

Mark Scheme

*GCE Information
Technology*



- Each mark scheme is initially prepared by the relevant Principal Examiner. It is discussed and amended at a standardising meeting before examiners begin their marking.
- The standardising meeting is held to ensure that the scheme covers candidates' responses to questions and that every examiner understands it and applies it in the same way.
- This published mark scheme is that used by the examiners in carrying out their marking and incorporates any amendments made and additional alternative answers included at the standardising meeting.
- It must be stressed that a mark scheme is a working document. It is not exhaustive; valid alternative answers and approaches not covered by the scheme will always be credited. Examiners refer to the Principal Examiner for advice about unusual answers which have not been included in the scheme.

1999 GCE Information Technology IT01

1. 1 mark stating and one mark for example

For example:

Accuracy - if the data is inaccurate wrong decisions can be made (1) e.g. ordering too many of an item because the previous weeks sales suggest that the stock is low or demand is high. Inaccurate information has little value.(1)

Intended use – information intended for a branch manager of a supermarket (1) showing till usage to allow them to allocate staff over a weekly period is used to give the Regional manager a view of the efficiency of the branch. Information not designed for a particular use is usually irrelevant or misleading.(1)

If the information has been poorly obtained e.g. by using too small a sample or inadequate equipment then only garbage will have been collected (1) and, therefore, there will only be garbage coming out. Cost (Method of Collection)

Up-to-date)	
Source)	All need an explanation
Quality of Info)	
Completeness)	
Relevance)	(2 x 2)
Validity)	
Reliability of source)	

Maximum 4

2. **Accept a List**

1 mark for each personal quality. **Can state but don't have to explain.**

For example:

Ability to work as part of a team(1) – means able to exchange views, share information, usual way of working in many IT establishments.

Good oral communication skills(1) – to enable efficient and effective communication with users – interviewing and questioning

Good written communication skills(1) – ability to write documentation both technical and end users

Organisational/line management skills (1)– ability to take orders and give them, to be responsible for own work and to delegate where necessary

Ability to listen (1)– if cannot, then users wants are often misinterpreted or ignored and instructions not followed correctly

Perseverance/problem solving (1) – both analysis and programming require the ability to stick at problems and see them through.

Ability to 'tease out' end-user requirements (1)

Communication Skills (1)

New skills, Adaptability to change (1)

Logical reasoning skills (1)

Work under pressure/meet deadlines (1)

Willing to accept training/retraining (1)

Maximum 4

DO NOT ALLOW TECHNICAL SKILLS

3. One word, short phrase answers acceptable.

Marks must only be awarded where the action is on a record **within the file**, therefore delete file, rename file, copy file etc will not be given any credit.

Answers should include any four of the following:

Add a record

Append a record

Delete a record

Read

Read only

Write

Read/write

View a record

Read/Write

View part of a record

Edit a record

The answers could be of the read/write type or of the add a record type – both are valid as they are actions on a record.

If the word record/data is not present, still give mark

Amend record

CANNOT ALLOW EXECUTE

NONE – Not acceptable

Allow PRINT a record

1 mark for each one

maximum 4

4. (a) TWO REASONS NEEDED

We are looking here for a realisation of the benefits of IT and the application of these in a given industry. 1 mark should be given for a benefit and 1 for a reason: For example each of the following would gain 2 marks:

The speed with which data can be processed allows quick turnaround of data (1) and ,therefore, more accurate results, important as industry has to monitor consumer demand which changes quickly (1)

Data can be manipulated more easily (1) thus allowing a wider use of statistical techniques for example the use of Statistical Analysis software or more simply the production of graphs (1)

Increased accuracy meaning data collected is more useable (1). Data can be read directly from documents avoids transposition errors or pre set options allow more accurate results or calculations of averages, sums etc more accurate (1).

Volume – It can handle far greater volumes of raw data (1) meaning that larger samples can be taken and more accurate results obtained as a result. (1)

- Increased accuracy)
- Increased speed)
- ability to cope with large volumes of data) If used without
- Reduction in paperwork) reason only (1)
- Improved manipulation/processing/presentation of data)
- Reduced cost of operation e.g. less survey staff required)
- Effective storage + explanation)
- Electronic data transfer (use of communications))
- Gather data at a distance)

FOUR SINGLE MARKS NOT ALLOWED FOR ABOVE

Benefit + reason (2 marks) (2 x 2).

(b)

2 marks for explaining data – key words are raw facts or figures or measurements (1) no processing carried out no use to anyone have no meaning as such in the context of the question scenario for example one questionnaire on its own has no meaning (1)

2 marks for explaining information – data that has been processed to give it meaning (1) for example when the total number of responses to a given question is known, a graph can be drawn of the results or the average age of respondents calculated(1)

4 marks maximum

(1) mark for definition, (1) for context related to question

DO NOT ALLOW DATA IS RAW DATA!

Total 8

5. (a) Level 1 – **unauthorised access** to material **without any intent** (1) to do anything other than just gain access. An example would be the student who gains access to the administrative side of a college network or to another student’s user area. The person who tries to get into a system just for the hell of it. (1)

Level 2 – **unauthorised access with intent to commit** (1) or to facilitate commission of further offences. For example accessing bank records with the intent of committing fraud. Accessing personal details with the intent of committing blackmail. (1)

Level 3 – **unauthorised modification** (1) of computer material. The code or data is actually changed rather than simply viewed and used. For example changing the balance in a bank account, altering someone’s credit status, changing an examination mark.(1)

Viruses
under
level 3

1 mark for the statement of the level and one for the relevant example. Please note that the words in bold are the key ones for the levels and that they need both parts to gain the one mark for statement of level.

- (b) **FOUR SEPARATE** measures @ 2 each

The range of answers here can be large. The mark allocation is 1 for each sensible suggestion and 1 for a reason why it is suitable. Note that the question refers to a stand-alone PC.

