

# GCE 2002

## *June Series*



## Report on the Examination

# Information and Communication Technology

- 
- Advanced Subsidiary
  - Advanced

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*Kathleen Tattersall, Director General*

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# Information and Communication Technology

## AS Units

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

#### General Comments

Many candidates were able to attempt all of the questions but some found that they could not answer questions on certain areas of the specification. Centres must ensure that full coverage of the specification is achieved. It is noticeable that whilst there are some very able candidates taking the paper, others do not have the depth of understanding of the subject to be able to gain good marks. There were a lot of very generalised answers which made little reference to ICT. Good candidates should be showing a depth of understanding and breadth of knowledge of the subject of ICT rather, than a series of learnt facts. Candidates were often failing to give examples, even where these were explicitly asked for in the question. It should be noted that this specification addresses the academic study of ICT and not just practical skills.

The depth of understanding shown by candidates is rising in answers to questions covering certain areas of the specification, for example on communications, but many candidates still do not look at the wider use of ICT and give answers that relate only to personal use. Answers to Question 6 showed evidence of this problem.

There were instances on this paper where the use of one-word answers to questions was credited: Question 1 and Question 11.

Although marks are not awarded specifically in this question paper for quality of language, candidates do disadvantage themselves by use of poor English, presentation and handwriting in their answers. Frequently even subject specific terms were miss-spelt, making it difficult for examiners to interpret the meaning of candidates' answers.

#### *Question 1*

Candidates found this a good first question to answer with many gaining full marks. Some candidates who used the term "information" in their answers, rather than data gained zero marks. Describing the characteristics of good quality information, rather than data was the most common reason for not scoring high marks. Another problem was candidates repeating their answers e.g. "accurate" and "correct" given as two characteristics.

#### *Question 2*

There were some very poor responses to this question with very few candidates getting both marks. Many candidates completely misunderstood the question. The two most common aspects were those whose interpretation was security issues (encryption) and those who explained the need for appropriate file extensions. However most candidates earned 1 mark, mainly for the binary/pixels 2<sup>nd</sup> mark. Poorer answers included discussion of processing and/or the shortening to codes to save space (e.g. M/F, R/B/G)

#### *Question 3*

This was an example of a question where candidates failed to gain high marks because they did not relate their answers to the context of the question. There was a tendency to just write down any

personal qualities that they could think of. Some referred to designing skills rather than investigational skills, whilst others failed to show an understanding of personal skills as appropriate to someone working in ICT. Some candidates described the need for technical skills and knowledge.

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

Few candidates scored full marks on this question. Some totally misunderstood the question and described the advantages to people buying cars with such systems “on-board”. This may have been due to candidates rushing through the paper or simply skim reading the questions and concentrating on what they thought were the key words. Others gained the first mark by stating what the systems allowed the drivers to do but then failed to include the advantage to the business.

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

Answers to this question covered the whole range of marks. Some candidates gave really good answers, showing a clear understanding of the advantages to business of different ways of using the Internet. However some candidates failed to give the advantage and some concentrated solely on on-line shopping provision – perhaps the result of learning answers to past questions. Some candidates described benefits to the customers instead of to the company.

#### ***Question 6***

Some candidates misread the question and described advantages rather than disadvantages. Others included viruses, although these were explicitly excluded in the question. This highlights the need for candidates to read questions properly. Many candidates did not consider the disadvantages from the business perspective, but answered from personal experience. It was also interesting to note the number of candidates who included the fact that the sender will not know whether the e-mail has been read – will they know if a letter has been read? Answers that gained no credit were included the size of attachments, setting up and training costs and answers that addressed procedural issues of e-mail usage. The latter two were something the company would have considered before adopting e-mail, again a case of not reading the question carefully. As in other questions, candidates tended to state a disadvantage without describing why it is a disadvantage. This question was a good discriminator.

#### ***Question 7***

This was a very poorly answered question with many candidates not understanding the difference between hardware and software. A surprising number of candidates completely addressed hardware issues and/or equipment layout. Very loose vocabulary was used in terms of the colours used, flickering screens and brightness of monitor. Generalised phrases such as “easy to use”, “friendly” and “quick” were common. This area is a very important aspect of software design and systems development and, as such, should be awarded appropriate consideration by both school and college candidates. This does not seem to be the case, perhaps surprisingly, given that such considerations should be addressed when carrying out the practical work necessary for ICT3. “Stress” without qualification or further explanation seemed to be some candidates' answer to everything.

#### ***Question 8***

The answers to this question gave the impression that there were a large number of candidates who were carrying out illegal acts with ICT without realising they have done so! There were many candidates who had little idea of the difference between malpractice and crime and many of the examples given for malpractice were in fact examples of illegal activities. A full range of marks was achieved by candidates on this question.

