

GCE

Specimen Papers with Mark Schemes

Edexcel Advanced Subsidiary GCE in Information and Communication Technology (8322)

First examination 2001

Edexcel Advanced GCE in Information and Communication Technology (9322)

First examination 2002

January 2000

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Mark Schemes

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The GCE awarding bodies have prepared new specifications to incorporate the range of features required by the new GCE and subject criteria. The specimen assessment material accompanying the new specifications is provided to give centres a reasonable idea of the general shape and character of the new planned question papers in advance of the first operational examination.

6651/0 1

Edexcel GCSE

Information and
Communication Technology

Unit Test 1 Systems Administration

Advanced Subsidiary / Advanced

Time: 1 hour 30 minutes

Materials required for the examination

Items included with these question papers

Answer Booklet (AB02)

Nil

Instructions to Candidates

Answer ALL questions.

In the boxes on the Answer Book, write the name of the Examining Body (Edexcel), your centre number, candidate number, the subject title, paper reference, your surname, other name(s) and signature.

The paper reference is shown towards the top left hand corner of the page.

Information for Candidates

Marks allocated to parts of questions are indicated in brackets.

There are 3 questions in this question paper.

Advice to Candidates

You must ensure that your answers to parts of questions are clearly numbered.

You are reminded of the necessity for good English and orderly presentation in your answers. This paper includes marks for quality of written communication.

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1. Below is a quotation from a computer sales person who is talking to an ICT systems administrator.

“A modern computer system is nothing without its Operating System and you will love this new OS because of its improved Graphics User Interface.”

- (a) Give TWO reasons why the sales person believes that the improved graphics user interface will be attractive to the systems administrator.

(2 marks)

- (b) Explain why the phrase: *“is nothing without its Operating System”* is **not** true.

(2 marks)

- (c) The sales person continues:

“Another great feature of this operating system is that it will automatically make all the adjustments if you insert an additional internal board.”

- (i) Describe TWO circumstances when a systems administrator might want to add an internal board to a system.

(4 marks)

- (ii) Describe what the systems administrator would have to do if the operating system did not support this automatic feature.

(2 marks)

- (iii) Describe how ONE aspect of the systems administrator’s responsibilities would be made easier due to this automatic feature.

(2 marks)

- (d) Annabel uses her computer system to store and retrieve many documents.

Annabel is very disciplined about deleting unwanted files from the hard disk.

Annabel is unhappy to find that file access has become slower.

- (i) Explain why Annabel's system has become slower.

(2 marks)

- (ii) Describe what Annabel should do to improve the speed of file access.

(2 marks)

- (iii) Explain how the Operating System would carry out the process that you have suggested in your answer to (d) (ii).

(3 marks)

(Total 19 Marks)

2. A medium sized company has plans for expansion.

The company sells cosmetics by mail order.

Although all sections of the company use similar ICT systems there is no overall organisation and control of ICT provision.

The management decides to appoint an ICT systems administrator to evaluate the ICT systems of the company.

(a) Describe how the systems administrator could carry out this investigation. **(4 marks)**

(b) The management of the company decide to appoint an ICT systems administrator to deal with this problem.

Describe THREE areas of expertise that a systems administrator should have in order to be effective in dealing with any ICT related problems of the company. **(6 marks)**

(c) The management of the company is concerned about their lack of market share and the Advertising Section is asked to react to the concern.

At present the Advertising Section does not use ICT for publicity purposes. The head of the section seeks advice from the ICT systems administrator.

Describe TWO aspects of an ICT solution that the systems administrator might propose. **(4 marks)**

(d) The head of the Advertising Section agrees to invest in the ICT solution proposed by the ICT systems administrator but is concerned about the processes of the implementation and the possible effects on the department.

Discuss how the head of Advertising Section should prepare the Section for the proposed ICT approach to their publicity responsibilities. **(5 marks)**

(Total 19 Marks)

3. (a) Democratic governments are responsible for providing a range of services for the citizens of a country.

Governments make spending decisions based upon statistical information that they are given.

Specialist ICT based companies collect data and use computer programs to analyse the data. The results of the analysis are presented to government.

- (i) Describe TWO detrimental effects that could have been due to the government being given incorrect information.

(4 marks)

- (ii) Describe TWO distinct ways in which such incorrect information could be generated by such a specialist ICT based company.

(4 marks)

- (iii) Describe the technical mechanisms that the ICT based company could put into place to minimise the generation of incorrect data.

(3 marks)

- (b) A manager is interviewing a candidate for the post of ICT systems administrator.

The Manager:

“ If I have an accident with my car due to inadequate maintenance by the garage, I could take the garage to court.

If our computer systems fail due to lack of software maintenance which results in danger to our users, we might find ourselves in court.”

