GCE MARKING SCHEME

INFORMATION & COMMUNICATION TECHNOLOGY
AS/Advanced

SUMMER 2011

INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2011 examination in GCE INFORMATION & COMMUNICATION TECHNOLOGY. They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

1(a)	**1 mark Description of use** *(Method and use) Any mix and match suitable combination* e.g. <u>retina scan / iris recognition</u> to gain access to room, <u>facial recognition</u> at airports for identity purposes, <u>thumbprints recognition </u>to take out a library book / school registration systems / for security /instead of or as well as passports **1 mark Benefit** *Individual / difficult to copy / better security (but cannot get in both parts)* *Accuracy* *Can lose smart cards*	2
1(b)	**1 mark Description of use** *Any suitable use/device* *In museums to allow children to gather information / in shops to enter info at POS* */ mobile phones to dial or display information / buying tickets at train stations …….* **1 mark Benefit** *Saves having to type, easier for disabled people to .., no need for mouse and keyboard, quicker to enter information.* Used in hostile environment because keyboards can get sticky	2
1(c)	**1 mark Description of use** *(Must give specific use)* For a primary school child using a maths program. Setting up a profile on a games console Customising a desktop/ application **1 mark for Benefit** It makes the operation of the computer as friendly as possible by using high resolution graphics and pointers, making it as intuitive for a user as possible, instead of typing in commands you enter them by pointing and clicking. Fun to use / colourful / easy to use as do not need to know commands / easier to customise backgrounds fonts / intuitive etc	2
2(a)	Accurate data is **correct / truthful / has no errors.**	1
2(b)	**1 mark for clear explanation of difference** It would pass any range or format checks but it may not be correct **1 mark for specific example** Example: a customer completes a form with DOB which is correct. e.g. 05/06/84 A data entry clerk makes a transcription error and types in the numbers the wrong way around 06/05/84. If added :-- Both would pass the range check to see that they are over 18 but only one of them has an accurate DoB for the customer (would get the second mark) **Good example showing the differences clearly worth two marks as above**	2

2(c)	(**1 mark for process 1 mark for example) x2**	4
	Process: <u>Monitor progress</u>	
	Example: A shop analyses the performance of its POS terminal operators and warns operators who are too slow or make too many mistakes.	
	Process: <u>Can target reasoning and strategy making (resources) to gain advantage over competitors</u>	
	Example: A manufacturer spends money developing a new product because they have seen a gap in the market. A company developed special sized shampoo bottles when airline companies limited the amount that could be taken into the cabin.	
	Information about customers' buying habits is valuable here and can lead to an organisation or company becoming more profitable. Information can tell an organisation how well it is doing compared to its competitors.	
	Example can be worth 2 marks if concept of targeting resources is clear.	
	Example 1: *Company decides to spend money on advertising in Area B to promote a particular product. ('… because they have noticed sluggish sales' may qualify for spotting trends mark)*	
	Example 2: *Information from research is used to identify gaps in a particular market which can then be filled by developing a new product.*	
	Process: <u>Spot trends</u>	
	Example: Analyse sales data and realise when something is out of fashion e.g. sales of tape recorders or if one region buys more of something than another.	
3	**Any two of 2 x 2 1 mark for each type given 1 mark for each advantage**	**4**
	Note - Advantages must be different.	
	<u>Internet/search engines</u>	
	Key word searches, Interactive resources, Editable information, Copy and paste pictures / diagrams into reports, Wider choice / variety of information available, Up-to-date information, Easier / quicker to search for information, to google, Can get lots of results faster than reading books	
	<u>Email experts / teacher</u>	
	Books may not be available; email could give faster response	
	<u>Chat to other students / tutors (blog)</u>	
	Real-time, Ask further questions if not sure	
	<u>Post questions on bulletin boards</u>	
	Reach wider audience	
	<u>CD based software</u>	
	Lighter to carry home, Key word searches, Copy and paste pictures / diagrams into reports	
	Interactive resources, Editable information, Wider choice / variety of information available	
	Up-to-date information, Easier / quicker to search for information	
	<u>On-line encyclopaedias</u>	
	Key word searches, Interactive resources, Editable information, Copy and paste pictures / diagrams into reports, Wider choice / variety of information available, Up-to-date information, Easier / quicker to search for information	
	<u>Teletext</u>	
	Up-to-date information	
	<u>Interactive Television</u>	
	Up-to-date information.	
	<u>Intranet</u> Condone	
	<u>VLE</u>	
	Mobile phone apps	
	etrader	

