



General Certificate of Education

**Information and Communication  
Technology 5521/6521**

*Specification*

**Report on the Examination**

*2006 examination - January series*

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## General Comments

In this January series of the examination both the AS and A2 units showed a good range of achieved marks. There was clear evidence that many candidates were well prepared for the unit they were attempting and it was pleasing to note that nearly all candidates answered all of the questions on the paper.

However, candidates need to be reminded to read the front of the question paper before beginning to read the questions themselves. Marks were lost by the use of brand names of specific software packages or items of hardware, candidates should respond to questions with reference to generic types of software. It is clearly stated on the front of all GCE ICT question papers that, ‘... *the use of brand names will not gain credit.*’

In order to acquire a good understanding of ICT as a subject, candidates should be able to transfer knowledge between units and apply it accordingly. Theory and practical work should not be considered as separate entities.. As can be seen from the reports on the papers and coursework, candidates may disadvantage themselves if they do not see the relationship between the different elements of the course and the different assessment objectives of the course as contained in the specification. Question 6 on the ICT 2 paper asks for examples of test data, a practical skill would be having the ability to select correct test data for a particular purpose. Similarly the ICT 6 report cites inadequate assessment criteria as a problem for candidates and yet evaluation criteria are a topic which candidates require knowledge and understanding of for unit 5.

Generally candidates are expected to respond to questions using full sentences for their answers, failure to do this can mean that insufficient detail is given to gain the marks available. On the few occasions where one word answers are acceptable, this will be clearly stated in the question.

The A2 question papers contain an essay question where there are specific marks for the quality of written communication. The quality of written communication during this series of the examination was reasonable, although a lot of incorrect spellings and many grammatical errors were seen. To gain the higher language marks, the essay must have structure and relevance, with the candidate clearly expressing complex ideas, as well as making good use of English. Paragraphs must be logically and smoothly linked. In this series there were a few instances of paragraphs either not being used at all, or just one being used for each of the three bullet points. Proper essay planning would improve this structure. Well-structured essays as described above, gained three or four quality of written communication marks.

## AS Units

### Unit 1 - Information: Nature, Role and Context

#### *Question 1*

Most candidates knew the characteristics of information that give it value and importance. However, many of the examples related to data rather than information. A good example for up-to-date information would be, ‘Information should be up-to-date. A five year old list of e-mail addresses would be out-of-date and may mean that people have changed address and cannot be contacted.’ A number of candidates answered this question as they would answer a data, information and knowledge question, and did not realise their mistake even when they answered Question 6. Good examination technique takes into account the reading all of questions before starting to answer them, and not relying upon learning the mark schemes used in previous examinations. This technique might have helped candidates to achieve better marks on this question.

### **Question 2**

This question was answered well in general, particularly in part (a) and part (b). In part (c) candidates were asked to identify facilities to encourage visitors to use the site. A good answer would have been, ‘To encourage visitors to its site the company could register with a search engine, place adverts on other related sites linking to their own site, send e-mails to existing customers informing them of the new facility, and using cookies for targeted marketing.’

### **Question 3**

Most candidates knew the answer to part (a). In part (b) many candidates confused the role of the Information Commissioner with that of the data user in a company.

### **Question 4**

Most candidates could identify uses of ICT in organisations, but some answers were very vague, for example simply stating quicker or faster does not gain credit. An example of a good answer for part (a) would have been written as follows.

‘Journalists on a newspaper can send articles by e-mail. This saves staff time and costs for editing as it is already in electronic format.’

### **Question 5**

The candidates were asked why the skills referred to were important. They were therefore expected to identify the use of the skill in an ICT context and explain its importance. Too many candidates did not identify an ICT use of the skill.

### **Question 6**

Many candidates did not achieve high marks for this question. A good answer would have included clear definitions of data, information and knowledge and have provided examples in an ICT context. A good example for knowledge in context would have been “a sales manager’s knowledge of sales trends allows her/him to interpret the information from this years sales report to predict next years sales.”

### **Question 7**

This question elicited the full range of marks available from candidates.

In part (a), there was evidence from the scripts that some candidates are unclear what “intent” means in the context of the Computer Misuse Act and also what is meant by “unauthorised access”.