- (i) Describe TWO situations in which the lack of software maintenance of a computer system could lead to dangerous situations.

(4 marks)

- (ii) Discuss the validity of the comparison between a car accident and a computer systems failure.

(4 marks)

(Total 19 marks)

Total For Paper = 57 marks + 3 marks for Quality of Written Communication

= 60 marks

END

6652/0 1

Edexcel GCSE

Information and
Communication Technology

Unit Test 2 The Generation of
Applications

Advanced Subsidiary / Advanced

Time: 1 hour 30 minutes

Materials required for the examination

Items included with these question papers

Answer Booklet (AB02)

Nil

Instructions to Candidates

Answer ALL questions.

In the boxes on the Answer Book, write the name of the Examining Body (Edexcel), your centre number, candidate number, the subject title, paper reference, your surname, other name(s) and signature.

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1. (a) A computer programmer wishes to develop a system in a high level language called VISTA.

The systems administrator informs the programmer that there is no interpreter for VISTA, only a compiler.

- (i) Describe the essential difference between the process of interpreting a computer program and the process of compiling a computer program.

(4 marks)

- (ii) Give TWO reasons why the programmer might not be happy to use a programming language that has no interpreter.

(4 marks)

- (b) After further consideration, the programmer decides that the system can be developed using an applications generator, in this case, spreadsheet software.

- (i) Describe TWO important advantages of using an applications generator from the programmer's point of view.

(4 marks)

- (ii) Give ONE important disadvantage of using an applications generator from the customer's point of view.

(2 marks)

- (iii) Describe FIVE main features that are common to ALL applications generators.

(5 marks)

(Total 19 Marks)

2. The life cycle of an ICT application includes the stages:

Proposal;

Design;

Implementation;

Evaluation.

(a) (i) State at what stages the users of the application should be involved.

(1 mark)

(ii) Describe how the users should be involved at each of the stages given in your answer to part (i).

(6 marks)

(b) Some application developers believe that the specification must be agreed and fixed in detail before any other stage is considered.

Others believe that modifications to the specification should be considered during the development process.

Discuss the relative merits of these two approaches.

(6 marks)

(c) Distinguish between **technical testing** and **maintenance** and state at which stage they occur.

(6 marks)

(Total 19 marks)

3. Users of a large microcomputer network are able to report technical and software faults to the ICT department using a simple spreadsheet such as the following:

Fault No.	Login No.	Date	Time	Room	Device No.	Type sw / hw	Urgency	Problem	Fix Notes	Fix Date
65	3305	23/3/97	12:55	M103	1256	hw	High	Toner low	Replaced	6/4/97

The spreadsheet cells contain only labels and data, i.e. no formulae or functions.

The requirements for the spreadsheet were:

- for users to be able quickly and easily to record faults;
- for users to be able to look up the progress of fixing a fault;
- for ICT technicians to view newly logged faults;
- for ICT technicians to enter information on the progress of fixing a fault;
- for the ICT manager to analyse faults to see if particular rooms, devices, or users were prone to error.

- (a) Comment on the effectiveness of the spreadsheet, taking into account the requirements.

(6 marks)

- (b) Modern spreadsheet software has a range of user interface screen objects available. For example option buttons, list boxes, command buttons and many more.

Design an improved user interface for the fault recording system, stating:

the object type of each screen object;
the functions that the screen object would provide.

(8 marks)

- (c) Design a maintenance strategy for the computer fault logging system.

(3 marks)

- (d) The users of this system want to know if this fault logging system has been effective.

Describe what information is needed to determine how effective the system has been.

(2 marks)

(Total 19 marks)

Total for Paper = 57 marks + 3 marks for Quality of Written Communication

= 60 marks

END

6654/0 1

Edexcel GCSE

Information and
Communication Technology

Unit Test 4 Systems Management

Advanced

Time: 1 hour 30 minutes

Materials required for the examination

Items included with these question papers

Answer Booklet (AB02)

Nil

Instructions to Candidates

Answer ALL questions.

In the boxes on the Answer Book, write the name of the Examining Body (Edexcel), your centre number, candidate number, the subject title, paper reference, your surname, other name(s) and signature.

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Advice to Candidates

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1. There is some evidence that certain specialist ICT systems are better at diagnosing illness than are many highly respected medical consultants.

(a) Describe THREE features of ICT systems that allow them to outperform, in certain areas, the intelligent behaviour of human beings.

(9 marks)

(b) ICT based systems exist that enable patients to diagnose their own ailments.

Discuss the **social, moral** and **legal** implications of such systems.

(6 marks)

(c) Describe, with justification, one other application of ICT that may be challenging the intellectual capabilities of the human species.

(4 marks)

(Total 19 marks)

2. A systems manager of a large company provides a number of ICT facilities including word processing across the company via a network.