Acceptable answers would be;

Password protection to prevent access to software by third person

Keyboard lock to prevent physical use of equipment

Isolation of machine in locked room with restricted access to it

Automatic virus checking – software permanently installed

Automatic backup to prevent data being inadvertently lost

Screen savers – to prevent unauthorised viewing of data

Automatic shut down if no action taken within a pre-defined period

Read/write restrictions on certain files to prevent changes being made to important data

And others realistic examples

Vetting of employees

Training

Procedures/code of practice/Employee Contract

Authenticity of Software (reliable source)

(1) Specify (1) Explanation in the context of using a stand-alone

Encryption of stored data

Allow **one** type of keyboard task

Audit trail

Saving data to floppy disk + removing disk (why you do it)

Allow removable Hard-disk

Shutting down the system properly

NOT ACCEPT LOG-OFF (infers network)

Any 4 x2 marks to 8 maximum

Total 14

6. There are 3 marks here for each risk 1 for stating risk
1 for explaining risk
1 for example of measure to prevent it

Problem + Solution (2)

Examples are:

Eye strain (1) caused by spending too long looking at poor quality screen with flicker/wrong contrast/poor environmental lighting(1) – improve screen quality/vary work/improve lighting(1) Employers pay for eye tests

Back/posture problems (1) due to use of desks or chairs at incorrect height or position (1) – use ergonomically designed furniture/ re-design office layout/adjustable height and back to chairs(1)

RSI (1) Repetitive Strain Injury caused by working for too long with hands at awkward angle or simply for too long doing same task (1) – ergonomically designed keyboards/wrist supports/vary work(1)

N.B. There are many different types of RSI and whilst it is not expected that a candidate will know these in detail they should know the effect that overuse/poor hardware design can cause.

Radiation Hazards (1) thought to cause problems to unborn children or to anyone if exposed for long periods of time (1) – reduce time spent at machines/allow pregnant women to move to other jobs/use low radiation screens (1) or aprons (1)

NB whilst it is understood that the last point has not been proven medically as yet it is still valid to give marks for it as it is a Health and Safety consideration.

Taking regular breaks – use only once, but it must be applied to cause

Stress (1)

Noise from printers (1)

Toxic ink from printers can cause headaches and nausea (1)

Ventilation/heat from computers (1)

Epilepsy (1)

NO USE OF MOBILE PHONES
NO USE OF CABLES/TRAILING LEADS

maximum 12

7. (a) **Recognise that it is hardware**

1 mark for stating and one mark for reason

modem (1) device for connecting to external line i.e. key is conversion of signals Analogue to digital signals(1)

N.B this may be adaptor for ISDN connections or similar

Telephone line i.e. key is physical connection(1) to allow connection to other networks or to a network or to the Internet (1)

N.B. Similarly this could be ISDN line or even other types such as Satellite/microwave communications

(2 x 2)

(b) 1 mark for each (credit should be given for all sensible suggestions) **be generous – Simple answers accepted.**

(i) **Browser**

To allow the user to read material on the Internet (1)

KEY WORD IS READ/VIEW/BROWSE

Read Web-Pages

(ii) **Editor**

Create Web-Pages / Edit Web-Pages

To allow user to prepare material to 'post' on the Internet (1)

(iii) **Email software**

To allow the sending and receiving of electronic mail/ to communicate with another person/organisation(1)

maximum 3

(c) 1 mark for giving the advantage and 1 mark for explaining it. Note that it should be relevant to this scenario and the reason must refer to why email is better than conventional mail/telephone systems

Examples are:

Time (1) – the fact that the company has an international market(1) and the difference in the time zones will make conventional telephone calls difficult whereas email can be sent irrespective of time and read at leisure..

Target Audience (1) – very mobile, hard to contact, conventional post(1) may not reach target audience with email message can be directed to individual and received independent of location or time.

Allows quick response (1) to request for, for example agenda items or papers for conferences. Less work for staff and senders in terms of editing etc as documents can be attached to message. Conventional mail often means re-typing necessary, important papers can be delayed. (1)

Adverts accessible to wide audience at minimal cost (1) to producer can be translated by reader or made available in other languages as appropriate. Conventional mailing expensive. (1)

Cost – one message can be prepared and sent simultaneously at a cost of a local call (1) One to many. Reach international clientele (1)

Allow: video conferencing over the internet – needs to explicitly state the benefit to the Company for the second month.

Cheaper (0) Bookings/on line bookings – more efficient, less time consuming than waiting for conventional replies. Book when convenient. (3 x 2)

Other reasons will be accepted.

DO NOT allow FASTER/QUICKER/CHEAPER. No marks without explanation

maximum 6

Total 13

8 *Quality of language will be assessed in this question.*

(M)

- what is meant by the Millennium Bug (2) Max;

2 marks for description

Something to do with Date and Changeover

1 for simplistic

2 for detailed

A fault in older computer systems which will/may result in failure of the systems to respond as needed when input data or internal clocks reach the year 2000

(H)

- how and why it occurred(3) max;

1 for some idea

2 for clear description of the problem

3 for good knowledge of why and how it arose

a space saving technique(1) used to economise on memory usage Year stored as two digit (1) rather than four digit number. Result is that any procedure/software that involves date checking e.g. stock control/ bank card expiry dates throws out card/stock when dates exceed 1999(1)

Systems were not designed to be used still in Year 2000. (1)

Lack of investment in system development (1)

Allow Leap Year problem (1)

(W)

- what is being done to tackle the problem; (5 max)
awareness programs -BCS, DfE, trade organisations – e.g. banking, retailing
Government agencies
Training programs – for staff to enable identification of potential problems
and production of solutions
Prevention of panic – carefully worded press releases to prevent lack of
customer confidence e.g. in banking
Publicity material – produced and circulated to many small/medium sized
companies. Phone lines and action teams available to give advice.
Accept specific examples NOT GPS
Allow 9/9/99
Practical Activities such as:
Contact hardware/software suppliers for confirmation of compliance or to get
“fix”
Contact trading partners to ensure compatibility
Create specialist team or purchase software to check for millennium behaviour
of systems
Have timetable for checking/correcting systems
Use replacement programs for in particular, suspect embedded systems/chips
Replace Hardware

(E)

- the effects on individuals and organisations of the failure of Information
systems(6 max)

6 marks available for description of effects on individuals and organisations of
the failure of systems. Use 1 mark for example of failure and 1 for the effect it
would have up to a maximum of 6. Please note that this is the failure of systems
in the broader sense and candidates do not have to describe failure as a result of
the millennium bug.