For part (b), candidates lost marks on this part of the question because they seemed to think that it was difficult to track misuse, whereas the non-disclosure of information relating to breaches of their security is more of an issue for the reputation of organisations.

### **Question 8**

Few candidates in part (a)(i) gained full marks for this part of the question, a good answer could read as follows ‘cc stands for carbon copy, this shows that a copy of the e-mail is sent to the addressee shown, for information only.’

Part (b) (ii) was answered well. However, it was not totally clear to candidates what the arrow for Y was pointing to. As a result marks were awarded for candidates stating that it showed that a file was attached and a mark for stating the file size, in order to give candidates the opportunity to gain both marks.

In part (a)(iii), most candidates thought Z was a footnote and repeated the information in the footnote; this gained no credit. A creditworthy answer could read ‘Z is a disclaimer stating that the company the sender works for takes no responsibility for the contents of the message.’

For part (b), approximately half the candidates knew it was because the names were in the address book and therefore the user would only have to click onto their name and would not have to type in the full address.

In part (c) many of the benefits were too vague with words such as it is quicker, faster and cheaper but without any explanation as to why this was the case or what it was quicker or cheaper than.

In part (d) a good answer could be, ‘Viruses can be sent with e-mails which may then corrupt the whole computer system.’

## **Unit 2 - Information: Management and Manipulation**

### ***Question 1***

This question was generally well answered with the majority of candidates understanding the idea of formatting the contents of a spreadsheet cell.

### ***Question 2***

This question was generally well answered with most candidates correctly naming two network topologies and drawing a clearly set out diagram for each one. It was pleasing to see an improvement from previous years in the standard of the diagrams provided by the candidates.

### ***Question 3***

Many candidates provided excellent responses to this question, but some candidates lost marks owing to poor examination technique. It is clearly stated on the front of all GCE ICT question papers that, ‘... the use of brand names will not gain credit.’ A worrying minority of candidates listed only branded software and thus could gain no marks.

### ***Question 4***

Most candidates could explain that a password is a set of characters, kept secret and used as a security measure. Fewer candidates gave clear explanations of levels of permitted access to a file. Better candidates often answered by example citing various types of staff who were given specific levels of access to a file. For example, doctors could append details to a medical records file; receptionists had no access to the medical records file, but could view and change the patient details file.

In part (b), most candidates could identify two valid methods, but a few candidates who gave two examples of the same method (e.g. fingerprint recognition and iris recognition) only gained one mark as they are both examples of biometric passwords.

### ***Question 5***

Substantial number of candidates were not sure how to explain what was meant by interactive processing and transaction processing, very few candidates gained full marks on this question. Interactive processing is where there is a dialogue between the user and the system and the user is provided with response.

Transaction processing deals with each set of data as it is submitted. Each transaction is completed before the next is begun.

Candidates need to be able to describe the different modes of processing and to identify suitable examples of use.

### ***Question 6***

In part (a), most candidates explained that all the errors should have been removed. Better candidates gained a second mark by identifying that the software should be tested on a variety of platforms or be usable by the target audience.

For part (b), many candidates failed to read this part of the question carefully and did not identify that types and examples of test data were required. Examples of validation techniques could not be credited.

### ***Question 7***

For parts (a) and (b), most candidates could name two types of printer but capabilities and limitations proved challenging for some candidates. Many candidates related answers to cost, which is not strictly a capability or limitation of a printer. For example the ability to print multiple copies at the same time is a capability of a dot matrix printer and the saturation of paper/smudging of pictures is a limitation of an inkjet printer. Candidates providing answers related to cost were given the benefit of the doubt and credited on this occasion.

In part (b), most candidates provided a recommendation supported by a reason. A few candidates failed to read this part of the question carefully and made recommendations about the purchase of computers rather than printers.

### ***Question 8***

It was pleasing to read many good responses to this question with candidates considering the effectiveness of the communication between user and computer system rather than just providing descriptions for the features of a GUI.

### ***Question 9***

In part (a), most candidates could identify one or two problems that had occurred due to storing the data in a flat file. However, some candidates appeared not to have read the whole question before starting to answer part (a) and gave answers concerning the problems due to lack of validation that were suitable for part (b). More astute candidates relabelled their answer as part (b)!