4(a)	Two advantages and one disadvantage (1 mark each), such as:	3
	Advantages	
	Don't have to be in the same location as teacher/pupils who are ill can keep up to date.	
	Students don't have to travel / can work at home.	
	Can access more courses/allows access to courses not taught in your school.	
	Classes can run with small number of pupils.	
	Shared expertise.	
	Potential cost saving to schools if well qualified.	
	Flexibility of time	
	Disadvantages	
	Diminish literacy – texting.	
	Cost implication of installation.	
	Lack of personal support (close at hand) / immediacy/no peer interaction.	
	Pupils must be motivated to achieve their goals.	
	Need for equipment at home.	
	Broadband problems (if qualified)	
4(b)	Two advantages and one disadvantage (1 mark each), such as:	3
	Advantages	
	Pupils work at own pace.	
	Good for pupils with learning difficulties. (customisation)	
	Pupils respond better to automated feedback.	
	Can gauge their own progress / instant feedback.	
	Engaging screens - colour/ animation/ sound/ video.	
	Special adaptations can be built in / Can target specific areas.	
	Materials provided in different formats such as text, voice, video, animations.	
	Have flexibility as to where and when they work, at home, in car, out walking/running.	
	Variety of activities can motivate and maintain interest.	
	Can access material using different hardware e.g. laptop, mobile phone, mp3 player, tablet. (No brand names)	
	Available at any time.	
	Revisit when you need to.	
	Multilingual support.	
	Disadvantages	
	Lack of personal support (close at hand) / no peer interaction.	
	Cost of software/specialist hardware.	
	No collaborative learning.	
	Note: same answers cannot be credited twice.	
5(a)	Incorporating data <u>automatically</u> from a store into an outline document. [1] (Linked to fields, implied automatic) e.g. Creating a set of letters informing parents of a parents meeting. [1] (Letter must have a real purpose)	2
5(b)	Pre-prepared page/layout with pictures, words which are going to be reused [1] e.g. Letterhead with school info and logo (common info or set layout) e.g. unused template, must be clear that a template has been used. [1]	2
5(c)	A macro is a stored list of instructions (which is used to automate a task, code, program) [1] e.g. Adding a teacher's signature to a letter [1]	2

6(a)	1 mark for reference to emulating human in the decision making / problem solving process. 1 mark for advice / probabilities or naming the three parts. **Example individual responses worth 1 mark only** • An expert system is a computer system which emulates the decision-making ability of a human expert. • Software which diagnoses problems and gives advice on what the causes of those problems are. • They can also give advice on solutions. • A program that gives advice on (medical) matters.	2
6(b)	**1 mark each for advantages and disadvantages but to get 5 must have at least 2 of each.** **Advantages** • The computer can store far more information than a GP. It can draw on a wide variety of sources such as stored knowledge from books, case studies to help in diagnosis and advice on things such as prescriptions / symptoms • The computer does not 'forget' or make mistakes – remembers obscure cases of heart diseases • Data can be kept up-to-date e.g. adding more results of radiology scans • The expert system is always available 24 hours a day. • Will never 'retire'. • The system can be used at a distance over a network. Therefore rural areas or even poorer third world countries have access to experts. • Provides accurate predictions with probabilities of all possible problems with more accurate advice especially for obscure illnesses • Some people prefer the privacy of 'talking' to a computer rather than talking to a GP • Gives the doctor more time to deal with other patients / saves overloading doctors in epidemic/pandemic • Can provide a second opinion • It can help train young doctors in unfamiliar diseases. • People can do an initial diagnosis from home saving them travel and time costs especially if in a rural area or have long waiting lists to see a GP, e.g. if you suspect your has a rash you could quickly check the symptoms for meningitis. **Disadvantages** • Over reliance on IT system • Loss of doctor expertise • Cost to buy and set up the system • Some people do not like to talk to a computer • People can convince themselves that they are worse than they from misusing the online version • Some 'experts' could lose their jobs or not be given training if computers are available to do the job. • Lacks the 'human touch' – lack of personal contact • Dependent upon the correct information being given. If data or rules wrong the wrong advice could be given. • Expert systems have no "common sense". They have no understanding of what they are for, nor of what the limits of their applicability are, nor of how their recommendations fit into a larger context. If MYCIN were told that a patient who has received a gunshot wound is bleeding to death, the program would attempt to diagnose a bacterial cause for the patient's symptoms. • Expert systems can make absurd errors, such as prescribing an obviously incorrect dosage of a drug for a patient whose weight and age are accidentally swapped by the clerk.	5