Examples could include;

Failure of computerised air traffic control systems (1) leading to delays for
flights and customer dissatisfaction (1)

Failure of Automatic Teller Machines (1) leading to frustration and loss of
business as customers cannot withdraw money (1)

Failure of computerised medical monitoring systems (1) could lead to strain
on nursing staff as manual monitoring necessary(1)

BE GENEROUS ON LAST SECTION but be sensible

1999 GCE Information Technology IT02

1 Privacy is the recognition that certain data should only be accessed by authorised personnel [1] e.g. medical data by a GP [1].

Security is the application of safeguards to protect the data from accidental or malicious modifications, destruction or damage [1] e.g. accidental deletion of data by an authorised employee [1]

Examples could be *when* or *how*;

Passwords, if explained but **not** twice

maximum 4

2 Accept bullet points and descriptive examples:

Maintenance of the data dictionary [1]

User documentation [1]

eg keep users informed

Database security [1]

eg backup procedures

Requirements of privacy [1]

eg allocating passwords / levels of access

That the type of data held meets the needs of the organisation [1]

That the facilities for retrieving data meet the needs of the organisation [1]

Periodic appraisal of data (i.e. is it complete, accurate and not duplicated). [1]

Not training

maximum 4

3 (a) A stored sequence of instructions or program [1] to carry out a task automatically or which can be called by name [1]

(b) Unit testing: to test the macro works correctly, but in isolation [1]

Integration Testing: testing the macro but in its environment [1]

Systems Testing: e.g. can it handle the volumes anticipated [1]

Description of a test strategy [1]

User acceptance testing [1]

maximum 3

Note: Answers such as 'should have tested the macro....' May only gain a maximum of one mark.

Total 5

4 (a) Traditional output still available e.g. output to 35 mm slide [1]

Wide range of outputs available e.g. hard copy of slides [1]

Use of video / animation to improve impact [1]

Automation of presentation (i.e. do not have to physically put OHP on projector) [1]

Provision of navigation tools [1]

Ease of editing or replacing individual slides or use of templates [1]

Makes the presentation 'more impressive' to the audience [1]

Import from other packages [1]

Remote presentations [1]

Any 3x1 to a maximum of 3

- (b) Awareness of the intended audience [1]
- Font sizes for text [1]
- Quality of graphic images ie distortion to size changes [1]
- Use of colour [1]
- Portability across different machines eg screen resolution [1]
- Delivery method e.g. video based / LCD display [1]
- Application of company standards eg size and colouring of logos [1]
- Layout [1]
- Overloading [1]

Any 3x1 to a maximum of 3

Total 6

- 5 (a) Structured Query Language (SQL) or write code to implement query [1]
Query by Example (QBE) or wizards [1]

maximum 2

- (b)

	SQL	QBE
Advantage	An International Standard allows import/export of queries [1] transferable skill [1] Greater flexibility in criteria [1]	Easier for novice as queries are constructed on a standard grid [1]
Disadvantage	Longer to acquire necessary skills [1] Greater chance of error as must be syntactically accurate [1]	Limited by the options provided [1]

To a maximum of (2x2)=4

Total 6

- 6 (a) Faster entry if not a trained typist/keyboard operator [1]
Leave hands free for other purpose [1]
Overcomes lack of familiarity with a keyboard [1]
Advantages to the disabled [1]
Health implications eg RSI [1]

Faster entry alone receives no marks

Maximum 2

- (b) Bulk entry of text based data [1]
Simple control instructions to manipulate data or control software [1]

Allow suitable examples, which incorporate these ideas

Maximum 2

- (c) Needs to be trained for an individual voice [1]
- Has a small dictionary of words [1]
- Slow recognition speed affects practical usability [1]
- User requires technical terms, which are not present in the dictionary [1]
- Excessive background noise [1]
- Poor microphone/recording equipment or positioning [1]
- Grammar/language problems eg there and their [1]
- Clarity of speech [1]
- Distinguishing between text and commands [1]

Maximum 3

Total 7

- 7 (a) The way in which the elements of a network are interconnected (physical layout) [1] which determines the cabling and interfaces needed [1]
- maximum 2

- (b) Star: Each computer is independent of the others, the system is unaffected if one computer or connection fails [1]
- Data transmission speeds may vary on each cabling link [1]
- Centralised control of message switching – security control [1]
- Easier to add new stations without disruption to the system [1]
- To a maximum of 2

- Ring: Less dependence on a single central computer [1]
- Routing is simpler as a packet simply circles the ‘ring’ [1]
- Very high transmission rates can be possible [1]
- maximum 2
maximum of 4 for
Part (b)

Note: Do not credit points given twice in different forms

- (c) Physical capacity of cables [1]
- Protocol limitations [1]
- Hardware limitations eg network cards, modems, etc [1]
- Difference between analogue and digital [1]
- Loading of network [1]
- maximum 2
Total 7