In part (b), most candidates could identify two problems due to the lack of validation. However, a common answer that could not gain credit for this part of the question was to cite the problems with the inconsistent telephone numbers for one customer; this was not due to a lack of validation but as a result of entering the same data on two separate occasions.

In part (c), most candidates could identify two extra fields; only better candidates gave suitable reason for choosing the fields.

In part (d), this part of the question elicited a wide range of responses. Better candidates clearly identified the structures required and related these structures to the file used in the question. Some weaker candidates just repeated the problems stated in part (a) and others described the manipulation facilities provided by a DBMS, rather than data structures. These responses could not be credited.

## **Unit 3 - The Use of Generic Application Software for Task Solutions**

### **General Comments**

The majority of project reports seen in this series were concerned, quite correctly, with generating a task based solution and so were entirely suitable for AS level. Some of the work seen though still focussed on producing a system and, by offering too much scope; the candidate was at times seen to be at a disadvantage. Centres are reminded that while work more often expected for ICT6 can be included it will not necessarily gain the candidates extra credit and the time taken to generate such work may deflect them from achieving the published criteria for this module.

While much of the work was based on Microsoft Excel or Access it was pleasing to see a growing number of web-based projects using mainly Microsoft FrontPage or Macromedia's Dreamweaver.

### ***Specification***

The requirements work was often detailed, although the input, processing and output needs were occasionally insufficiently stated for the mark boundaries selected by centres. Indeed a number of web based reports missed opportunities here where they could have discussed issues behind preparing images, sound or other media for publication through the Internet.

Some centres were still allocating high marks when the design work was clearly incomplete e.g. designs lacking validation and formulae in spreadsheets, or database style projects where the focus was solely on the visual aspects at the expense of processing (queries) or reporting specifications.

### ***Implementation***

The implementation work seen was generally to an appropriate standard for the module and often produced operable solutions. Overall some good quality work was seen with clear documentation that offered an accurate explanation of how the solution was developed. Weaker candidates offered only partial solutions that tended to lack the essential functionality of the task described. For example a solution that needed to generate a quote for a customer but no evidence was provided of this quote existing in hard copy format.

### ***Testing***

Testing suffered from familiar issues with some candidates omitting a test plan altogether whilst others offered little or no data. Weak test plans focus too much on validation or navigation tests without truly testing whether the described tasks or tasks could be completed using the solution produced i.e. can that quote be output and is it accurate? For tasks that carry out search activities on multiple data items for example, then data sets are expected as test data. Disappointingly there were cases where the testing itself was not always fully evidenced, with some candidates offering no hard-copy evidence in support of their testing.

In particular, corrective action is not always clearly indicated. It is expected that as candidates develop their solution they will test them using the plans generated in the specification section. The testing is likely to produce errors and is expected that the candidate will document these, if possible correct the source of the error, and so re-test.

### ***User Documentation and Evaluation***

As in previous sessions the user documentation work continues to be accurately assessed but evaluations still often fail to consider a relevant range of criteria for the assessment of a task-based ICT solution. It is

expected that candidates will be taught the general criteria for the success of an ICT solution and then show the ability to relate these generic concepts to their own work.

## **A2 Units**

### **Unit 4 - Information Systems within Organisations**

#### **General Comments**

This unit, more than any other, expects candidates to have a basic understanding of how ICT is used and managed in organisations of different types and sizes, and those with this basic understanding perform better in the unit than those who have not spent time relating the various topics to a range of organisations.

#### ***Question 1***

Most candidates gained some marks on this question with the better prepared candidates recognising the term from the specification and offering up a good definition of risk analysis. Candidates lost marks for not relating their answer to ICT, instead just discussing named threats to an organisation in general terms.

#### ***Question 2***

Candidates who read the question properly, and used the example given as a guide, usually managed to gain at least half marks on this question, with many gaining full marks.

#### ***Question 3***

In part (a), again, many candidates scored at least one of the three available marks for identifying a reason for using a formal method. Unfortunately, many confused formal methods in ICT systems development, which was the question, with formal ways of communicating information; these candidates seldom gained the other two marks.

In part (b), many candidates offered alternative tasks that a team leader should perform, such as controlling change, allocating the right task to the right team member etc, using good expansions to gain an extension mark. A few confused the team leader rôle with that of a Project Manager.