7	**3x (1 mark for each advantage and example)**	6
	Advantages – each point must be illustrated with a suitable example.	
	Repetitive processing / carrying out the same task to the same standard repeatedly (consistency), e.g. Processing the payroll run on a computer for a large organisation.	
	Data storage capacity / Able to store an enormous amount of information in a small space, e.g. all the information on the pupils in a large school will fit on a hard drive compared to a huge number of filing cabinets.	
	Speed of searching / Able to find information quickly/ Easier to find <u>specific</u> data if qualified, e.g. a police check will find information on a particular car almost instantly.	
	Accuracy and context / Calculations are carried out accurately, e.g. in a spreadsheet if formula and data are correct then calculations will be correct.	
	Speed of data communications / Messages sent out across the world instantaneously, e.g. an email can be sent from the UK to the USA within seconds.	
	The ability to produce different output formats / Information can be produced in tabular or graphical format, e.g. a scientist producing a report will include data in a table and to make some of them easier to understand will produce some of them as graphs.	
	• Ease of editing. **NOT** to do with handwriting.	
	• Easier to back up data .... (Well qualified).	
	• Allows predictive analysis / gives *better* management information	
	List of three factors gains one mark.	
8(a)	**9-12 marks** Candidates give a clear, coherent answer fully and accurately describing four developments giving benefits and an example for each. They use appropriate terminology and accurate spelling, punctuation and grammar.	12
	5-8 marks Candidates give a brief description, benefit and/or example but responses lack clarity. There are a few errors in spelling, punctuation and grammar	
	1-4 marks Candidates simply make brief points and may not give benefits or examples. The response lacks clarity and there are significant errors in spelling, punctuation and grammar.	
	0 marks No valid response.	
	Indicative content	
	Answers have to cover 4 developments to get full marks.	
	(One mark for naming the item, 2nd mark for further amplification and the third mark for the benefit)	
	• MP3 player – allowing people to listen to a choice of thousands of tracks on a small portable player, which means that they can listen to their favourite music wherever they are.	
	• Music downloads – allows the user to select the particular track that they want rather than a whole CD which saves them money, which they can target at more of what they want.	
	• T.V. / Radio downloads	
	• Digital photography – allows the user to get better at taking thousands of photos and only have to print out the best ones. Saves money and allows them to improve.	
	• Interactive TV – gives the user far more choice over what they watch by controlling the channels and because they can transmit information they can shop, check email, book holidays and bet, etc.	
	• Chat rooms / social networking	
	• Mobile phones	
	• Betting	
	• Dating	
	• Games (playing)	
	• Editing digital images	
	• Online shopping/booking	
	• Voting	
	• Home cinema / bluray / dvd / speaker systems / surround sound	
	• Streaming movies / Streaming T.V. / Movies on demand / Sport on demand	
	• Internet telephony/ Voip (not skype)	
	• 3D T.V.	
	• Creating music	
	• Digital radio	