#### ***Question 9***

There was an excellent response to this question with a significant number of candidates gaining good marks. The first mark proved to be a common stumbling block for many candidates, with “less

queues” and “less work” being the usual attempts at an answer. Some candidates did give disadvantages of the use of ATMs in answer to part (a) (ii) but generally the answers to this part were good. Some candidates missed out part (b) and others described the benefits to the police or to stores, that the banks could provide the data to, rather than the banks themselves. Where candidates generally lost marks on this question it was usually because their answers were too brief and did not explain the advantages.

### **Question 10**

The focus of the question was to test candidates' understanding of the Data Protection Legislation. Candidates were given the principles and then asked to explain what an organisation had to do to comply with them. Some candidates found answering the question difficult and those who had learnt the principles verbatim did not show an understanding of what they had learnt. Many of the answers were recursive, simply restating the question. The first principle was the one with which more candidates had difficulty. For the third principle many wrote about penalties rather than procedures. The full range of marks was achieved on this question

### **Question 11**

This question covered several areas of the specification and was again trying to test candidates' understanding of basic principles: inputs, stored data, outputs and reasons for using ICT. For part (a) (i) most candidates gained one mark for “hours worked” but few realised that an identifier was also needed. Part (a) (ii) had most candidates gaining 2 marks but (a) (iii) was poorly answered, with calculations rather than documents being given as answers. In part (b) many candidates described advantages to employees instead of the organisation. Weaker candidates did manage to gain some marks on this question and strong candidates performed well, some achieving full marks.

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

### **General Comments**

This was the fourth paper of the new examination and it was pleasing to note that nearly all candidates attempted to answer every question on the paper and most responses were of a satisfactory standard. There were very few scripts with questions not attempted. There was a marked increase in candidates providing answers using full sentences.

Candidates who used the correct technical terms and related these to the context of the question scored high marks for their answers. However, many candidates were still quoting facts from the subject area without specifically answering the question.

Candidates still continue to answer questions using only references to brand names rather than the general terminology required e.g. “Word” package instead of word-processing package was a very common unacceptable answer. It was stated clearly on the questions that “*The use of brand names will not gain credit*”.

### **Question 1**

The majority of candidates were able to identify at least one function to prevent accidental deletion/alteration of data. A common mistake made by candidates was to quote functions provided by an operating system e.g. recycle bin rather than functions provided by a software package.

**Question 2**

Candidates needed to identify why a CD-Rewriter would be required rather than just storing data on a computer's hard disk. A popular correct answer was the use of a CD-Rewriter for backing up data. This incorporated the concept of being able to remove the data from the computer and store it elsewhere, and also being able to re-use the medium. Other correct answers described the transporting of large amounts of data for use on other computers or archiving data that was no longer required for regular use but needed to be stored in an accessible format. Music, games or programs can be digitally stored but candidates needed to explain why the CD-Rewriter was required and ensure that the use described did not break any copyright laws.

**Question 3**

Many candidates could clearly state two advantages of using a network and were able to illustrate their response with evidence from their own experience of using a network at school or college. The descriptions of the disadvantages of using a network were often weak and frequently did not show a clear understanding of the process. For example, a common response was, "if the server goes down then so does everything else." Better candidates stated, "if the server goes down then network stations will be unable to access resources controlled by the server."

**Question 4**

Candidates provided excellent responses to this question with many scoring full marks. Most candidates provided answers that showed they had clearly understood the context of the question i.e. the password was a fixed number of digits.

**Question 5**

In part (a) most candidates identified batch processing.

In part (b), however, a worrying number of candidates could not describe three features of this type of processing. Many candidates simply reflected the question by stating the processing was done overnight, rather than stating that, as the output was not time critical and the processing required no human intervention, once started, it could be completed when the system was least used.

**Question 6**

Most definitions of both *verification* and *validation* of data were very weak and did not show understanding of either concept or the difference between the two techniques. Candidates needed to include in their explanation that verification was the checking, by comparison, that no alterations are made to data as it was transferred from one system to another or on first entry into the computer system, and that validation was checking for sensible data or rejecting data that was unreasonable. Candidates often provided satisfactory examples of verification and validation, however some candidates lost marks by confusing the terms.

**Question 7**

Few candidates showed a clear understanding of these three types of package software. Many answers confused the characteristics of generic software with the characteristics of an integrated package. However, most candidates could provide a suitable example of generic software. The use of specific software was frequently not fully explained, with candidates recognising that the software was used to perform a specific task but not going on to explain that the user also required specialist knowledge e.g. an accounting package used by an accountant. Candidates who had studied the use of bespoke software often gave informed answers but other candidates showed worrying misconceptions e.g. the use of bespoke software to support speech based applications.

### **Question 8**

Part (a) of the question was usually well answered with most candidates able to identify four items of software and their uses. Candidates who gave weaker responses often included the following common problems: using manufacturer’s brand names instead of the general name for a package; naming types of software (e.g. application, system) instead of items of software; using incorrect terms for operating system (e.g. operations system); describing items of hardware instead of software.

In part (b) many candidates did not include sufficiently different reasons for needing training, so could only be awarded one mark. Candidates needed to explore the ideas of new functions/features being included and also changes being made to existing functions of hardware and software e.g. inclusion of new formulae and different methods of producing a graph using spreadsheet software.