Recently the users of the word processing facility have complained that it is out of date and can be slow.

- (a) Describe how the systems manager could devise the criteria for proposing a replacement word processing facility.

(3 marks)

- (b) Many modern word processing packages can work in a multi-tasking environment.

Describe ONE circumstance where the facility to multi-task might be beneficial.

(3 marks)

- (c) The systems manager is considering the complaint that the word processing facility can be slow.

The systems manager can set the Operating System to support either co-operative or pre-emptive multi-tasking.

The systems manager thinks that the pre-emptive multi-tasking would better serve his customers.

Explain why the systems manager might think this way.

(4 marks)

- (d) State ONE problem disabled people might have using the new word processing package and describe a software solution to each problem.

(2 marks)

- (e) The new word processing package allows macros to be created.

- (i) Distinguish between recorded macro and a programmed macro.

(4 marks)

- (ii) Describe an example of a word processing macro.

(3 marks)

(Total 19 marks)

3. A large insurance company contains a specialist unit researching into the insurance claims for personal injury. One reason for this research is that there is a suspicion that some claims are fraudulent.

Part of the research involves examining a variety of documents to extract specific information that has to be entered onto a pre-designed paper form. The forms are currently analysed manually. The results have to be double-checked for accuracy.

The person in charge of the unit has approached the company's ICT systems manager about computerising the analysis of the data.

- (a) The systems manager has decided to investigate the possible cost implications of the proposed system.

Describe ONE benefit of the computerisation of the data analysis.

Describe how the benefits may be costed.

(4 marks)

- (b) Once the systems manager understands the nature of the data that will have to be stored on the computer system, she has concerns about the legal and moral issues that may be involved.

Discuss what these issues may be.

(4 marks)

- (c) The computerisation has been given the go ahead but it will involve the purchase of some new equipment.

Describe TWO advantage of leasing the necessary equipment rather than buying it.

(2 marks)

- (d) Once the required hardware and software has been installed, it must be rigorously tested before real data can be entered and analysed.

State FIVE main tests that must be carried out on the installed system.

(5 marks)

- (e) The insurance company is a very large organisation using computers for a wide variety of applications, many of which are essential for the smooth running of the organisation.

Describe how the systems manager can minimise the risk of computer systems becoming unusable either through user ignorance or hardware malfunction.

(4 marks)

(Total 19 marks)

Total for Paper = 57 marks + 3 marks for Quality of Written Communication

= 60 marks

END

6655/0 1

Edexcel GCSE

Information and
Communication Technology

Unit Test 5 The Implementation of
Event Driven Applications

Advanced

Time: 1 hour 30 minutes

Materials required for the examination

Answer Booklet (AB02)

Items included with these question papers

Nil

Instructions to Candidates

Answer ALL questions.

In the boxes on the Answer Book, write the name of the Examining Body (Edexcel), your centre number, candidate number, the subject title, paper reference, your surname, other name(s) and signature.

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1. Part of the user interface of a particular application is a screen form that contains a number of visible interactive objects.

(a) Describe FOUR characteristics of visual interactive objects that allow the design of a good user interface.

(4 marks)

(b) One of these objects is an area that displays information in Rich Text Format.

(i) Discuss the advantages and disadvantages of designing user interfaces that use Rich Text Format objects.

(4 marks)

(ii) Describe how Rich Text Format is achieved from a technical point of view.

(3 marks)

(c) Integral to the user interface is a HELP facility that is provided by files in Hypertext format.

(i) Explain why information structured as Hypertext is particularly suited to HELP facilities.

(4 marks)

(ii) Describe another major ICT application where information is structured as Hypertext.

(4 marks)

(Total 19 Marks)

2. (a) Object based event driven applications are usually developed using an Integrated Development Environment (IDE).

Describe FOUR facilities that might be provided by an IDE, illustrating each description with an example of use.

(8 marks)

- (b) Luis is developing an application to simulate games that use dice.

The programs that Luis is developing seem to work but they are giving results that Luis does not expect.

Abeda, a friend of Luis, comments:

“The problem may be that you allow some variables more scope than they need.”

Explain why some programmers may be tempted to give variables more scope than is required.

(3 marks)

- (c) Luis limits the scope of the variables as much as is possible.

When he tries to run the application, he gets several similar error messages.

- (i) State what the error message is likely to be.

(2 marks)

- (ii) Explain why the application that appeared to work before, now produces error messages.

(3 marks)

- (d) Luis finds the reasons for the error messages and is happy to find that the test results are as expected.

However, he is disappointed with the performance of the application with respect to speed.

Abeda comments:

“There are many long loops in your program. What about the data types of the loop control variables?”

Explain why the data type of a loop control variable could affect the performance of the application.