#### ***Question 4***

This question covered the topic of change management, asking for the change to be identified then to state how it would affect employees. A pleasing number of candidates answered this very well, scoring well above half marks, with most candidates being able to write enough to gain some credit.

#### ***Question 5***

In part (a), despite this subject appearing on most ICT4 papers, it is disappointing that some candidates are unable to list four topics that should be included in the ICT code of practice. Non-ICT topics are not accepted as creditworthy. However, the vast majority of candidates scored at least two of the four marks available.

In part (b), most candidates scored very well on this part, with many gaining all available marks, although some candidates struggled with explaining how a method was effective, giving advantage/disadvantage style answers or actually saying why a method was NOT effective. These negative or irrelevant points did not gain any marks.

### **Question 6**

The question used an illustration that showed part of a questionnaire, which was intended to show the style of free text and limited-choice questions and showed just three questions on a much bigger questionnaire. However, many candidates failed to appreciate this and did not extend their analysis beyond what was visible.

Most candidates gained marks on the two data capture methods in parts (a) and (b), some gained more by identifying a suitable verification method and validation (part (b) only) as suitable methods for ensuring data accuracy.

In part (c), only a few candidates gained both marks for realising that the free text answers would need collating, grouping and précisising so that the recipient would not have to read every single answer. Many gained both marks for offering a series of graphs for the limited-choice questions, or ‘a graph for each question’. Answers that mentioned a single graph or chart could not be credited, especially as they could see four completely different questions on the example given.

Part (d) was not well answered generally, although many did gain one of the two marks, failing to explain why the company had chosen to use ICT for these responses.

### **Question 7**

Most candidates gained some marks on this question about Information System Security Policies, but very few gained all available marks, mainly due to a misreading of the question. Previously when requesting factors covered in an Information Systems Security Policy, the majority of candidates have answered with a list of procedures for preventing misuse, just one of the topics. This time the questions allowed for both, and candidates who read the whole question before embarking on part (a) probably realised this.

Part (a) gave candidates an opportunity to describe how a range of procedures could be implemented to protect systems and data, for example making sure that users log out of their network machines when going for a break, to prevent an unauthorised user from gaining access to the system. Many candidates could give the procedures for protecting, but failed to explain how they worked, just describing what they were.

In part (b), candidates were expected to think about which legislation was important for information systems and data security. Most candidates correctly gave the Data Protection legislation as one of those, and many gave either Computer Misuse legislation or Freedom of Information legislation.

Part (c) asked for four factors that need consideration when writing a security policy. Many knew these from the specification, so Prevention of misuse, Detection of Misuse, Investigation of misuse, Staff Responsibilities and Disciplinary Procedures all gained credit.

### **Question 8**

These were standard definitions that many candidates could recall well, many gaining full marks as they also gave two good examples. This time, a description of a system was credited if the candidate had used the description to give the explanation. Others failed to include the examples, which were specifically requested. Some candidates confused the two types of system, which is worrying at A2 level.

### **Question 9**

Overall the standard of the essays was quite poor with only a minority gaining over half marks, although a small minority did appreciate the topic and wrote excellent succinct essays that scored marks in the top quartile. It was also pleasing to see that many candidates are starting to plan their essays before actually embarking on them.

Unfortunately, it was apparent that many candidates had not studied the topic of Corporate Information System Strategies and had therefore little idea of the concept of organisational planning for the ICT they intend to use in the future. Many candidates treated this as if it was about the

introduction of a new system, gaining a few marks as they tried to fit this scenario into the three topics given on the bullet points. Others made a valiant attempt and then ‘brain-dumped’ everything else they had revised that hadn’t appeared on the paper, often writing pages of irrelevant material. A few mistook ‘personnel in the organisation’ for the Personnel Department (Human Resources).

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

### ***Question 1***

Many candidates gained full marks for this question. However, some candidates lost marks by offering the example given in the question stem.

### ***Question 2***

Many candidates were able to name two system resources and give a reasonable explanation of why a GUI increases the demands on the resources they had named, thus securing full marks. Other candidates, however, found the question more difficult. It was quite common not to give an answer at all. Of those that did, some could name a resource or two, but struggled to say why, for example, the processor had more work to do to support a GUI than another style of user interface. Some candidates offered resources that were not system resources.