### **Question 9**

In part (a) most candidates could identify the problems with the file of orders but only the better candidates could describe these problems using the appropriate technical terminology. For example, candidates could identify that Sue Sneath and Mrs Sneath were the same salesperson and this difference in names could cause a problem but did not describe the problem as inconsistency of data.

In part (b) the better candidates were able to identify database structures and illustrate their answers with examples from the given scenario. The question was looking for data structures e.g. tables, primary keys, relationships and foreign keys, not manipulation and formatting such as forms, reports, queries etc. Candidates scored good marks using a wide range of approaches including: Entity-Relationship diagrams, restructured tables with primary and foreign keys identified, and written descriptions. Weaker candidates did not identify tables as required structures and continued to refer to files, even confusing the terms files and records. Again, candidates who made good use of technical terminology found it easy to gain full marks for this part of the question.

### **Question 10**

In part (a) in order to gain high marks for this part of the question, candidates needed to make clear references to the diagram of the input screen that was provided as an insert (Figure 2). Many candidates made general statements about a “good HCI” without clearly referencing the evidence provided. For example, “Good use of colour to highlight items for the user,” was sufficient for one mark, this needed to be expanded, “to labels of items that must be input by the user were highlighted by the use of a red font,” in order to gain a second mark for this point.

Part (b) was generally well answered, with many candidates gaining full marks for this part by clearly identifying a trigger event e.g. entry of Customer Number and the item(s) entered automatically, customer details (Forename, Surname, Address, Postcode).

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

### **General Comments**

The majority of the work submitted was produced using Microsoft Office suite of applications and was either spreadsheet or database implementations. Generally the spreadsheet implementations were of a higher standard than the database implementations, with more software specific features relevant to the solving of the problem being exploited.

The problems attempted were generally suitable for the requirements of the specification and, in most cases, the resulting solutions were appropriate. Some centres misinterpreted the standard in terms of the criteria published and often awarding too much credit. This was particularly evident when marks were awarded yet the candidate presented limited evidence of implementation and testing.

### ***Specification***

Great care needs to be taken when advising candidates about the nature of the problem to be solved. For example, it was sometimes seen that in a database style project that very complex problems with too much scope were tackled. Whilst suitable for ICT 6, such problems often led to the candidate producing a superficial solution that was often not operable within the environment described.

Most candidates gave due consideration to user requirements and there were some good attempts to identify input, processing and output needs. Weaker candidates gave vague descriptions, referring to “keyboard input” and “screen output”, but failed to consider these needs in sufficient detail,

Some good design work was seen but problems did exist where there was insufficient evidence to support a third party implementation. Often this was because candidates focused solely on the visual elements of interface design. In spreadsheet work, often there was no design for the macros that appeared later in the implementation. In database work there was often a failure to consider how the data would be manipulated e.g. query design. Many candidates did not clearly describe the origins for their database structures and many, as a result, could not correctly formulate the entities and attributes into a coherent, workable database structure. Too many projects were seen where the solution was implemented using a flat-file structure rather than a relational database. A further weakness was the use of multiple tables consisting only of one-to-one relationships.

Very few candidates produced a written, coherent testing strategy. Test plans and test data were, at times, limited. For database implementations, data sets for testing must be included. For example, if a query that locates delinquent borrowers for a library is to be tested, it must be clear which records from the stored data are expected to be retrieved. Candidates should clearly test that the major functions of the implementation work. For example, if the purpose of the project is to conduct a stock re-order then this function needs to be checked for the correct output, and the data on which it should act should be clearly defined. Some candidates spent far too much time testing validation at the expense of the critical tasks that the project intended to deliver.

### ***Implementation***

Some candidates failed to realise or understand that documentary evidence must be provided to prove that they had met the assessment objectives. There must be clear proof in the submitted project to establish that the solution described has been built, and to show the Moderator what skills and techniques were deployed. Spreadsheet solutions must include printouts of the formulae used where the cell references can be clearly identified and checked. Thus care must be taken that screen shots are legible.

Evidence of the quality of the implementation can be taken from the testing section, however there must be clear documentation of the solution to allow a judgement to be made by the Moderator on the effectiveness of the solution produced in meeting the assessment criteria.

### ***Testing***

It is *critical* that the fundamental purpose of the project is fully tested and that hard copy evidence of this is included for the Moderator to see. It is the intention that testing should take place as the solution is developed and that candidates should show the problems that occurred, the steps they took to solve these problems and any subsequent re-testing to show success.

Weak test plans focussing solely on testing validation, input masks and navigation do not provide adequate proof and the focus must be on the main objectives of the solution.

### ***Evaluation***

Before attempting this section candidates must be clear on the general criteria for the assessment of an Information Technology based solution. The candidate is then expected to reflect on how well their solution meets these criteria. The criteria may need extending depending upon the nature of the project but the candidates must discuss their success/failure and not simply state the evaluation criteria stating whether it has been achieved.