8(b)	**5-6 marks**	Candidates give a clear, coherent answer fully and accurately discussing the disadvantages. They use appropriate terminology and accurate spelling, punctuation and grammar.	6
	3-4 marks	Candidates discuss the disadvantages but responses lack clarity. There are a few errors in spelling, punctuation and grammar	
	1-2 marks	Candidates simply give brief points. The response lacks clarity and there are significant errors in spelling, punctuation and grammar.	
	0 marks	No valid response.	
	Indicative content		
	Up to 2 marks for disadvantage and further amplification/example/consequence		
		• Addiction to computer games – can affect schoolwork	
		• Addiction to gambling can lead to debt	
		• Sedentary nature – people sitting at their computers all day and not getting any exercise and having an effect on their health and leading to obesity	
		• Health problems – incorrect posture can lead to backache, using joysticks repeatedly can lead to RSI	
		• Chat rooms – young children could be groomed to meet undesirable people	
		• Inappropriate material – it is very easy for young children to come across material such as hard pornography which could harm them	
		• Closure of cinemas / video shops, etc – no need to go out to watch a film when you can watch it in your own home	
		• Cyber bullying – Children could be depressed.	
		• Spending too much time at a computer distracts you from working	
		• Downloading of viruses – Could make computer unusable.	
		• Downloading copyrighted music and depriving performers of payment	
		• Social isolation.	
		Consequence might come first.	
9(a)	**Answer should have three elements – software / real life / investigative**		1
	Use of a program to predict the behaviour of a real life system.		
	OR		
	Means using a computer and mathematical formulas to investigate /imitate real life situations.		
9(b)	1 for description, 1 for advantage and 1 for disadvantage		3
	Allows the government to predict what will happen if they changed some factors such as raising taxes, reducing interest rates, changing amount of public spending.		
	Advantage		
	Possible to experience a lot more situations		
	Cheaper as not going to waste money on impossible actions		
	It can save time as you can roll on the model to see what it is like after more than one year		
	Disadvantage		
	There will always be some difference between simulation and reality		
	Accuracy of the rules and variables		
	Some situations are hard to model.		

10(a)	**No mark for writing out the formula used.** **One mark for explaining what formula does and one mark for why the information is required.** e.g. Absolute reference formula in row 5 of sheet 6 means that as you change the rate of VAT then you will only have to change the one cell B34 as it will always refer back to this value. e.g. DATE: I used Date on page 1, cell a5 to show on which day the transaction occurred to date stamp it for future reference. Single IF: I used the IF formula on page 4 in cell f7. IF (A5 >= 17,"OK", "not old enough") checks the age of the person in A5 and this allows them to apply for a driving licence.	4
10(b)	2x **(one mark for stating method and field, and one mark for advantage) Has to be different for each,** e.g. **List boxes** I used a list box in cell F4 on page 3 to select text from a pre-determined list (or their own example)(1) reducing data entry errors (1) increasing efficiency (1). **Option or check boxes** (Boolean choice) I used a check box in cell D4 on page 4 to click in the cell for yes/no data placing a tick in the cell (or their own example) (1) increasing efficiency by saving time (1). **Spinners** I used a spinner in cell G8 on page 6 using a button (or their own example) (1) to let you see how input changes will alter the outputs in a model (1) so you can see different outcomes more easily (1). **NOT** speed of entry. **VLOOKUP and variations** I used Vlookup in cell H14 on page 10 to find the price of the product (1) You can update a table of prices without having to rewrite formulas such as multiple IF statements. (1) Faster to automatically enter data (1)	4
10(c)	**One mark for naming a validation technique up to two marks for detailed description. Fourth mark for describing the error message.** e.g. In cell B3 on page 2, I put a range check (1) of between 1 and 9999 (1) on my customer order number (1) to ensure numbers were within the correct range (1) In cell C3 on page 4, I used conditional formatting (1) by putting a preset formula (1) e.g. to work out the date (1) for data in another cell (1) In cell F12 on page 8, I set the text length (1) to 10 characters to put a limit (1) on customer Postcode (1) to prevent incorrect data being entered (1) Description of their own appropriate error message (1).	4
10(d)	**Two marks for description of a macro process. What and Why** **No mark for naming a different process but up to two marks for detailed description**. **Must be a macro used in the candidates spreadsheet.** Examples could come from: Search, Sort, 3D referencing, Graph, Output Report (invoice) / data entry form (order form), VB code, Vlookup, pivot tables, etc. e.g. My macro in cell F3 on page 2, defined the special print settings in the Page Setup dialog box (1) and printed the invoice (1). *Identify a navigation macro and where is it going to/between (1) this will make it more user friendly / to move backwards and forwards more efficiently (1)* I used 3D referencing formulas in cell H5 on page 6, to summarise monthly data (1) onto the annual summary sheet (1). *Graph: The graph on page 8 showed me how money was spent (1) and it allowed me to work out the breakeven point (1)* **Condone:** SUM, Max, Min, Average, Count (and variations).	4
	Total	**80**