### ***Question 3***

Nearly all candidates scored three marks or more. The section of the specification examined in part a) seems to be very well understood, that examined in part b) less well so. Many candidates were able to give reasons for failure but were unable to expand their reasons sufficiently to gain more than two marks. Since the question said the software had been extensively tested, ‘inadequate testing’ (a very common answer) was not accepted alone, without appropriate detail of where the testing might have fallen down: failure to test all paths through complex software, failure to test software with the available hardware/software combinations are examples of appropriate responses.

### ***Question 4***

In part (a), The better candidates were able to score full marks here; and some candidates who could not score full marks were able to score up to three marks for offering some part of a full and accurate explanation of what data normalisation is. Candidates who learn answers from past mark schemes without any understanding are rarely able to gain good marks.

In part (b), This part was generally little understood. In a relational database, data consistency is achieved by storing data only once; data integrity is achieved by ensuring the correctness of data by, for example, validating the data; and data independence is achieved by storing data independently from the programs that access them. However, it was encouraging that the best candidates showed clear understanding of this part of the specification and were able to score all the way up to full marks.

### ***Question 5***

Many candidates scored well here. Among those who did not score well, there was frequently some misunderstanding of what is meant by ‘the use of networked systems for various applications’. Some candidates talked about specific application software, and their answers were thus not worthy of credit, nor were the answers where candidates described personal benefits to users rather than any of the ‘benefits that a company gains’, which the question had required.

### **Question 6**

This question was generally very poorly answered. Many candidates offered factors that were obviously physiological. Many offered the psychological factor ‘user friendly’, which the question had excluded. Many of those who could name any creditable factors were unable to expand well enough to score high marks. The example given in the stem is worthy of study: making the interface user friendly (factor), by supplying a beep (example of this factor being considered), which the user will hear and be alerted to the lack of paper (expansion to showing how the factor was considered). This was intended as an exemplar of one factor for three marks. What good candidates did was to think of three other factors (perhaps the ones suggested in the specification), and supply three appropriate and different examples, each of which would show how that factor had been considered.

### **Question 7**

Some candidates now appear to be well prepared for questions on this part of the specification. This is an encouraging trend given the increasing importance of internet based applications.

### **Question 8**

Very many candidates gained full marks easily in parts b)ii) and c). In part a), the better candidates had all eight marks, while very many lost some marks by failing to explain their reasons or by failing to offer four creditable reasons. Part (b) (i) attracted few really good answers; many candidates could only repeat the question; though many had one mark for saying that evaluation would be against requirements.

### **Question 9**

General - Many candidates took time, which they could ill afford to do, to describe the advantages and disadvantages of computer networks, and of various computer network topologies: none of this was mentioned in the question. However, there was ample opportunity for synoptic responses to gain credit, and many good candidates were awarded those marks.

Security - Many weaker candidates were able to score several, and some full marks for descriptions of the security arrangements in their own school or college. Most candidates scored very well here.

Network auditing and accounting - Weaker candidates found these sections not so easy. Better candidates, however had a clear idea of the differences between the two, and scored well up to the maximum marks available.

## **Unit 6 - The Use of Information Systems for Problem Solving**

This session saw few entries for this module and the work that was submitted had largely been implemented with Microsoft Access.

Standards were generally sound although some centres still need to address familiar problems identified in previous reports.

Centres are reminded that the key issue for ICT6 is, ‘... to produce an information system for a real end-user’. Thus genuine interaction between the candidate and the end-user is an essential requirement for this module and has a critical effect on the assessment. Centres are specifically reminded that this is essential within the testing section if a high mark is to be considered by supervisors. One example of good practice would be for candidates to include detailed plans in their design work as to how the end-

user would test the solution. These plans may include scenarios for the end-user to complete and the actual data to be input or processed.

Work for ICT6 is expected to reflect a realistic situation where data is expected to change over time. Some of the candidates work was still inappropriate, focussing on ‘one-off’ solutions. These solutions either solved a single problem with no need for reusability or trivialised solutions so they could not be operated over time. Some work seen needed the candidates to focus more carefully on achieving a solution to their problem and testing this solution rather than focussing on showing skills and testing implementation objects without due regard to the effectiveness, or completeness, of the solution developed.