- 8 (a) (i) Account Number: allow Check digit but **not** check sum [1]
length or format [1] and check the account number exists on the
master file [1]
- (ii) PIN: allow Length or format Check [1] a check for the PIN
accessed by the account number matching with the PIN entered
manually [1]

maximum 4

- (b) Encryption of data or secure lines, specifically the PIN by hardware
before transmission, to ensure secrecy if intercepted [2]
Also allow..... checks to ensure data received is identical to that sent
to preserve accuracy of the data [2]
Authentication of the client-ATM hardware [1] + reason [1]

maximum 2

Total 6

9. (a) Remote Data Entry [1]
Data input off-line [1]
Transactions collected as batches [1]
Transactions sent / transmitted to central location [1]
Batch /Control totals [1]
Verification of transactions [1]
Validation before processing [1]
Concept of a sorted [1] transaction file [1] used to update a master file [1]
Processing cannot begin until all the data is collected **or** at regular
intervals eg weekly [1]

*Note: The most desirable answer would be a flowchart. Flow is required in
the question and a candidate will only fail to gain credit if the sequence is
clearly inappropriate.*

maximum 6

- (b) Transactions processed as they occur [1]
Immediate update of transactions [1]
Updates available to all users of the system [1]
Increased security risk [1]
Concept of 'pseudo' real time [1]
Additional costs in terms of physical resources e.g. hardware [1]
Staff may require new skills / additional training [1]
More complex backup [1]

maximum 4

Total 10

10. (a) E.g. distribution of a printer driver or software 'fix' [1]
Files to be distributed are less than 1.44 Mb or 2 Mb [1]
Customers still using 'old' equipment i.e. the floppy disk is still universal [1]
Where it is necessary to boot from the media prior to installation of CD driver e.g. installation of a O/S [1]
Floppy disk holds authentication info [1]

maximum 2

- (b) CD-ROM [1] mass distribution of software e.g. a new software version [1] cost-effective to mass produce [1] original cannot be altered or damaged [1] has a larger capacity [1] speed of access [1]
Internet site or bulletin board [1] registered users can access upgrades [1] transfers distribution cost to end-user [1] upgrades/'fixes' available to all when posted on the site [1] demo versions with limited life for trial [1] E-mail [1] can be used to send drivers/'fixes' to registered software owners [1] reduces distribution costs [1] no media costs [1]

Any other **different** large capacity random access storage medium eg zip [1]

maximum (2x3)=6

Total 8

11. The solution for this question is intended to provide a framework of key concepts rather than any definitive set of solutions.

Mark allocations: Approximately 4 marks each for the three issues specifically asked for in the question. Maximum for all three sections together to be 12. A further 4 marks for a general discussion of issues not covered in the three previously mentioned sections may be allocated if a maximum of 12 has not been reached. Four marks are allocated for quality and coherence of answer. Total 16.

In each section two marks are allocated for a benefit/drawback of de facto standards with an explanation (1+1). To gain four marks in a section at least one example **must** be discussed.

		Maximum Mark
Operating Systems	S	4
Portability of data between applications	A	4
Portability of data between different computer systems	C	4
General Discussion	M	4
<i>To an overall total of.....</i>		12

Possible answers

	Issue	Benefits or disadvantages
Operating Systems	Windows 95 has become the de facto standard for PCs [1] Or LINUX or UNIX	This significantly increased the sales of software for the Microsoft Corporation [1] It has benefited individuals as a wider and more extensive range of user support is available [1]
Portability of data between applications Not clipboard	API (Applications Programming Interface) OLE	A set of standards that allow organisations to generate software which interfaces with other software [1] Ease of use for the individual as data can now be used in differing packages with transparency of the technical issues. [1]
Portability of data between different computer systems Not programs	TCP/IPs development as a de facto standard	Organisations whose communications protocols are based on the OSI standard. [1] Individuals have gained wider access to information held on differing computer systems through the Internet. [1]

Note: A candidate discussing de jure standards e.g. OSI is certainly within the spirit of this question and should be credited.

Notes:

De Facto and de jure standards and issues that might be used:

Microsoft (success of their O/S by allowing hardware manufacturers license to product equipment that will implement IT/developers access to the code to produce applications software).

Strict control by Microsoft. E.g. UNIX has been enhanced by many different software companies which has led to software and hardware compatibility problems.

ISA (Industry Standard Architecture).
API (Application Programming Interface – a standard set of program commands and functions that allow a programmer to interface with another program)
OLE (Object Linking and Embedding)
ISO 9660 (ISO standard for CD storage e.g. PhotoCD – previously High Sierra)
HTTP (Hypertext Transfer Protocol to identify the address of WWW pages).
HTML (Hypertext Mark-up Languages – a standard to allow different browsers to view data).
X.25 (standard for packet switched systems)
X.400 (standard for e-mail transfer methods).
X.500 (standard that defines unique identities for e-mail purposes).
V24 (standard for modem connection)
V series (e.g. V.26 BIS – 2400bps transmit, 1200bps receive, full duplex)
FTP (File Transfer Protocol)
OSI (Open Systems Interconnect)
TCP/IP
CCITT (Comite Consultatif International Telegraphique et Telephonique)
International committee that defines communication protocols and standards
ISO (International Standards Organisation)
DGIS (Direct Graphics Interface Standard)
RS232 (Serial connection port standards)
CCIR 601 (Standard for defining digital video)

1999 GCE Information Technology IT04

1. Factors which could contribute to the failure of the system:

4 @ (1) to max 4

inadequate analysis (1)

lack of management involvement in design (1)=*lack of end-user involvement*

emphasis on low-level data processing (1)

lack of management knowledge of IT systems/capabilities (1)

inappropriate management demands (1)

excessive management demands (1)

lack of professional standards (1)

needs adaptive maintenance (1)

NOT 'right format etc.'

insufficient training (1)

2. (a) What is meant by the term expert system:

knowledge built into the system as a set of rules (i.e. knowledge **base**) (1)

rules held as data, updated by use (i.e. inference engine) (1)

must be clear distinction to a database

must have concept of update for 2nd mark

'contains the knowledge and replicates the performance of a human expert' (1)

NOT 'a human expert'

- (b) Any example use of an expert system:

e.g. given the details of a site (1) the E.I. makes a prediction of existence of mineral ores (PROSPECTOR) (1)

(alt) the system Nervous Shock Advisor gives advice on the outcome of legal cases in the area of emotional distress. (1) This is based on judgements reached in previous court cases.(1)

must have concept of prediction or previous knowledge for 2nd mark e.g.