### ***User Documentation***

The focus for this work should be on the main task that the solution delivers and the explanation of it in a form suitable for the prospective (real or realistic) end-user. To this end, many candidates produced sound, good quality user documentation which demonstrated normal use of the system with some candidates providing forms of on-line help.

## A2 Units

### Unit 4 Information Systems within Organisations

#### General Comments

This question paper was the first of the new examination and was designed to enable candidates to show the advanced knowledge and understanding of ICT that they had gained over two years of studying this subject, with a focus on issues relating to Information Systems within Organisations. Many candidates were able to give answers that did indeed show their real understanding of the subject matter.

The quality of communication was generally good, although some candidates' presentation and handwriting made it hard for examiners to mark their scripts. For instance, it is not necessary to compress all answers into as few pages as possible of the answer booklet.

Whilst many candidates had obviously used specimen papers and the specification for revision, it was clear that some had never studied the specification as they could not answer questions using some of the very basic definitions that are there. Questions 2, 6(b) and 7(b) could all be answered with responses well-referenced to the specification.

Some candidates appeared unable to transfer knowledge into the given context, although the transition from Question 8 to Question 9 often saw the supermarket context followed through.

The style of all ICT papers has been changed so that candidates are able to deduce how many marks are available for each point made. Thus, giving a list of eight items when asked to "Describe four" will only gain a maximum of four marks. In a few cases, there was still evidence of candidates writing down everything they knew in their answer to the question. There was also some evidence of poor examination technique where candidates wrote out the questions and then failed to complete the paper.

There were some non-ICT related answers given, especially for Questions 3 and 9, where many candidates gave generalised answers.

#### *Question 1*

This question required a simple, straight-forward definition, available in many books and dictionaries. However, many candidates managed to get only the example mark. The question referred only to *formal information flow*, but many candidates seemed to think they had to explain what informal flow is as well.

Few candidates managed to get the two description marks for saying that formal information flow is a fully documented set of agreed procedures stating stages of flow, control, exception handling and distribution. Acceptable examples were any document that was obviously formal, for example a business letter, minutes of a meeting, an agenda, a memorandum. Intranet, Lotus Notes and e-mail were only allowed if described in a formal context.

#### *Question 2*

The command word in this question is "State". Five marks were available and were given for a short phrase such as lack of teamwork. Lack of user involvement in design, lack of understanding of the

capabilities of ICT by management, meaning there was no need to give long explanations or descriptions.

Most candidates gained three or four of the five marks, although some gained none by answering with “management of change” type of responses rather, than realising that the question was about the MIS itself.

### **Question 3**

Many candidates failed to read this question properly and hence gave ethical and moral issues of working in the industry, rather than the more practical issues of working with an organisation’s computer system, as was asked for in the question. Most candidates will have had to sign a similar agreement to use their educational establishment’s network, so the number of very good responses was disappointing.

The candidates who realised that this question was about responsibilities to the company whilst using the computers managed to gain at least half of the available eight marks, with some gaining all eight. The better candidates also knew to answer from the company’s point of view, rather than as a list of “Do not...” instructions. Good examples of issues which a code of practice should address include: employees’ responsibilities when using company software (e.g. not copying the software and taking it home); every user to have a separate Logon ID and password which it is the user’s responsibility to keep safe and change it regularly; responsibilities when using the company link to the Internet (e.g. not using it for personal use in work time, not visiting inappropriate sites).

### **Question 4**

This question was about an IT Security policy i.e. a set of procedures that an organisation would have in place to ensure the security and integrity of the information systems and data. It was a completely different question to the code of practice of Question 3 which was looking at user responsibilities.

It was obvious from many responses that candidates did not read all parts of the question before attempting to answer. In this question, many candidates wrote the answer to part (b) as a part (a) response, then (understandable) felt that they could not use it again in part (b). The context given was a medical centre thus any examples had to be either in this context or in a generic context that was appropriate for the size of organisation. A few candidates thought they had to know the intricacies of prescription handling, but this was not the case.

In part (a) many candidates concentrated on the prevention of misuse aspects. The specification clearly lists other factors, such as detection, investigation, security procedures, staff responsibilities and disciplinary procedures. Only one expansion mark could be awarded for each factor, whereas many candidates gave four different types of security for prevention of access or they focused on legislative issues.

Part (b) was looking for Audit Trail with an explanation of what it is. Provided candidates’ responses covered “what had changed/how the data had changed” and then also either “who had changed it” or “when it had been changed”, the second mark could be gained. Many candidates offered validation or verification, or keeping a paper trail as viable alternatives; some others thought it was appropriate to ask a patient to check their records each time they came into the centre - not a viable, or ICT, approach.

Part (c) caused the most confusion. Candidates who gave the criteria for choosing the disaster contingency plan, rather than the contents or types of plan, managed to score well on this question, as long as they kept the medical centre context in mind.