(3 marks)

(Total 19 Marks)

3. The country of Datalia has a comprehensive bus service run by a company named Whippet Travel.

Bus routes are divided into fare stages.

All buses have just 44 passenger seats arranged in two pairs across the bus to a length of 11. Thus the seats are numbered A1, B1, C1, D1 ----- A11, B11, C11, D11.

All seats on every bus must be booked in advance.

The seat booking system is ICT based and includes the use of spreadsheet and relational database software that can communicate with each other.

- (a) Describe, in general terms, THREE of the base tables that are essential to the underlying database of the booking system.

(5 marks)

- (b) The screen interface for seat booking has been implemented via a spreadsheet where one cell maps to one seat.

The booking clerks of Whippet Travel have requested an improved screen interface. In particular they want to be able to use drag and drop operations to change seat allocations and they want to retrieve the full details of a passenger by double clicking on the appropriate cell.

Explain why event procedures are necessary if the improvements to screen interface are to be implemented.

(4 marks)

- (c) It has been decided to scrap the use of the spreadsheet software and use a general-purpose event driven programming language to implement the new interface.

Explain how the programming language and the database software should relate to each other.

(4 marks)

- (d) Describe how the event procedures required to implement the drag and drop effects are best implemented for this application.

(6 marks)

(Total Marks 19)

**Total for Paper = 57 marks + 3 marks for Quality of Written Communication
= 60 marks**

END

Mark schemes

Mark schemes

Advanced Subsidiary and
Advanced GCE

Information and Communication Technology

Unit 1 Systems Administration
Unit 2 The Generation of Applications
Unit 4 Systems Management
Unit 5 The Implementation of Event Driven Applications

**Advanced Subsidiary / Advanced Level
Information and Communication Technology**

GENERAL INSTRUCTIONS ON MARKING

When marking this paper, the following points must be observed. The general instructions to Assistant Examiners (booklet U39) details these procedures in full but the following points are worthy of important consideration.

1. Use ticks (in red) in the body of a candidate's response to indicate where marks have been awarded.
2. 'Error carried forward' techniques should be applied when detailed by the mark scheme and as instructed at the standardising meeting. For example, in a question consisting of parts, where the answer to the part (a) of the question is used in part (b), examiners must give consideration to the candidate's use of the incorrect answer to part (a) (which has already been penalised) in part (b). This method ensures that an error is penalised once and once only in a question.
3. When a question consists of a number of parts (i.e. (a), (a)(i), (b) etc), total the ticks to each part question and enter the mark in the margin at the end of the candidate's response to each part question. Add the marks to each part question together and write and encircle this total at the end of the question. Transfer this mark to the front of the script.
4. When a question is a single one, not consisting of a number of parts, total the ticks and write and encircle this total at the end of the question. Transfer this mark to the front of the script.
5. The question totals on the front of the script should be added together, along with any quality of written communication marks, to give a final total. This final total is inserted in the 'For Examiner's use only' box, ringed and initialled. This final total is also entered onto the appropriate mark sheet.
6. Quality of written communication should be marked in the written papers as follows:

Quality of Written Communication 3 marks are available on each written paper	
For 1 mark	The candidate rarely uses specialist vocabulary, but displays reasonably good spelling, punctuation and grammar to communicate with some clarity, relevance and coherence.
For 2 marks	The candidate uses some specialist vocabulary and displays good spelling, punctuation and grammar to communicate, often with clarity, relevance and coherence.
For 3 marks	The candidate uses appropriate specialist vocabulary and displays excellent spelling, punctuation and grammar to communicate consistently with clarity, relevance and coherence.

Unit 1 Systems Administration

1. (a) Ease of use for the customers of the service that the SA provides, this would enhance the image of the system and thus his / her administration.

The mechanisms of administration of the system will be eased and hence the SA will be able to be more responsive.

One mark for each reason that clearly relates to a GUI and is qualified.

(2 marks)

- (b) *The candidate should show some understanding based on any two of:*

a raw system nevertheless has some boot up software built in;

a raw system is a fully integrated working machine of communicating components;

a raw machine is capable of decoding machine code instructions;

it can't be "nothing" for how else could the OS be loaded?

The candidate cannot be awarded marks unless there is an indication of an understanding of the nature of a raw machine.

(2 marks)

- (c) (i) To provide some new facility such as sound because of the requirements of some new software.

To add a new means of outside communication,

such as an additional parallel port because of the need to communicate with an external control device.

For each circumstance: 1 mark for a sensible board and another mark for any reasonable context.

(4 marks)

- (ii) The SA will first have to study the appropriate technical documentation and then make the OS/hardware modifications by hand.

(2 marks)

- (iii) *There are several SA responsibilities that could be the base of this answer.*

Full marks can be awarded if the candidate makes a connection with the responsibility and the advantage of the automatic facility. For example:

the responsibility of training staff and the reduction of the skills to be tested.