01	Any three of the following, discussed in detail: **3x2** **1 mark per factor - 1 mark per explanation. (No Factor no mark for extension)** **If mistake in factor but good extension can gain extension mark** **Note explanations must be distinctly different and match the factor.** NOT Layout appropriate to the **task**. Consistency of signposting and pop up information *e.g. Every 'Next' should be in the same place using the same icon.* *Navigation around the program should be clear consistent and easy to follow.* – intuitive, learn faster Clear navigational structure *e.g. It speeds things up if there is a similar route through the programs (if it is clear) as users do not have to keep learning things / Helps users learn their way around the system.* *There should be standard 'feel' to software.* *e.g. Large/minimal text for a child to minimise reading which builds up user confidence / Bright colour scheme to attract a young child's attention.* *Doing a repetitive task such as entering holiday bookings means you have less guidance on the screen.* **Note Nothing to do with devices** Customisable to suit the needs of the user *e.g. Makes it more efficient if the user can change items to suit their work preference.* Location of where machine is to be used *e.g. No sound in a noisy area.* *Touch screens in museums / factories / etc (with explanation of why).* House Style/Ethos (Not Consistent Layout) *e.g. So that it conveys who the organisation is and all the company docs look/feel the same.* Specific point about colour *blindness* *e.g. Design to avoid red/green combination - blue/yellow best combination.* On Screen / online helpfiles (built in with software) *e.g. Rather than wasting time looking in manuals,* important if no outside help available when working / Tool tips telling the user what to do / interactive user manual that answers general FAQ. **No marks if can be read as a Google search.** Disabled Access (If get explanation and factor mixed up can gain 1 mark) *e.g. If a person is blind then the computer could recognise voice input / Braille keyboard.* *Expertise of the user/ ability of user / difference between novice and expert user* An expert user will need shortcuts so that the task can be completed as quickly as possible whereas a novice will need a number of steps to guide them. *CONDONE:* Font size – (but not as a factor) readability, appropriate to level of user, avoid eye strain List of 3 =1 mark	6
02	Any 4 points • Have a minimum amount of text on screen • Use child friendly font/size of font • Use bright colours to attract the child's attention • Have an uncluttered appearance • Involve minimal use of the keyboard / alternative input devices • Use speech synthesis / sound so that they can hear the words • Animation/videos to keep their interest • Instant feedback on their responses • Interactivity e.g. quizzes, educational games • Visual prompts e.g. pictures of a cat	4

03	**Indicative content:**	6
	These points could be made but must be related to each topology.	
	Do not give opposites separate marks.	

Advantages of ring
- Network not dependant on central computer
- Each computer has the same access as the others so no one computer can hog the network

Advantages of star
- Fault tolerant – if one of the cables fails, then the other computers can still be used
- Load tolerant – extra computers can be added without much loss in performance because all computers have their own path to the server
- Easy to add extra computers – extra computers can be added without disturbing the network

Disadvantages of ring
- If there is a break in the connection then the whole network fails
- Faults are difficult to locate
- It is impossible to keep the network running whilst equipment is added or removed because there is only one path for the data to follow

Disadvantages of star
- Higher cost – the large amount of cabling needed makes it more expensive
- Dependence on the central server

LAN or WAN The ring is a Local Area Network which means it can only be accessed from within the building or organisation. Messages are passed around all devices on the ring and repeated on to the next if not at the destination address. It is usually a peer to peer network so all stations on the network have the same access rights.

The star is often a wide area network linking networks via gateways and a classic example of this is the internet or when large banks link up their branches with the HQ computers. All traffic goes through the fileserver.

Security and reliability There may be more than one fileserver on the ring network and if one goes down the ring can still function by redirecting network traffic to the functioning server. The ring network depends upon the repeaters sending the signal around the network. If a repeater fails the signal cannot be forwarded but this does not stop limited communication in one direction between some stations on the network.

In the star network if a node goes down the others can still function but if the central fileserver/hub goes down then the network cannot function. Can add extra 'nodes' without disturbing the rest of the network.

In the star network everything goes through the central fileserver/hub which can have firewalls and proxy servers allowing central control of message switching allow a high degree of security. In the ring every device has access to the token before repeating it on, making easier hacking or corruption possible.

Transmission speeds In the ring transmission is in one direction only and therefore can be quite fast In the start you can have different transmission speeds on each of the nodes some can be super fast e.g. between file and communications servers and others e.g. to printers can be slower.

Costs Cabling for a local area network such as the ring is less and ethernet cable is probably sufficient. However wide area star networks may need expensive fibre optic cabling or even satellite links. Gateways can also be expensive.