### **Question 5**

Part (a) was focused on the failings of the old system and part (b) had an emphasis on what is required in any new system. Some candidates confused the two. Some candidates seemed to think the question was merely about the upgrading of a package.

Part (a) was a “State” question therefore three points could be made for the three marks. Some candidates offered business reasons - such as establishing a competitive edge - which were not appropriate in the ICT context.

Part (b) was generally answered well, with candidates able to describe three technological, economical, legal, operational, schedule, training or changeover factors.

### **Question 6**

This is a topic at the very heart of this module – the information needs of different people in an organisation. Part (a) asked for the basic differences, and part (b) gave the opportunity for the candidate to use these differences to illustrate a characteristic of good information. The better candidates did this and gained full or nearly full marks on this question.

In part (a), some candidates showed a lack of understanding of the different levels within an organisation. The differences – in detail (detailed/aggregated), in type (operational/strategic), in timing (current/historical) and so on - are mentioned in the specification. Many candidates failed to use an appropriate level of terminology and some could not think of alternatives to those used in the question (day-to-day and annual).

Part (b) asked for **one** characteristic, yet many candidates gave two or more, and failed to explain them sufficiently. For instance, many gave “accurate and up-to-date” as a characteristic, then expanded “up-to-date”, gaining only one mark. Some examples did not illustrate anything but simply restated the obvious; other answers illustrated an entirely different characteristic. A new characteristic, “brief”, appeared in many responses. This is not necessarily a characteristic of good quality information and does not map onto "in the right detail" as well as "concise" does. Where a candidate offered “brief and concise”, the "concise" was interpreted by examiners as correct, with a clarifying description or example.

### **Question 7**

This was a generally well-answered question with most candidates picking up at least half the available 12 marks and many gaining 10 or more. Candidates who failed to score well had mostly confused parts (b) and (c), or had not concentrated on the ICT aspects.

Part (a) showed that some candidates failed to understand that different levels of user would need training on different aspects of any system, as they would be doing different jobs. Candidates who scored well on this section used the given scenario with named different levels of staff. Staff IT literacy would also be an issue: the novices would need a more basic training than others. Staff with some previous experience of the hardware or software could be trained sooner than others, enabling them to be productive sooner. The fourth possible allowable point, that consideration of future new staff would need addressing, was not used by any candidate.

Part (b) asked for methods of user support – these are detailed in the specification and most candidates gained all four marks.

Part (c) asked for methods of training and “advantages”. Not all candidates gave an advantage, but merely described the method. Some gave advantages such as “cheap” and “easy”, which are not appropriate on an A2 ICT paper.

### **Question 8**

This question was answered either very poorly, with candidates gaining four or fewer marks, or very well, with candidates gaining seven or more marks out of ten, with few candidates in-between. One very evident problem was that although the stem clearly was about a supermarket context, candidates responded with learnt answers from other contexts, especially in part (b).

Part (a) was about the differences between a *data processing system* and an *information system*. Many understood that a data processing system deals at a repetitive transactional level and that an information system provides information to aid in decision-making. Only the better candidates could then give an example that truly illustrated the differences – e.g. that the Point-of-Sale system in a supermarket processes transactions to produce a till total and adjust the stock levels, but the Sales information system organises that stock information to produce reports that can be analysed by managers to see which are the best-selling products. Many candidates could not even give the name of a system, offering e.g. "bar codes" as a viable system.

Part (b) then required candidates to look at the differences between “tactical” and “strategic” management information needs. Some candidates confused the two and gave answers the wrong way around, gaining no marks at all. The context was chosen deliberately as a large chain of supermarkets so that the candidates could separate out "tactical", meaning local (either departmentally or just one shop), and "strategic", meaning central or head office. The better candidates managed to do this.

Part (c) was perhaps the worst answered question on the whole paper. A practical step-by-step example was required, for example “Information about items sold at the Point-of-Sale system in each supermarket is sent to head office, where it is amalgamated and analysed to show different buying patterns throughout the country. This enables management to formulate marketing strategy for the coming year”.

### **Question 9**

Many candidates produced well-structured essays that answered the question well and demonstrated good examination technique. The proportion of candidates who scored fifteen or more marks was pleasingly high.

The less successful responses to this question were essays based on either a business studies premise of “organisation, technology and people” or a systems life cycle premise. These were possibly practised approaches, but failed to answer the question as it was asked. Candidates should be reminded that the bullet points are a guide to what is expected from their response. Re-writing the question as the introductory paragraph should be avoided.

The question was about the management of change and therefore responses should have made it evident that candidates were considering what would be needed should new or improved ICT systems be introduced into an organisation. There was much discussion, for instance, of organisation structure, some with diagrams, others with meaningless quotes.

Candidates could score well on staffing issues, offering far more information than the maximum points allowed for that section in many cases, whilst not really understanding some of the procedural points. Candidates often failed to expand on single issues. For example, candidates would write about the need for communication but would not say how management could deliver in that area. They struggled with the terms “internal” and “external” procedures. A number saw that introducing

the Internet would change the way in which the firm was run, but could not expand on how these might affect the practicalities within the firm.