(2 marks)

- (d) (i) The hard disk will have become fragmented.

Thus the OS will take longer to locate free space and files that are not stored in contiguous areas.

Marks are for these concepts; detailed technical descriptions are not required here.

(2 marks)

- (ii) Use some utility such as "Defrag" to tidy up the data on the disk.

Any reference to a 'Garbage Collection' utility would suffice.

(2 marks)

- (iii) The OS deals with fragmentation by using by using a linked list data structure whereby each free area points to the next free area and each "fragment" of a file points to the next.

(1 mark)

The "tidy up" utility would detect the existence of the non-deleted files and with the use of the IAS and the stored pointers join them together and restore them in contiguous areas on the disk. Free space would be dealt with in the same way.

(2 marks)

(3 marks)

(Total 19 marks)

2. (a) *The candidate must bring out the prime nature of any evaluation that is the view of the customer, in this case the WP users. Hence there can be 2 marks for describing how reliable information from the users could be obtained:*
questionnaires, observation.
The next stage is to investigate products that would solve the problems.
Thus another 2 marks for such as: information from suppliers, observing the facilities of other companies.

(4 marks)

- (b) Diplomatic communication skills with people that enable the non-contentious collection of information and the eventual imposition of standards.

A sound technical understanding of hardware and software systems in order to be able to make informed judgements about systems.

An understanding of the implications for staff with a view to designing training programs.

For full marks, the candidates must make it clear that they understand three distinct areas of expertise; just meaningful headings would gain only half marks.

(6 marks)

- (c) *The candidate must clearly identify the area of activity, for example “Advertise on the Internet”; this would gain 1 mark; such a statement should be followed by some reasonable detail of the processes actually required to achieve the activity; this would gain the second mark.*

For each aspect, the role of ICT must be clear, for example “Get feedback from present customers” is a good idea but there is no reference to ICT: “Use OMR questionnaires to get feedback from customers” would be worth 1 mark; to get the second mark there must be some detail of how an ICT system will be used to analyse the customer responses.

(4 marks)

- (d) *For 4 marks there should be the expectation of a detailed discussion that takes on at least TWO main areas of possible concern.*

An extra 1 mark can be awarded to candidates who present aspects of preparation that deal with both the physical and the intellectual problems of implementation.

(5 marks)

(Total 19 marks)

3. (a) (i) Under or over provision of medical or education services resulting in either waste of funds or crises for individuals.

Unexpected effects on the economy of the country resulting in problems with the export and import trade.

Responses must indicate the reasons for the detrimental effects, simple statements of situations would only gain half marks.

(4 marks)

- (ii) Inadequacies in the data collect processes.

Mistakes in the software that analyses the data.

(4 marks)

- (iii) Professional questionnaire design coupled with questionnaire testing and ICT based data validation.

Complete testing of the analysis software involving normal, extreme and exceptional data.

There must be reference to both data capture and its processing.

(3 marks)

- (b) (i) Out of date or incorrect software could affect information being acted upon by people or machines.

There are unlimited number of situations that could be described, for example:

the police being led to make a mistaken identity and possibly harming an innocent person;

the control software on a train protection system not being updated thus resulting in a fatal accident;

a hospital patient not being given the latest drug because new treatment regimes have not been entered into the system.

Candidates must qualify two distinct situations to gain full marks, a heading that is meaningful would gain half marks.

(4 marks)

- (ii) There is a very direct association between a car accident and a life and death situation. If a piece of software is controlling an aircraft then the comparison with a computer systems fault is just as stark *but the candidate's response should lead to the conclusion that very many computer systems failures can result in serious consequences for people. Some indirect consequence examples should be given, for example the inappropriate billing for gas that has resulted in the suicide of elderly people.*

(4 marks)

(Total 19 marks)

Total for Paper 57 + 3 marks for Quality of Written Communication = 60 marks

Unit 2 The Generation of Applications

1. (a) (i) A compiler turns a HLL program in to a logically equivalent Run file (*1 mark*) then be executed by the target processor without any reference to the source language (*1 mark*) an interpreter executes the program statement by statement (*1 mark*) from the source code (*1 mark*).

(4 marks)

- (ii) A programmer spends much time in running debugging sections of program code (*1 mark*). If there is only a compiler available then the programmer will have to initiate the compiling process (*1 mark*) for each test, no matter how small (*1 mark*). Compared with using an interpreter, where a run can be initiated immediately after a source code edit (*1 mark*), this can be a lengthy process and adds to the development time (*1 mark*).

(4 marks)

- (b) (i) An applications generator exists within a development environment (*1 mark*).

A range of complex facilities and functions are provided that can be integrated into the application being developed (*1 mark*), for example spell checker, referential integrity checker, selection of predefined user interfaces (*1 mark*).