'possible diagnosis'

maximum 4

3. Mark as: (2) for **difference**, (2) for example, (2) for personnel

Strategic: used to inform the business plan (1) to assist decision making (1)

e.g. projected income per income stream (1). Personnel: senior management/board level (1)

Operational: used to assist daily tasks (1) e.g. outstanding total of invoices (1).

Personnel: mid-management/clerical level (1)

'Management use an M.I.S., Workers use operational information = data processing system' (3)

DIFFERENCE must be clear for full marks

maximum 6

4 Max (1) per point to max (10)

Threat	Counter
Physical = terrorists/war	Locks etc.
Data Loss	Backup
Personnel	Procedures
Hardware	Duplicate system
Communications	Firewall/Encryption
Virus = Logic Bomb	Anti-virus
Fire = Flood = Earthquake	Off-site duplication/archive
Electrical surges = Power failure	UPS/Off-site duplication/ = RAID = mirror
Hacking	Passwords/firewall
VDU emanations	screen cover
Data errors	Validation/verification
Y2000	test scripts/software checks
NOT Human error	NOT replace hardware training

maximum 10

No grouping but beware duplicates

5 (a) Methods of data collection: (1) per item

Bar codes(1) = EPOS = till (1)
palm held (PDA) (1)
OCR (1)
Keypad (1) NOT keyboard
Voice recognition (1)
Allow smart chips in packaging if well described (1)
NOT: magstripe, light-pen, scanner, MICR, keyboard, smart card,

maximum 3

(b) Factors: (1) per item

quantity of data = size of operation
quality of data required = quality of information
diversity of stock= *cannot bar code everything*
diversity of sites, location
staffing levels available
level of system equipment
ease of use
throughput=timescale NOT speed
level of detail required in data capture=accuracy
NOT speed of processing, hardware/software compatibility,

maximum 4

(c) Audit trail : Accept answers stated in general software terms.

Functionality: to produce a selective record (1)
of what has happened on the system (1) = *concept of tracking every transaction*
who has been using it (1)
when & for how long (1)
and what this person did with the data (1) = which files were accessed.

Why necessary: to meet formal (1) audit requirements = legal requirements (NOT law)
to ensure protection of the system from fraud (1)
or the accusation of fraud (1).

Allow marks even if software auditing i.e. question is about stock control. In this case unlikely to get last three marks

maximum 6

maximum 13 for question

6 (a) DATA Collection for SYSTEM: *NB do not allow input devices: scanner, OCR, etc*

Low tech: user completes paper based 'pro-forma' (1)
given to main office by a set time each day (1)
to form a batch of messages for display (1)

High tech: user completes template on network (1)
given to main office by a set time each day (1)
posted to main office newsletter e-mail address (1)

NOT questionnaire, staff meeting.

Med-tech
Pro-forma (1), on a disc (1) disc to office at set time (1)
(in a folder (1)) max (6)

(b) Training

How provided:

On-line tutorials (1) = *on Intranet*
Step through guides (1) = user guide = manual
Formal training courses (1) = *internal or external or computer teacher etc.*
CBT = Interactive video (1)

maximum 3

- (c) Urgent messages: e.g. school closing/pupil contact reception. (1) *Accept most things i.e. need not be too urgent...trip on Saturday cancelled*
some type of vetting process (1) e.g. *teacher passwords (1) NOT student passwords = access levels*
signed by Head/Deputy/Office Manager i.e. a formal audit (1)

maximum 3...mark as (1) for use & (2) for safeguard against misuse

maximum 12 for question

7 (a) Reports

Any 3 @ 2 each if **described** from:

Calls logged per hour (1) = number of calls
response time to initial call (1)
analysis of types of problem (1)

resolution time from initial call (1) *taken from the knowledge base which stores call ref number, caller id, initial suggestion of fault fix, number of return calls on this call ref, status of call e.g. fix. (1)*

how well the problem was resolved (1)
to gain second mark any of the above may be attached to a query e.g. on a particular problem, version, explanation of a help-desk in action

maximum 6

(b) Move to ISDN

Advantages:

User support can log-on and take control remotely (1)
File will arrive quicker (1), fix takes place on-line (1)
Support can examine the precise environment in which the problem arises (1)
Disc not lost (1), file contents not damaged (1)
NOT do not need to send discs, save postage

Disadvantages:

Cost of ISDN line (1), charges (1), additional routers/cards (1)
Service may be poor if User support do not organise demand (1)
Possible lack of security for client (1)= *virus*
Time to change & become operational (1)

NOT 'not connected to Internet'

Hardware costs

General e-mail answers e.g. can send to all

Customers do not know how to use it

maximum 6

maximum 12 for question

8. (a) Three corporate level factors;

any 3 @ (2) each if **described**

general organisation structure = *'what depts can work together' (1) = levels within organisation*

information flow

hardware platform

software o.s. environment

company DBMS, commonality of data= *of data transfer between depts (1)*

commonality of user interface

commonality of training

management of attitude change

time to become operational (1)

new internal procedures (1)

method of changeover (1) plus (1) if described

implications for maintenance & support

employment pattern and conditions (1)

NOT cost UNLESS broken down & including corporate factors above

maximum 6

(b) Sub-division of project to tasks

Mark as 2 @ 2: (1) for main aspect then a **further IT specific** (1) for expansion to a max of (4)

(a) the balance of team members from different departments will bring different views: business, system, operational & technical skills (2) IF stated as this

(b) to allow appropriate allocation to task: play to strengths but view 'whole' (1) plus IT e.g. (1)

(c) sub-tasks more manageable i.e. clearly define and realise objectives (1) plus IT e.g. (1)

(d) enable stricter control of cost and time; (1) per sub-area in IT related example (1)

NOT improves motivation unless IT specific

Any general teamwork issues which have no mention of IT

maximum 4

maximum 10 for question

9. Mark allocation: approximately 4 for the presentation and coherence of argument.

LISTING the legislation (0)

the different aspects of I.T. related legislation which affect organisations

(1) for each main aspect to a **maximum 10 in Total**

Data Protection (4-6) NB candidates cannot get 10 marks on DP Act alone

Accept a 'brain dump' of the Principles of the DP Act: Give (1) per point up to a maximum of (6)

Must Register (1)

P1: Personal data shall be obtained and processed fairly & lawfully and not be processed unless certain conditions are met.