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

### **General Comments**

Overall, the standard of response this year is comparable to the previous legacy standard. The candidates who had looked at the specification, and heeded its contents tended to produce a better response than the candidates who were less well prepared. It was obvious, however, that some centres had followed the legacy syllabus and this led to some candidates providing answers which could not be credited due to the changes made to the specification for Curriculum 2000.

The introduction of the synoptic element to the specification has also allowed candidates to gain credit for answers that are relevant and appear in any other part of the specification. This has, to some extent, allowed weaker candidates to fall back on knowledge from the AS units, but it has also allowed stronger candidates to show the extent of their knowledge and their ability to link this together in a sensible fashion.

Responses to the continuous prose question, Question 9, were, on the whole, thought out and accompanied by some sort of plan. The answers tended to indicate a reasonable ability to put together a flowing argument. There were several examples from the rest of the paper, however, that showed that candidates' limited vocabulary is stopping them from gaining higher marks.

It was also disappointing to note the number of candidates who did not make use of the stem in order to frame their answers in the required context. Candidates were providing pre-learned answers (sometimes straight from previous mark schemes) without considering their validity to the context given.

### ***Question 1***

Responses to this question varied widely, with most candidates able to gain at least 1 mark but few achieved full marks. Good responses outlined distinct problems, with a little detail. Several candidates responded by outlining testing strategies (e.g. alpha and beta testing) without mentioning why software can still fail. Other popular and inappropriate responses included “testing is inadequate”, “testers do not know what they are doing” and “software does not meet end user requirements”.

### ***Question 2***

Responses to this question showed some misunderstanding of the term “emulation”. Several candidates gave responses which described a software filter, rather than emulation of another system. It was also common to find limitations that described lack of functionality of application software, rather than lack of functionality of the emulation. A popular response was that the designer would require more training. Most candidates gained some marks on this question.

### ***Question 3***

Common misconceptions on part (a) were that a protocol is a physical device or confusion with the term prototype. It was also disappointing to find that several candidates did not take note of the stem and so defined the term without reference to computer networks.

Part (b) was either answered based on the misconception in (a), or more usually answered with reference to the Internet. Whilst it was not required, reference to specific protocols was credited. Better answers to this part described the relation of open systems to protocols.

Most candidates could gain some credit for part (c) and could reasonably identify a consideration to be taken into account when deciding upon a computer network. Unacceptable answers simply stated whether it should be a LAN or a WAN without any reasoning to back this up.

#### **Question 4**

Most candidates could gain some marks, but many failed to score highly due to the generic nature of their response, or the way they introduced their own scenario. In terms of gaining marks, it was important in this question that the candidate be able to discuss the evaluation criteria in relation to the given context. There were several examples of “cost” as a criterion without relating this to the benefits gained by the company, and “performance” without saying why this is important to the company. Descriptions of performance that included benchmark testing were not credited.

#### **Question 5**

Part (a) was a problem for many candidates, and indicated that either they did not know what the terms mean, or that they did not know how to express this knowledge using words that were not present in the question. Several stated how to normalise, but could not say why a relational database should be normalised; that data independence meant data was not dependent on the data in the database, rather than being independent of the program; that data consistency meant that data was in the same format throughout the database, rather than that data was from the same source wherever referenced; that integrity was a measure of security rather than a measure of correctness or how trustworthy the data is for use.

Part (b) was generally attempted well, with weaker candidates being able to describe a reasonable application of validation, and better candidates able to define and apply validation in context. There is still evidence of confusion between validation and verification, and some occurrences where candidates could not give examples in context.

Part (c) gave many candidates the opportunity to gain at least one mark. Where candidates failed to score well is where they discussed points that did not relate to the design issues of the database, e.g. several candidates stated that adherence to the Data Protection Act was necessary, but then did not relate this to design.

#### **Question 6**

Part (a) showed that many candidates had learned about “human/computer interaction” using materials based on the legacy syllabus – several answers related to physical factors that are no longer included in the current specification. It was also obvious that there does not seem to be a clear distinction between *interaction* and *interface* (many answers concentrated on size of icon and use of colour, for example). Where answers related this to, for example, disabilities of the end user, this gained credit. Good answers also referred to the level of user skill relating to the interaction.

Part (b) also caused a lot of problems for candidates. Few were able to recognise that the word “resource” referred to computer resources. There were many responses that cited “time”, “money” and “training” as resources. There were also several responses to this part that would have made excellent answers to part (a). It is vital that candidates use the wording of the question to give answers in an ICT context, and bear in mind the content of the specification of the unit they are taking at the time. There were also several responses that discussed “memory” or “processor” without any

quantification or indication of how an effective interface can impact these. There was also the idea that an effective interface has to be graphical in responses.

Responses to part (c) normally met with some success. Candidates could easily relate to non-standard items causing problems for support staff, and better candidates could expand well upon this idea.