The development time is minimised due to the high level in initial functionality (*1 mark*).

(4 marks)

- (ii) The customer will have to own a copy of the generator (*1 mark*) for example the spreadsheet software whereas an application developed into compiled code has no extra software overhead (*1 mark*).

(2 marks)

- (iii) *The candidate should give a brief description of any **five** common features that could include:*

functions related to the class of the generator;
forms;
toolboxes;
macros;
debug facilities;
help systems;
user created procedures;
class procedures.

(5 marks)

(Total 19 marks)

2. (a) (i) Proposal & Evaluation
(no marks for one answer)

(1 mark)

(ii) **Proposal**

Full involvement with the proposal for layouts on user interfaces (input and output) (1 mark).

Agreement of the functionality of the project (1 mark).

Agreement of projected costs estimated time scales and other contractual matters (1 mark).

Evaluation

Structured feedback on technical performance (1 mark).

Structured feedback on the suitability of the user interface (1 mark).

Suggestions of bug fixes and upgrades (1 mark).

(6 marks)

- (b) A balanced argument would be appropriate here with at least **three** marks for the presentation.

For full marks there should be some reference to the influence that current development tools are having on the encouragement towards a prototyping approach.

(6 marks)

- (c) A full description of the process of technical testing is required including indications of the need of planning (3 marks).

It must be clear that maintenance is an ongoing process (1 mark) that requires input from users, implementers and software & hardware providers (1 mark). Also there is a loop back to the mechanisms of technical testing (1 mark).

(6 marks)

(Total 19 marks)

3. (a) *There are a host of comments that the candidate could make.
Some short but relevant reference to 6 distinct points would gain full marks.
Possible points could include:*

Users can fairly quickly enter faults;
Users have to type in some data (fault no., log in no., date, time) which could be provided automatically;
The spreadsheet is wider than the screen so horizontal scrolling is necessary;
The limited space for the problem does not encourage users to give full and accurate descriptions of the problem;
Users can easily miss important columns out;
Looking up the progress of a fault is slow because the user has to scroll through all faults previously logged particularly if they did not make a note of the fault no;
Technicians cannot easily find newly logged faults;
Technicians can enter their progress on fixing a fault;
The ICT manager can do simple searches to analyse the fault reporting;
The ICT manager cannot do complex searches;
Two or more users cannot enter a fault at the same time;
System no good for logging faults that need to be fixed immediately;
Users can delete other users fault logs.

(6 marks)

- (b) *There are likely to be a variety of designs. For marking purposes give 4 marks for the names of 4 sensible objects that relate to stated application and another 4 marks for a stated contextual use of the object.*

Type (hardware/software) could be entered by clicking option buttons.
Searches by fault no. and log in no. can be provided from command buttons.
Only a single fault need be displayed on the screen.
By default, only the user's faults should be displayed - move through them using scroll bar, latest logged viewed first.
Error messages can be displayed if a compulsory item is missed out.
A range of pre-programmed reports could be available from a drop down menu.
A message could appear on the technician's screen when a fault needs fixing immediately.
Technicians should have access to separate screens which allow them to view all unfixed faults, new faults, urgent faults.

(8 marks)

- (c) *Give a mark for any 3 of the following:*

Back up hourly;
Remove all references to fixed items a week after they have been fixed;
Give new staff access;
Train all new staff how to use the system when they first arrive;
Remove unfixable items when the member of staff has been informed;
Keep software and documentation up to date;
Restore backup when necessary.

(3 marks)

- (d) The most fundamental information to generate is concerned with the time between the reporting and fixing of the fault, *the candidate should indicate that there could be a delay between the fault being detected and the report being made (1 mark).*

The proposed system does not capture the data to generate this information *and the candidate should indicate how this could be done (1 mark).*

(2 marks)

(Total 19 marks)

Total for Paper = 57 + 3 marks for Quality of Written Communication = 60 marks

Unit 4 Systems Management

1. *This question is about the features of ICT systems that allow them to outperform humans and not about features that enable the mimicking of humans.*

- (a) ICT systems can store unlimited knowledge from a range of human sources; thus the ICT system's body of knowledge can be potentially greater than any individual.

An ICT system can process the knowledge in at least **three** distinct ways:

- It can be structured as a database that can be interrogated by a number of structured rules;
- It can examine a vast number of combinations of input states and make comparisons with standard possibilities;
- ICT systems can control multimedia delivery systems and thus present a range of stimuli and information in a context that could not be matched by a human.

0 – 3 marks for each of three distinct points.

(9 marks)

- (b) *Any question at Advanced Level that asks the candidate to “discuss” requires balanced arguments for full marks. Good arguments that are confined to one side of the argument are unlikely to gain more than half marks.*

The assistant examiner must make judgements about unexpected responses. Below are some possible points. Each valid point within a balanced context would gain a maximum of two marks.