P2: Personal data shall be held only for specified and lawful purposes & not be processed in any way incompatible with that purpose.

P3: Personal data held for a purpose should be adequate, relevant but 'not more than is sufficient'

P4: Personal data shall be accurate and kept up to date

P5: Personal data held for a purpose shall not be kept longer than is necessary for that purpose

P6: Personal data should be processed in accordance with the rights of the data subject e.g. data subject must be supplied with a copy in readable form and (if appropriate) have such data corrected or removed

P7: The Data User should take appropriate technical security measures against unauthorised access to, alteration, disclosure, loss or destruction of personal data

P8 Personal data should not be transferred to a country outside the EEC unless that country has similar DP legislation.

Alternative

Candidates may list some aspects of the 1998 DP Act e.g.

Legislation now includes opinions

Legislation now includes manual records

Legislation now has the concept of 'sensitive data' e.g. ethnic origin, political opinion, mental health records, sex life.

Legislation requires consent to process etc etc.

Any one of these gets (1) mark to a max (6). Further guidance will be given at standardisation meeting.

Software Misuse (4-6)

Unauthorised access to programs or data: applies to anyone who gains access but was not authorised, 'exploring the system'. Example: obtaining a listing of data/program

Unauthorised access with criminal intent (ulterior intent): intent on a more serious crime. Example: access to different computers in preparation of a fraud

Unauthorised modification of computer material (programs or data being held): deliberately modify the code/data with deliberate intent. Examples: deliberately introduce a virus, modify a piece of code such that it does not run

Health & Safety (2-4)

Inappropriate physical setting: incorrect seat positioning, no foot rests, no wrist support

Inappropriate screen positioning, orientation

Inappropriate lighting: natural, artificial, blinds

Health: RSI, eyestrain, epileptic fits, allow exposure to radiation

Software demands: stress

Copyright, Design & Patents (2-3)

Concepts: copy software (1), more than licence (1), adequate number of copies (1)

Maximum of 10 for the above section NB take great care not to exceed maximum

types of formal procedures which are used to enforce legislation (maximum 6)

mark as (1) for each aspect if explained to a MAX of 6

(a) formal written procedures e.g. memo 'you must not bring in discs' = posters on the wall = display on intranet net

(b) part of signed contract of employment

(c) may form part of quality monitoring procedures (e.g. quality manual/staff handbook)

(d) training courses e.g. health and safety, DP legislation

(e) induction courses for new staff

(f) routine audit by both company, internal and external auditors = audit trail

(g) disciplinary measures

(h) *appoint a H & S officer*

(i) *appoint a DP officer*

(j) *conduct a H & S inspection*

= *H&S Audit*

maximum of 6 for the above section

the potential difference between legislation and company policy (maximum 2)

Following statement gets (2)

a legal requirement is specified by an Act of Parliament whereas a company policy is an agreed set of rules but has no direct legal backing [may be indirect e.g. disciplinary measure]

OR legislation is same for any company, policy is agreed set of rules related to ensure compliance with legislation to protect company. (or ethics)

Examples Mark as (1) each to max 4.

Likely examples:

Have a 'tick box' on an enrolment form, this allows use of any data e.g. photo in prospectus

Do not store manual files in an alphabetic order then not subject to DP Act

do not take files home to work home PC.

do not leave notebook/files in parked car

ensure hardware password protected

ensure encryption of data during transmission

do not install unauthorised software e.g. games

do not loan notebook to a third party e.g. son/daughter

one person installs all software

The maximum total marks for the content of the question is 16 marks. A total of 4 marks should be reserved for coherence of language.

1999 GCE Information Technology IT05

- 1 Additional dialogue to deal with log-in, id and password (1)
Network drives become visible in desktop applications. (1)
Networked resources such as printers become available in desktop applications (1)
Icon/menu option for email appear (1)
Icon/menu option for newsgroups appear (1)
Icon/menu option for browser tools appear (1)
Other 'computers' visible in peer-peer networks (1)
Icon/menu option for networked software/applications (1)
NOT ANSWERS ABOUT SPEED OF PROCESSING.

Any 2x1=2

2 (a) ADAPTIVE MAINTENANCE: EG

- To deal with y2k or EMU changes (1)
To deal with external issues such as tax law, budgetary, tax rate, etc (1).
To deal with hardware or software developments, new processors, new operating systems, etc (1)

PERFECTIVE MAINTENANCE: EG

- To enhance functionality/ introduce new features of the package (1)
To decrease processing time (1)
To improve HCI (1)

CORRECTIVE MAINTENANCE EG:

- To fix bugs/logic errors, coding errors, etc - NOT 'problems' must be more specific (1) Etc.