### **Question 7**

In general, part (a) was well attempted and most candidates could score marks relating to the duties of a database administrator, with better candidates able to expand these points to gain the higher marks. Some candidates struggled because of confusion between the rôles of database, network and system administrators – for example some answers included the installation of new hardware and software.

Part (b) indicated that there is a wide misunderstanding of the term “client” in an ICT context with several candidates interpreting this as being the client for a company rather than the client in a client-server database environment. Equally, several candidates confused “client-server database” with client-server networks.

### **Question 8**

In part (a) it was possible for weaker candidates to gain some credit, whilst stronger candidates were able to pick up more marks. Good candidates succeeded by contrasting "stand-alone" with "network" issues, rather than explaining the different functions of a network.

Part (b)(i) showed that there is some confusion between the terms *Internet* and *Intranet*, with many responses following the idea of website construction and e-commerce.

Problems described by candidates in (b)(ii) were usually able to gain some credit, however, all too often the term “hacker” appeared, with the assumption that this equals unauthorised access, and so did not gain credit. Issues of network speed were also mentioned, but often without enough qualification to gain marks. Good candidates were, however, able to do well on this part.

Part (b)(iii) was often related back to (b)(ii) although this was not necessary, and candidates were often able gain marks here. Popular answers included the use of firewalls and audit trails, with stronger candidates able to expand on both these points.

### **Question 9**

In terms of structuring and logical approach, this question was attempted well by the majority of candidates. It is pleasing to see that candidates and centres are becoming more used to this type of question.

In terms of content, many candidates confused standardisation issues with many other issues. Standardisation was often cited as a requirement for networking, purchase of site licences, auditing, volume discounts and improved communication. Several candidates pursued the arguments relating to cost throughout their entire answers.

By far the best marks were scored in addressing issues relating to “resistance to change”. Several of the weaker candidates cited age as a barrier to learning new systems. This is an idea that should not be encouraged.

Stronger candidates usually gained the better marks by clearly relating their responses back to the context of the question; some responses did not do this and discussed ideas such as profitability. This seems to suggest that for some candidates there is no distinction between the term *organisation* and

the term *business*. It is very important in this type of question that the context is adhered to in order that candidates gain good marks.

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

### General Comments

A number of coursework supervisors built on their previous experience with module IT06 and facilitated the production of high standards of work from their candidates; work that was accurately and consistently marked within the assessment criteria. Where discrepancies occurred, these were due to there being inadequate evidence within the candidates' reports to support the judgements being made by the supervisor.

The key issue to this unit is, "... to produce an information system for a real end-user." Genuine interaction between the candidate and the end-user is an *essential* requirement for this unit and has a critical effect on the assessment, particularly within the testing section. In addition, work for this module is then expected to reflect a realistic situation where data is expected to change over time. A number of candidates produced "one-off" solutions that either solved a single problem with no need for reusability or trivialised the solution so that it could not be operated over time.

The majority of work seen was implemented using *Microsoft Access* and this facilitated some high quality implementations. The over reliance of some candidates on textbook-based situations gave them limited opportunity to achieve the full scope of the implementation.

### Analysis

The purpose of this section is to explain fully the precise operation of the current system and the constraints upon it to the point that the design could be developed by a third party. Frequently it became clear that candidates did not have a full enough understanding of the problem they were solving and this often then led on to simplistic or inappropriate solutions.

Some form of data and process analysis is essential in order to identify fully the information flow and data dynamics. Certainly a data dictionary should be produced in this section, particularly if a database design is to be considered at a later stage. Unfortunately high marks were sometimes awarded for superficial attempts at this section. The simple inclusion of a data flow diagram without other essential written descriptive work is unlikely to ensure that the information flows and data dynamics have been fully identified. Systems analysis tools and techniques are widely explained through a vast range of resources and texts. It is expected that candidates will make appropriate and sensible use of these tools and techniques.

It is clear that this section makes the greatest contribution towards the candidate's successful completion of this unit. Without a full understanding of the problem and how the system currently operates, candidates will be limited in the solution they are able to develop.

### Design

In ICT 6, the discussion of possible solutions has now been subsumed within a single design section. However, candidates often gave a simple list, with the justification being a statement of the functions of the software package to be used. The theory for judging the suitability of software against specified criteria and user requirements is covered in module ICT5.

To achieve high marks for Design, not only must a competent third party be able to implement from the designs given, but an effective and full testing strategy and plan must be present in this section of the documentation.

It was pleasing to see candidates attempting normalisation when a database solution was selected. A distinct weakness, however, was the over-concentration on the visual aspects of design. Candidates often gave good form or report designs, but many candidates neglected to design the queries for the system, or give sufficient detail about those queries. Candidates often failed to clearly document the processing methods that would be applied to their data. Macros were often mentioned as existing and were documented in the Implementation, but too often were completely omitted from the Design work.