Social

Ease of access to knowledge. Large Body of knowledge gives in built second opinions. Potential for social manipulation by suppression of selected information. Reduction of human interaction skills, importance of human comfort.

Moral

Greater equality of opportunity to have access to knowledge. (The moral argument that knowledge belongs to all) The dangers of such unlimited access without advice and human interaction.

Legal

Possibility of extensive vetting of the stored knowledge due to the legal obligations of the providers of the system. Individual humans being less accountable.

(6 marks)

- (c) *The examiner must be prepared for a range of responses here.
Just a description of two applications, for example Chess and Financial Advice, could gain **half** the possible marks.*

*To obtain **full** marks the candidate must explain how the intellectual capability of a human is challenged.*

(4 marks)

(Total 19 marks)

1. (a) *The candidate is asked about the process of devising criteria NOT what the criteria should be. Four distinct relevant information gathering techniques or processes are required. Maybe including:*

Find out problems from users;
Find out requirements from users;
Look in press, INTERNET, ask companies/associates etc. for details of suitable packages;
Send off for literature;
Arrange for trials / presentations;
Report on how each package meets the requirements;
Select package in conjunction with user representatives.

(3 marks)

- (b) *The candidate may describe a circumstance that is totally within the WP environment for example when repagination or printing in the background is taking place. Alternatively the candidate may describe the use of another application whilst word-processing for example embedding a spreadsheet or a database report. For any case the candidate must describe the advantage in the context of what would happen if the facility was **not** available.*

(3 marks)

- (c) Keyboard generates interrupt.
Background program suspended.
Input dealt with.
Background program continues.

(2 marks)

The advantage of preemptive multitasking is that the processor is not taken over by long-running tasks such as complex mathematical analysis (*1 mark*).

If the ICT manager provides a general service then it is likely to be better for most users to have the OS switch the power of the processor to give all applications a chance to use it (*1 mark*).

(2 marks)

- (d) Trouble distinguishing colours/eyestrain – change colour configuration.
Difficulty using mouse – change sensitivity/speed.
Difficulty using keyboard – slow down auto repeat.

(2 marks)

(e) (i) **Recorded Macro**

A sequence of user processes (key strokes, mouse selections) which are recorded automatically as a module of code (*1 mark*).

The sequence of events represented by the recorded code can be “replayed” by calling the module at will (*1 mark*).

(2 marks)

Programmed Macro

A program module hand coded in the integral macro language of the word processor (*1 mark*). Unlike the recorded macro this code can use many the common facilities associated with programming languages such as looping and selection (*1 mark*).

(2 marks)

(ii) **For example:**

To count the number of sentences with more than 10 words as a simple check on the complexity of the language included.

To format tables - sets indentation, centring, borders, typestyle, table headers automatically. (*Any other suitable example*)

(3 marks)

(Total 19 marks)

3. (a) **Benefits:**

Much faster analysis of the data leading to less researchers being needed.
More accurate results, less checking needed leading to less researchers needed.

(2 marks each, maximum 4 marks)

(b) *The candidate should frame their discussion in the context of the preamble to the question i.e. the investigation of fraudulent insurance claims.*

Special issues could include:

- Implications of storing personal information;
- The need for meticulous accuracy of the data in case of use of the data in legal process;
- The concern of possible conflict between her moral responsibilities to the company and to the customers;
- The possibility that data could make indirect reference to other members of staff then, from a moral point of view, should they be informed?

(Any 2 points in context, 2 marks each, maximum 4 marks)

(c) Don't need large sum of money up front.

Leasing company responsible for hardware maintenance.

Often get (fairly) new equipment.

(1 mark each, maximum 2 marks)

(d) Can logon from all workstations.

Test all login codes allow access to the network.

Test login codes allow access to the right packages.

Test major options of every package especially saving and printing.

Test directory and data file security.

Test backing up and restoration.

(1 mark each, maximum 5 marks)

(e) Ensure all new staff are appropriately trained.

All systems are documented.

Hardware is regularly serviced.

All enhancements are tested.

All systems are secure.

All systems are protected from viruses.

(1 mark each, maximum 4 marks)

(Total 19 marks)

Total for paper = 57 + 3 Quality of Written Communication = 60 marks

Unit 5 The Implementation of Event Driven Applications

1. (a) *The candidate must indicate the relationship between a characteristic of a visual interactive object and the advantage to a user interface that it presents.*

Ability to:

be programmed to respond to a number of distinct events,
encouraging the multiple use of controls;

visually respond to certain events,
thus distinguishing actions (down/up);

be hidden and shown,
allowing multiple use of the same form;

to be enabled and disabled,
thus allowing the forcing of a sequence of events;

to change appearance (colour, border style, 3D),
allowing a visual indication of a recent history of interactions;

to have their position programmed,
for redirecting priority of interaction;

to be members of a control array,
to use the opportunities of subscribing;

to be created a run time,
to produce precisely positioned and sized families of visual objects.

