of the evaluation to the person(s) requiring the evaluation to be carried out (1)
- To show the end user which packages were being considered as possible solutions (1)
- To detail the required functionality that was being checked for in this evaluation (1)
- To describe how the evaluation has been carried out/ methodology (1)
- To show the results of the evaluation for each package being considered (1)
- To give the end user a recommendation based on the evaluation carried out (1)
- To give the end user justification for the recommendation made (1)

**4 × 1**

**Total 4 marks**

- 3 Describe **two** distinct ways in which standards can arise within the ICT industry. 4 marks

- Formal/ de jure standards (1) set by professional bodies/ governments/ official bodies and then passed on to the industry (1)
- De facto standards (1) arisen through historic precedent/ sales success i.e. through popular choice (1)

**Do not credit examples unless supported by some sort of justification as above.  
Examples given must be ICT examples in order to gain credit.**

**2 × (2,1,0)**

**Total 4 marks**

4 Hardware and software are often described as being 'compatible' with other hardware or software.

(a) Describe the term compatible in this context. 2 marks

(b) An emulator can sometimes be used to achieve compatibility.  
Describe **one** advantage and **one** limitation of the use of emulation. 4 marks

a)

- different hardware manufactures produce machines which all support the same software/data files (1)
- applications are not dependent on particular hardware configurations (1)
- e.g. processor type, memory configuration, VDU configuration (1)
- compatible hardware refers to those systems which conform to a particular minimum hardware specification (1)
- similar architecture/ instruction set (1)
- peripheral devices can be used on compatible systems (1)
- compatible software refers to software that is able to share data/ work with other software packages (1)

**2 × 1 mark**

b)

Advantage:

- access to more file types (1) that might be specific to particular software that is not available on the system (1)
- allows the use of existing hardware (1) so do not have to invest in further hardware that may be of limited use (1)
- cheaper in the short term (1) so can decide if there is a need to invest in a new system at a later date (1)
- possible access to other hardware (1) that may only be developed for the 'other' platform (1)
- access to both platforms (1) user has advantages of both sets of operating systems available at once/accessible through a simple mouse click (1)

**Max 1 × (2,1,0)**

Disadvantage:

- lack of functionality (1) there may be functions missing that are required in order to be productive (e.g. lack of printer support) (1)
- speed issues (1) the emulator may run too slowly to be of practical use (1)
- resource issues (1) the software takes up space on the hard disk of an existing system that may reduce the speed of the original system (1)
- licensing issues (1) will have to buy software licences for applications to run under the emulator (1)
- may still need to convert the files (1) if suitable software is not available under the emulator (1)

**Max 1 × (2,1,0)**

**Total 6 marks**

- 5 *Whilst planning to install a network accounting system, a company has become concerned about the security of its local computer network.*
- (a) *Explain two procedures that the company could adopt to discourage breaches of security.* 6 marks
- (b) *State two reasons for using accounting software on a network.* 2 marks

a)

- Procedures for employing/ vetting staff (3,2,1,0)
- Procedures for restricting/ controlling system access (3,2,1,0)
- Procedures for use of information gained from network accounting/ auditing systems (3,2,1,0)
- Procedures for the use of removable media (3,2,1,0)

Credit any point that relates to company issues and that can justifiably form part of a code of practice.

Marks can allocated for: what is the procedure (1), expansion (1) why is it an appropriate procedure for the company (1)

**NB The question is about procedures**

**2 × (3,2,1,0) marks**

b)

- Charge users for use of scarce/expensive resources e.g. colour printing (1)
- See where network has high traffic in terms of time or location so that it can be dealt with/ charges adjusted accordingly (1)
- To ensure that resources are being utilised efficiently (1)
- Encourage efficient use of resources (1)
- Able to vary charges with respect to requirement and/ or utilisation (1)

**2 × 1 mark**

**Total 8 marks**

- 6 *Describe four factors that need to be considered when a large company is devising a backup strategy for its information systems* 7 marks

- Media (1) what is a suitable medium for making the backup onto (1)
- Frequency (1) how often the data on the system changes will affect how often the backup needs to be made (1)
- Storage (1) the backup needs to be stored safely and securely from the main system(s) (1)
- Volume (1) the backup needs to take into account how much data there is e.g. for how long the backup will take (1)
- Personnel (1) who is going to conduct the backup, so that the company can be confident that the backup has occurred (1)
- Logging (1) will there be a record indicating when the backup has taken place, and any problems that may have occurred? (1)
- Testing (1) integrity of the backup needs to be ensured, so that if it needs to be recovered it can be relied on (1)
- How critical the system is (1) can the system be taken offline in order to backup? (1)

**If factors are only named/ listed with no descriptions then award**

- 0 marks for 1 factor
- 1 mark for 2 or 3 factors
- 2 marks for 4 factors.