Testing was not well documented at this stage with few candidates producing a test strategy and plan(s) before implementation. The candidate must have a clear idea of the desired result, the criteria for success and the nature and scope of the data used for the test. The main focus for testing must be on the main functionality of the system. For example, in a car hire system it is essential that the candidate is able to show that an available car can be hired, that it cannot be double booked and that the car can be returned and so made available for subsequent bookings. Over-reliance on navigation testing and on validation tests for entering a single object to a table, e.g. a new customer, is relevant but should not be the main thrust of testing.

With regard to planning, it was encouraging to see the use of appropriate techniques such as Gantt or PERT charts often produced by software means. The use of software to plan and manage progress is pleasing to see, but the simple inclusion of one diagram within the report is not a compelling reason to give very high marks for planning for implementation without other supporting documentation.

### ***Implementation***

Candidates must focus on proving that they have generated a full and effective solution to the problem posed. Whilst evidence may be drawn from the testing phase to support this judgement, there must be adequate technical documentation within this section to support the judgements made.

### ***Testing***

Testing continues to be one of the weakest aspects of candidates' reports, despite many centres using appropriately structured test plans. It is clear that there is still an over reliance only on testing events. Is it common to read of a test for "pressing a button" and then to read "works as expected" with no proof. Systems designed for ICT 6 must manipulate data. The candidate must clearly demonstrate what events need to be considered, how and what data these events manipulate, and the resulting output.

The marking criteria states that the, "...system works with a full range of test data." When candidates did use appropriate data it often did not address the full range of values expected. This was often due to inadequate planning for testing which may relate to candidates not bring fully sure of the what their system was supposed to achieve.

To get into the highest mark range for the Testing criteria, there must be, "clear evidence of end-user involvement in testing." This was a significant change for the ICT 6 assessment and allowance was made in the moderation of this year's work for conversion to the new requirements. No such allowance will be made for further assessments and evidence of participation must be clear in future if a high mark is to be accepted by the Moderator.

### ***User Guide***

In IT 6, the User Guide was assessed as part of the Report; in ICT 6 it is assessed separately from the Report. To gain high marks in this section, user guides must be comprehensive. A common weakness was the inclusion of detail about how the software package works, rather than comprehensive detail about the software customisation produced. Systems should deal with problems in which there is dynamic change to data and clearly the guides should deal with the issue, including issues such as archiving where necessary.

### ***Evaluation***

Candidates will be familiar with the generalised criteria for assessment. Whilst any information system will have general criteria that can be applied (e.g. how robust the solution is), the candidate must make these criteria specific to the problem in hand. The candidate must identify suitable performance indicators, both qualitative and quantitative, against which to assess the performance of the solution. Evidence must be provided within the report and as part of the discussion. For example, if a candidate had set an objective relating to accuracy of processed data, then it is necessary to state what degree of accuracy is required. In discussion of whether this objective had been met, the candidate should offer reference to proof, which should be available within the testing section of the report.

### ***Report***

The final report should be clearly delineated, have page numbering and a list of contents. Overall it should be possible for a third party to follow the progress of the solution through its stages, clearly seeing the development of the system. Illustrations should be used when appropriate. Candidates are reminded of the need for accurate spelling and grammar.

## Mark Ranges 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	28.8	7.7
Unit 2 - Information: Management and Manipulation	60	60	28.6	9.2
Unit 3 - The Use of Generic Application Software for Task Solution	60	60	25.0	11.3

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

### Unit 1 - Information: Nature, Role and Context (25153 candidates)

Grade	Max. mark	A	B	C	D	E
Scaled Boundary Mark	60	39	35	31	27	24
Uniform Boundary Mark	90	72	63	54	45	36

### Unit 2 - Information: Management and Manipulation (29361 candidates)

Grade	Max. mark	A	B	C	D	E
Scaled Boundary Mark	60	39	35	31	27	24
Uniform Boundary Mark	90	72	63	54	45	36

### Unit 3 - The Use of Generic Application Software for Task Solution (31712 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 (25504 candidates)

	A	B	C	D	E
Cumulative %	5.2	16.5	35.7	57.6	76.8

Unit/Component	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
Unit 4- Information Systems within Organisations	90	90	34.7	10.6
Unit 5 - Information: Policy, Strategy and Systems	90	90	31.1	11.2
Unit 6 - The Use of Information Systems for Problem Solving	90	90	40.7	16.5

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

### Unit 4 – Information Systems within Organisations (14245 candidates)

Grade	Max. mark	A	B	C	D	E
Scaled Boundary Mark	90	50	45	40	36	32
Uniform Boundary Mark	90	72	63	54	45	36

### Unit 5 – Information: Policy, Strategy and Systems (14242 candidates)

Grade	Max. mark	A	B	C	D	E
Scaled Boundary Mark	90	44	40	36	32	29
Uniform Boundary Mark	90	72	63	54	45	36

## Unit 6- The Use of Information Systems for Problem Solving (14234 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 (13299 candidates)

	A	B	C	D	E
Cumulative %	6.0	19.2	41.1	67.9	89.1

### Definitions

**Boundary Mark:** the minimum (scaled) 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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