A continued cause for concern in some centres’ work was the analysis section where too often the work is over assessed, as inadequate evidence can be found in the candidates’ reports to support the mark boundaries selected by the supervisors. This is particularly noticeable when assessing work on information flows. As much of the work is developed into database applications there must be adequate detail given in the analysis to begin the design effort on a relational database structure. Evaluation is also an issue in some centres where the cause is often inadequate criteria for genuine assessment of the solution’s success or failure.

## Mark Range and Award of Grades

Unit/Component	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
Unit 1 - Information: Nature, Role and Context	60	60	24.7	8.1
Unit 2 - Information: Management and Manipulation	60	60	33.4	9.0
Unit 3 - The Use of Generic Application Software for Task Solution	60	60	29.9	10.8

For units which contain only one component, scaled marks are the same as raw marks.

### Unit 1 - Information: Nature, Role and Context (14104 candidates)

Grade	Max. mark	A	B	C	D	E
Scaled Boundary Mark	60	39	34	29	24	20
Uniform Boundary Mark	90	72	63	54	45	36

### Unit 2 - Information: Management and Manipulation (8154 candidates)

Grade	Max. mark	A	B	C	D	E
Scaled Boundary Mark	60	45	40	36	32	28
Uniform Boundary Mark	90	72	63	54	45	36

### Unit 3 - The Use of Generic Application Software for Task Solution (535 candidates)

Grade	Max. mark	A	B	C	D	E
Scaled Boundary Mark	60	42	36	30	24	18
Uniform Boundary Mark	120	96	84	72	60	48

### Advanced Subsidiary award

Provisional statistics for the award (658 candidates)

	A	B	C	D	E
Cumulative %	5.80	22.73	46.55	74.76	93.42

Unit/Component	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
Unit 4- Information Systems within Organisations	90	90	40.0	12.9
Unit 5 - Information: Policy, Strategy and Systems	90	90	37.5	13.9
Unit 6 - The Use of Information Systems for Problem Solving	90	90	23.7	19.2

For units which contain only one component, scaled marks are the same as raw marks.

### Unit 4 - Information Systems within Organisations (5423 candidates)

Grade	Max. mark	A	B	C	D	E
Scaled Boundary Mark	90	56	50	44	38	32
Uniform Boundary Mark	90	72	63	54	45	36

## Unit 5 - Information: Policy, Strategy and Systems (1824 candidates)

Grade	Max. mark	A	B	C	D	E
Scaled Boundary Mark	90	54	48	42	36	30
Uniform Boundary Mark	90	72	63	54	45	36

## Unit 6 - The Use of Information Systems for Problem Solving (61 candidates)

Grade	Max. mark	A	B	C	D	E
Scaled Boundary Mark	90	59	50	42	34	26
Uniform Boundary Mark	120	96	84	72	60	48

### Advanced award

Provisional statistics for the award (57 candidates)

	A	B	C	D	E
Cumulative %	8.51	23.40	57.45	80.85	93.62

### Definitions

**Boundary Mark:** the minimum mark required by a candidate to qualify for a given grade.

**Mean Mark:** is the sum of all candidates' marks divided by the number of candidates. In order to compare mean marks for different components, the mean mark (scaled) should be expressed as a percentage of the maximum mark (scaled).

**Standard Deviation:** a measure of the spread of candidates' marks. In most components, approximately two-thirds of all candidates lie in a range of plus or minus one standard deviation from the mean, and approximately 95% of all candidates lie in a range of plus or minus two standard deviations from the mean. In order to compare the standard deviations for different components, the standard deviation (scaled) should be expressed as a percentage of the maximum mark (scaled).

**Uniform Mark:** a score on a standard scale which indicates a candidate's performance. The lowest uniform mark for grade A is always 80% of the maximum uniform mark for the unit, similarly grade B is

70%, grade C is 60%, grade D is 50% and grade E is 40%. A candidate's total scaled mark for each unit is converted to a uniform mark and the uniform marks for the units which count towards the AS or A-level qualification are added in order to determine the candidate's overall grade.

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