**4 × (2,1,0) marks**

**Total 8 marks**

- 7 A software company is producing a software package to perform an initial assessment of students entering colleges.
- a) There is a fixed deadline for the release of this package.  
Describe **two** effects that this might have on the final product. 4 marks
- b) The production of this package is a complex task. For this reason the company has decided to allocate sub-tasks to separate development teams.  
Describe **two** benefits of this approach. 4 marks
- c) Two weeks after the release of the package, several colleges report identical problems with the software.  
Describe what the company should do in this situation. 2 marks
- a)
- Testing may not be fully carried out (1) so e.g. only the major functions of the software are checked/ only checked against a small set of hardware (1)
  - Functionality may be left out (1) as it is deemed superfluous to requirements (1)
  - Programming is not fully documented (1) so it is difficult to improve/ correct the software (1)
- 2 × (2,1,0) marks**
- b)
- This should reduced the development time (1) as parts can be worked on simultaneously (1)
  - Personnel with particular expertise can be given parts of the system (1) so that the parts of the system are as efficient as possible (1)
  - By using a modular approach (1) the system should be easier to test/ modify/ maintain (1)
- 2 × (2,1,0) marks**
- c)
- Produce a maintenance release/ software patch/ update (1) so that the software can operate with the operating system/ hardware that the colleges have (1)
  - Provide a website/ document (1) so that technical staff have instructions on how to address the issue (1)
- 1 × (2,1,0) marks**
- Total 10 marks**

8 A mail order music company has decided to expand and has established a retail outlet in a busy shopping centre.

a) An important feature of the mail order system is the interface for the staff who use it.

State **three** features you would expect the human/ computer interface to have in such a system and give a different reason for each one. 6 marks

b) (i) Name an appropriate device for capturing data on each item that is sold via the retail outlet. 1 mark

(ii) Describe **one** advantage for the company of using this device. 2 marks

a)

- Cater for different levels of user expertise (1) workers may not be very ICT literate (1)
- Cater for different end user's physical abilities (1) e.g. for partially sighted (1)
- Consistent at both sites (1) so staff do not have to learn two systems (1)
- Sensible use of colour (1) as the system will be used fairly intensively (1)
- Help features accessible (1) so that users are able to assist themselves when they need to (1)
- Menu based system (1) so that input choices are restricted to items sold (1)
- Graphical user interface (1) to build on users previous experience/ to avoid language issues/ etc (1)
- Consistency with other systems (1) so that users are less likely to make errors (1)
- Automated data entry (1) to reduce errors (1)

Credit any feature related to interface that fits within the given context.

Second mark is given for expansions that can be justified within context.

**3 × (2,1,0) marks**

b)(i)

- Bar code scanner (1)
- Keyboard (1)

**1 mark**

(ii) This description must relate to the answer to (i) in order to get the marks.

**e.g. Bar code scanner**

- simple method (1) needs minimal training so staff can be working quickly (1)
- stock is already provided with bar code from supplier (1) so little extra work required in preparation (1)
- Speed of data capture c/w other methods (1) so that store increases productivity (1)
- Etc.

**e.g. Keyboard**

- cheap method c/w bar code scanner (1)
- simple method (1) needs minimal training so staff can be working quickly (1)
- Etc.

**1 × (2,1,0) marks**

**Total 9 marks**

9 Internet technologies allow large companies to deliver training and assessment across their entire organisation. This can be of benefit to the companies and to their employees.