Any 3x1=3

- (b) alpha testing carried out by software house (1)
beta testing carried out by selection of software users (1)

2 x 1 = 2

Total 5

3. (a) generic functionality such as print, save, import/export data to/from other packages_etc. (1)
- complex/sophisticated HCI to ease data manipulation (1)
- standard statistical functions such as mean, standard deviation, probabilities, averages, etc (1)
- user defined functions/macros (1)
- forecasting/modelling/identify trends (1)
- tabulation of data (1)
- output of data in graphical form (1)
- e.g. Histograms/bar charts/pie charts (1)
- carry out standard statistical tests (1)
- access to standard statistical tables (such as normal distribution) (1)
- methods to facilitate input and management of volumes of data. (accept sorting)_ (1)
- for survey work- questionnaire design (for OCR/OMR input perhaps) (1)
- etc.

any 6x1=6

3. (b) IT capability alone is not sufficient (1) – need some knowledge and experience of statistics (1)

ANSWERS ABOUT TRAINING ARE NOT ENOUGH

1+1=2

Total 8

4 The answers here are not prescriptive but suggest a typical response. A high scoring candidate will recognise the different needs of all of these users in terms of :

- read/write access,
- levels of reporting
- and the scope of access

maximum 1 mark for each point for each user

Answers will depend on when and how attendance data is collected:-

- once per day via traditional registers which return to office for data entry,
- at each class, by swiping students id card in on-line reader,
- teachers with computers holding class lists with radio link to office for central upgrade/query, etc

NB. IF they say 'NO ACCESS for a user' = No marks for this part of the question.

Students

Read access only to attendance data (1)

Restricted to their own records (1)

May be able to give their own reasons for absence (1)

teaching staff:

read access only for a traditional method/central database (1)

may have write access for on-line method prior to upload to a central server (1)

search or query particular student records (1)

reporting at individual student level or class level or at department level or all records depending on the College (1)

office staff

input/edit and update capability (1)

restricted access to a departmental data set (1)

reporting at individual student level or class level (1)

senior managers

read only access (1) (Ignore read/write access here.)

access to full data set (1)

summary reporting rather than detail of each student or class (1)

If only 1 user is addressed- max 3/8

If only 2 users are addressed max 5/8

Any 8*1= 8

Total 8

5. Up to a maximum of 8 marks, give 1 for each sensible change suggested and 1 for the justification. Candidates must justify changes to gain full marks.

A max of 4 is available if no justification is given. Justifications do not need to be explicitly linked to particular changes suggested.

Do not credit same justification more than once.

Changes might include:	Reasons
Systems files only need backup prior to systems upgrades (1)	reduce backup time /hospital system must never be down (1)
Separate procedures/systems/media/devices for backing up systems/program files and database files(1)	reduce demands on storage capacity (1)
Periodic dump of database to disc while on-line (1)	Dump can be backed up to tape without going off-line (1)
Need for weekly backup tape (1)	Data errors will overwrite good data in three days if not discovered (1)
Use of raid array to facilitate on-line backup (1)	to eradicate down time (1)
Use incremental backup if not doing already (1)	Reduce time system unavailable/ hospital system must never be down (1)
Keep off-site master / keep in fireproof safe(1)	Added security (1)
Medium term full backup to CD/dump to CD	More reliable than tape (1) or If a data error is not detected within three days it will be impossible to restore from backup (1)
Set up a live mirror server to act as backup on the network (1)	Improve recovery time after data loss (1)
Live backup to another machine across the network (1)	Faster recovery from disaster (1)
Employ software solution to enable on-line backup. If off-line time is a problem – find a software solution to enable on-line backups to take place (1)	To reduce down time – hospital system must never be down (1)
Planned testing of tapes by restoring them (1)	To ensure media /strategy is OK (1)
Maintain a backup log (1)	To keep records of failures in backup process (1)
Use compression (1)	To reduce backup time or storage media space (1)

8x1=8

Total 8

6. (a) (i) **What the log might contain: maximum 4 from:**
 a record of facilities used by each person including processor time(1),
 no of pages printed (1)
 or disk space used (1).
 details of systems failures/ crashes/error messages (1)
 details files stored/ updated/deleted (1)
 details of e-mail usage/storage (1)
 IDs of logged-on users/who (1)
 network address/hardware id of logged on users/details of workstations (1)
 time & duration of log in/log out/ when logged in (1)
 details of applications used/count of users per application/ no. of
 licenses used (1)
 details of network traffic (1)
 details of failed login attempts (1)

4x1=4

- (ii) **Why it is useful :** (Max. 4 from)
 provide systems administration with information about network load (1)
 monitoring software licenses (1)
 enable administrators to deal with network performance problems (1)
 facilitate sensible distribution of resources to users (1) e.g..
 memory/time/printers/ etc.
 to limit use of scarce resources (1), possibly through a charging system (1)
 inform decisions about any upgrade or systems enhancement (1)
 help in controlling abuse of network (1)
 enable administrator to identify and support novice users (1)

4x4=4

- (b) Central or main computer exists on server based network but not on
 peer-to-peer (1)

Shared data/programs/applications stored on server c/w on any local hard drive (1)
 maintenance benefit of installing applications once on server c/w installing copy on
 each local hard- drive in peer-peer (1)
 systems manager overheads for a server based network (1) E.g. setting up user
 accounts and access rights. (1)
 shared resources such as printers, hard drives, etc in peer-peer only available when
 workstation is on c/w available when network is up for server based (1)
 Server based net can simplify job of central administrator, at some cost in
 performance (1)
 Server introduces single point of failure (1)
 Server implies one 'more capable' machine suited to serving many clients. (1)
 server based network tend to be much larger scale than peer-peer (1)
 software upgrades more easily managed on server based network (1)
 security issues harder to control on peer-peer (1)
 server based nets likely to need additional hardware: routers, bridges, repeaters,
 switches, etc (1)
 centrally managed backup on server based net. (1)
 speed of access varies with number of users/load on server based net. (1).

General answers about speed of access score 0.