(Any four characteristics and reference to interface 4 marks)

(b) (i) *Possible points:*

Rich Text has all its formatting information embedded;

The total text, including formatting, consists of ASCII characters;

Thus it can be edited by conventional means;

Many applications can interpret Rich Text thus it is easy to move selections of Rich Text from one application to another;

The main disadvantage is the memory taken to store all the formatting information and thus the capacity of Rich Text compatible visible objects may be limited.

(Any four sensible points 4 marks)

(ii) Each character or group of characters is preceded by a sequence of “commands” that define the format, font, colour, size etc. of that group (2 marks).

The object that displays the Rich Text has the functionality to interpret these commands to affect the display appropriately (1 mark).

(3 marks)

(c) (i) A HELP facility requires non sequential searching (1 mark); direct connections between related topics and a user interface that turns these connections into a browser (1 mark). Hypertext can provide this.

In particular, Hypertext creation systems allow the highlighting (1 mark) of key words (often by colour) that allow the user to jump to a connected topic (1 mark).

(4 marks)

(ii) *The candidate must describe an application where non-linear searching of text is essential for the sensible exploitation of the application (2 marks). For example, any form of interactive encyclopaedia or INTERNET browsing (2 marks).*

(4 marks)

(Total 19 marks)

2. (a) *The example of use of each screen object must be plausible to gain the second mark.*

Toolbox of available screen components

To allow the easy placing of screen objects and set up the event procedure templates.

(2 marks)

Context sensitive editor

It provides windows in which code can be written and edited using normal editing facilities but in addition is aware of the syntax of the language being used and will indicate when a syntax error has been made.

(2 marks)

Context Sensitive Help

It allows the programmer to select any statement and requests a description of its function by a single key depression.

(2 marks)

Contextual Debugging Facilities

When a run error is detected the IDE displays the appropriate procedure and highlights the statement from where the detection has been activated.

In addition the current values of some variables can be displayed by the action of mouse pointing.

(2 marks)

*(Any other combination of **four** IDE facilities)*

(maximum 8 marks)

- (b) In the extreme it is tempting to declare all variable as Global. For example, as the programmer can refer to them from any procedure and can simplify procedure parameter lists.

The candidate may answer the question in the context of the inadequate facilities of a particular language, such an approach would gain a maximum of 2 marks.

(3 marks)

- (c) (i) "Undeclared variable" *or similar.*
Only 1 mark for Undeclared.

(2 marks)

- (ii) A variable that has been mistakenly addressed (*1 mark*) in a sub-procedure has now gone out of scope (*1 mark*) because of the removal of a Global or Public declaration (*1 mark*).

(3 marks)

- (d) During the execution of a long loop the arithmetic required on the loop control variable would have to take place many times (*1 mark*).

If it can be arranged that, for example, that arithmetic can be achieved with integer variables rather than real variables (*1 mark*) then the process would be quicker because there are less complex processes to be carried out (*1 mark*).

(3 marks)

(Total 19 marks)

3. (a) *The candidate who looks deeply into the possible interpretations of the scenario might produce a range of plausible base tables and the assistant examiner will have to make judgements.*

The three most likely to be discussed are:

- ROUTES;
- BUSES;
- PASSENGERS.

(3 marks)

For full marks the candidate should indicate the means of relating these tables by a discussion of suitable primary and foreign keys *(2 marks)*.

(5 marks)

- (b) The proposed interface improvements require that there is an object on the screen that represents a seat on the bus *(1 mark)*. That object must be able to distinguish between events that it suffers *(1 mark)*. These different events will have to activate other actions in the system, maybe some complex database manipulation *(1 mark)*. This is only possible if complex event procedures can be written *(1 mark)*.

(4 marks)

- (c) The programming language and the database management system should be able to establish a client - server relationship *(2 marks)* in the sense that the user interface created in the programming language is the client *(1 mark)* which demands services from the server database *(1 mark)*.

(4 marks)

- (d) *The candidate must indicate that using actual dropping of the selected object requires quite precise mouse actions.*

It would be better for the user if the programmer used the mouse down, mouse up and the drag drop event procedures *(2 marks)* to swop the objects' captions *(1 mark)* and update the underlying database *(1 mark)* thus giving the impression of precise dropping *(1 mark)*.

A correct answer that involves direct dropping would gain a maximum of 4 marks.

(6 marks)

(Total 19 marks)

Total for paper = 57 + 3 Quality of Written Communication = 60 marks

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