- a) Describe **three** possible benefits to a company. 6 marks  
b) Describe **three** possible benefits to an employee. 6 marks  
c) The interaction of an employee with an online training system needs careful planning. List **four** factors that should be considered. 4 marks

a)

- Training is consistent across the company (1) irrespective of physical location (1)
- Able to move staff around (1) without need for retraining/ they can continue current training (1)
- Able to change content at one time (1) so that latest training is available to employees (1)
- Quality Assurance (1) easy to track online assessment and see if there are areas to work on (1)
- Cost benefit (1) e.g. no need to employ an instructor to deliver the courses/ no need to send staff on courses (1)
- Time factor (1) employees can train during quiet periods for the company (1)

**3 × (2,1,0) marks**

b)

- Access to curriculum all the time (1) so missed sessions can be caught up with (1)
- Instant feedback on assessment (1) so that weak areas can be addressed immediately (1)
- Ability to work at own pace (1) so misunderstood parts can be repeated over and over until they are understood (1)
- Stimulating learning environment (1) some people do not learn well in a classroom situation/ very hands on approach (1)
- Ability to work for different sites (1) so training can be carried out when convenient to the student not the trainer (1)

**3 × (2,1,0) marks**

c)

- User friendliness
- ICT literacy of the student
- Use of shortcuts
- Familiar/ meaningful icons
- Consistent layout
- Informative response from system/ error messages
- Forgiveness (system has to cope with 'odd' responses)
- Feeling of control – employee controls system not the other way around

**4 × 1 mark**

**Total 16 marks**

**10** *Software solutions can be provided for specialist applications in a number of ways. Discuss the possible ways of providing such solutions. Your discussion should include:*

- *how the solution can be provided;*
- *advantages of providing the solution in this way;*
- *disadvantages of providing the solution in this way;*
- *criteria for deciding which approach is the most appropriate.*

*The quality of written communication will be assessed in your answer. 20 marks*

The solution for this question is intended to provide a framework of key concepts rather than a definitive solution. The aim is to establish an agreed standard that can be applied consistently, by all examiners, taking account of the many alternative answers to this type of question.

Allocation of marks:

Possible ways of providing the solution (code as **P**) – 4 marks

Advantages of each method (code as **A**) – 4 marks

Disadvantages of each method (code as **D**) – 4 marks

Criteria for deciding of suitable approach (code as **C**) – 4 marks

Quality of written communication (code as **Q**) – 4 marks

Maximum mark for content is 16/20.

*Possible way of providing the solution (P marks)*

Use generic application package/ generator to develop a specific solution (1)

Purchase specialist software off the shelf appropriate to the specific task (1)

Employ an in-house team to develop a specific solution (1)

Employ external consultants to develop a solution that meets the user specification (1)

*Advantages of each method (A marks)*

Generic – max 2 marks

Easily available solution c/w the others (1)

Lots of support available in terms of documentation, courses etc. (1)

Can be adapted for solving other problems (1)

Large skill base available in the workforce (1)

Able to transport data to other applications easily (1)

Etc.

Off-the-shelf specific package – max 2 marks

Designed with this type of problem in mind (1)

Relatively short lead-time to operation c/w others (1)

Well supported by developers and other users (1)

Availability of personnel with proven skills on this software (1)

Etc.

Bespoke software – max 2 marks

Exact match to the problem at hand (1)

More control over final outcome c/w others (1)

Possibility of marketing solution if very successful (1)

There may not be a suitable software solution on the market for this problem, so there may be no other choice (1)

Etc.

*Disadvantages of each method – (D marks)*

Generic – max 2 marks

Solution still has to be created (1)

May not produce the most efficient/ ideal solution(1)

Difficult/ ill advised to alter coding of the application/ alterations may invalidate available support (1)

Etc.

Off-the-shelf specific package – max 2 marks

May not have all the required functionality/ may have too much functionality (1)

May use proprietary file formats that cannot be shared (1)

Upgrades may be hard to get hold of/ expensive (1)

Will the company still be around in the future to support/ develop the product? (1)

Etc.

Bespoke software – max 2 marks

Very long lead-time to completion of project (1)

Most expensive option c/w the others (1)

Problem needs defining unambiguously for the developers (1)

Quality of documentation/ support may not be of the required standard (1)

Etc.

Credit any advantages that are specific to development either in-house or by external consultants.

*Criteria for selecting appropriate method (C marks)*

Company policy – does the company insist we use a certain method? (1)

Time constraints – how long do we have until we have to make use of the new software? (1)

Cost constraints – how much can we afford to spend on this solution? (1)

Personnel – do we have people with the skills available to purchase/ create/ use the new software? (1)

Support issues – what support is available for this software/ how long will it be available for? (1)

Affect on the company – how will this solution impact on the rest of our business? (1)

Etc.

Credit any reasonable criteria that could be applied to choosing a method of solution.

### **Quality of Written Communication marks (4 marks)**

**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 this type of criteria candidates are given a mark on the basis of a “best-fit” approach.

**Total 20 marks**