Do not credit answers about topology – e.g. peer-peer : when one station crashes, the whole network crashes.
Do not credit answers about software licenses -e.g. claims of need to only buy one license for server.

any 6x1=6
 Total 14

- 7 (a) intuitive to use (1)
 command, menus etc in familiar places on screen –similar menu structure to other packages (1)
 ability to customise tool bars/menus (1)
 help readily available on-line (1)
 context sensitive help (1)
 short cuts available for expert users (1)
 effective use of colour/sound to assist users (1)
 effective diagnostic messages on screen (1)
 use of wizards to assist with complex tasks (1)
 Well suited to task- not unnecessarily complicated (1)
- 7 (b) (i) **Physical factors:**
 position of screen/ lighting (1) - always visible/not facing window/avoiding glare or reflections (1)
 arrangement of seating (1) -adjustable level of chair (1)
 work patterns (1) ability to take frequent breaks (1)
 ergonomics of hardware (1) problems such as RSI, mention of keyboard design or wrist rests, etc. (1)
 Choice of colour schemes (1) the effect of colour blindness to certain colours (1)
 Sound effects associated with tasks (1) problem in a noisy environment or for people with hearing difficulties (1)
 Etc.
- (ii) **Psychological:**
 A different set of peer pressures (1) may exist in this store- e.g. manager at this store is anti the new system (1)
 Different background or experience (1) -These users may have used a different previous system to those in the other store (1)
 Different satisfaction level/degree of familiarity with previous system (1) - may have been using old system much longer (1)
 Strong IT phobia (1) / willingness to accept an IT solution in this store (1)
 Different social context in this store (1) - maybe this store is in the US/Europe/etc. (1)
 Low user self confidence (1) if many staff feel unable to cope this may build to create group dissatisfaction (1)
 Sound effects associated with tasks (1) initially helpful could become irritating (1), etc.
- any 4*1=4

Choice of colour schemes (1) the effect of colour combinations can affect mood or attitude towards the system (1)
HCI complexity (1) may lead to frustrating expert users (1) because of help given to novice users (1)

Four factors are needed for full marks, allow 3-1 split between the physical and psychological.

If any factors are wrongly identified as physical or psychological then do not credit them.

NB Colour and sound could be identified as either type of factor or both and can score in both (i) and (ii). In these two cases the first mark is available even if the factor is wrongly identified as being physical or psychological.

4*(2,1,0)= 8

Total 12

8. (a) Candidates must go beyond rephrasing the term. e.g. it is not enough to explain the meaning of 'robust'

Performance:

Use of benchmarks (1),

Definition of benchmark e.g. standard tests/ sequences of operations performed on all systems (1)

Example of a benchmark test – e.g. measure time taken to search 10,000 records for one record (1)

Or Speed of calculation (1)

Or accuracy of calculations (1)

Process existing data and compare output of new system with that of the existing system (1)

Robustness

Scale of known errors/no. of known bugs in current release (1)

What happens when erroneous data is deliberately input/attempts to carry out erroneous transactions. (1)

E.g. Try deleting tax record when there are pay records stored for that person. (1)

Test the system with large volumes of data. (1)

Test the system with many users. (1)

User Support:

- Ability of University to provide own user support (1)
- Measure call response times when logging a problem with software house (1)
- Ask existing users of system/supplier (1)
- Are the sources freely available (1)
- Is there a user community we can tap? (1)
- Availability of on-line help or good documentation (1)
- Availability of training from software house or other organisations(1)
- Help desk availability (1)
- Help desk costs/charging structure (1) $3 \times (1+1) = 6$

(b) Other criteria might include

- Functionality – check list of features provided or required (2,1,0)
- Compatibility with existing systems, file format, user interface, platform (2,1,0)
- Transferability of data, import of data from previous system or other systems within organisation (2,1,0)
- Upgradability- future upgrade paths (2,1,0)
- Portability, ability to run on different platforms (2,1,0)
- Financial issues, development costs, turnkey cost, cost benefit, total cost of ownership (2,1,0)
- Reputation of vendor, likelihood that vendor will exist for the lifetime of the product (2,1,0)
- Complexity of system (2,1,0)
- Year 2000 or EMU compliance + explanation (2,1,0)

Any $3 \times 2 = 6$

Total 12

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

Mark allocations:

Max 6 marks for explanation of protocols and why they are required.

Max 6 marks for explanation OSI seven layer model (Do not list all seven layers).

Max 6 for explanation of the benefits and limitations of standards.

Maximum mark for content is 16/20. Up to 4 marks are available for the quality and coherence of the candidate's argument.

Points gaining credit:

(P) Explanation of protocols and why they are required. maximum 6

Protocols are sets of rules/conventions defining how systems communicate with each other (1)

Covering:-

cabling (1), transmission mode (1), speed of transmission (1), data format (1), Error detection (1), error correction (1), web addresses (1)

Allowing any equipment or systems using same protocol to be connected (1)

(S) Explanation of the OSI seven-layer model: maximum 6

Abbreviation for Open systems integration / interconnection (1)

Description of what OSI means: Hierarchy of conventions/layers dealing with different aspects of how systems interconnect (2,1,0)

For up to a max of three layers- 1 for naming and 1 for describing its role in the model: *second mark depends on first*

Application layer (1) –closest to user/highest level (1), deals with interface between end users, applications programs and devices (1), deals with accounting (1), entry control (1), user ID's (1) FTP,HTTP

Presentation (1)- ensures data in different formats can be exchanged (1)- e.g. ASCII and EBCDIC (1), deals with encryption (1)

Session (1) – users interface to network (1), deals with users requests for network services (1)

Transport (1)- deals with data transmission between host computers (1), addressing (1), error controls (1)

Network (1)- routing of information around network (1), network accounting (1) data link (1) – physical transmission media: cables, etc are subject to interference (1) this layer handles data transmission errors (1), deals with techniques for acknowledgement and receipt of data (1)

physical layer (1) ,lowest level (1) deals with mechanical & electrical connections of devices- pin connections on plugs and sockets (1) , signal voltage levels (1) timings, etc. (1)

(B) Benefits and limitations of standard: maximum 6

Need for international forum to agree standards (2,1,0)

Wider marketplace for products complying with standards (2,1,0)

Potential of standards to slow developments – waiting for standards to change to accommodate new developments (2,1,0)

Ability of major manufacturers to dictate global standards i.e. de-facto standards (2,1,0)

Easier exchange of files between different platforms (2,1,0)

Total 20