04	Any 4 - See which users are using the network - Check on emails being sent when should be working - Check on which sites employees visit - Check on hardware to see what needs upgrading - Check to see right number of licences - Guide users through problems - Check to see no unauthorised software loaded on machines - Log off users who have forgotten to do so - Check on components to see if any failing - Shut down stations - Rebuild stations / re-setup stations / re-install/update software - Send instant messages - Control stations - Clear printer queues at stations **NOT** manage passwords / delete files / other tasks normally done at the server	4
05	Any 2 points from Auditing (keeping logs) Auditing keeps a record of who has done what on the network. Auditing keeps records of: • usernames • the times they logged on and off • details of programs they used • details of files accessed • details of changes made. Auditing is used to identify abuses of the systems by authorised staff and also to investigate instances of unauthorised access (i.e. by hackers). Managing user accounts Allocation of passwords Allocation of access levels to users	2
06	Any 2 from the following (1 for factor and 1 for further development) x 2 - Physical security – this involves protecting hardware and software using physical rather than software methods either to restrict access to the computer equipment or the storage medium -- using physical methods (Locks, guards biometric methods) - Prevention of misuse using logical (software) methods -- user ids, passwords, levels of access (e.g. who can update web pages) - Continuous investigation of irregularities i.e. query any transactions that are out of the ordinary for customers, - System Access - establishing procedures for accessing data such as log on procedures, firewalls - Personnel administration – training (including prevention of accidental misuse) , fitting the employee to the task, ensuring that staff are controlled, staff screening - Operational procedures including disaster recovery planning and dealing with threats from viruses, backup, updating antivirus - Staff code of conduct and responsibilities, e.g. Downloading from the internet - Disciplinary procedures. **NOT** auditing procedures	4
07	**Distributed computing** - a series of computers are networked together (1) each working on solving the same problem (1). Sharing the same data processing task/project (1) between different computers on a network (1)	2

08	*Advantages of distributed computing*	4
	• reduces cost because an expensive powerful computer such as a supercomputer is not needed	
	• can pass work to computers anywhere in the world using the Internet	
	• improved performance as each computer can work on part of the data.	
	Disadvantage of distributed computing	
	• issues with the security of data spread out on so many different computers.	
	• Heavy reliance on networks and communications which may not always be reliable	
	• Increased costs owing to the use of expensive communication lines	
09	Any 2 from x 2	4
	• Use of a search engine (1) <u>enter</u> key words to find the information you require (1). (can award marks for Boolean search if they mention putting in terms as well)	
	• Use the Uniform Resource Locator (URL) (1): if you know the web address (URL) of a site you can simply <u>type/enter</u> it in (1). If you do not know the address of the sites of interest, then you can <u>buy</u> books (called directories) (1) or <u>buy</u> one of the popular Internet magazines that contain them (1).	
	• Surf the Internet by following hyperlinks (1): <u>click</u> on a link to move from one area of interest to another (1).	
	• The use of a web crawler (1) which browses the web and <u>keeps</u> an index of what it finds (1)	
	Must have an <u>action</u> for second mark	
10	Any four of the following, **discussed in suitable detail**: **4 x 1**	4
	• Maintaining a company website / need for trained staff	
	• Catalogue of stock / stock database/table	
	• Methods of secure payment / shopping trolley	
	• Database/table of customer orders/bids	
	• Order/bid tracking / email confirmation	
	If candidates just state four points then maximum mark is 1	
11	(a) (1 mark for statement of change and 1 mark for explanation of why) 3 x 2	6
	• Job losses or fear of job losses (1) - new system may replace staff who performed manual processes e.g. filing, etc (1)	
	• Having to learn new skills (1) /(Don't know how to use system) - older staff may be stressed by appearing to look stupid in front of younger staff who have the skill (1)	
	• Fear of change of organisational structure /Relocation (1) - loss of authority by being bypassed by younger staff or having to move location which could make the journey to work harder (1)	
	• Change in work patterns (1) - split shifts or change of hours or night work, 24/7	
	• Change in internal procedures (1) - may make staff take on extra responsibilities for no extra money (1)	
	• Health fears (1) - Concerned about the health risks of prolonged use of ICT equipment (1)	
	• Big brother watching	

12	1 mark for brief description of the factor and 1 mark for further explanation or an example x 2 - Appropriate training/retraining – to ensure all staff understand the new system and wondering what to do. - Explanation of the advantages – so that staff can see how they will benefit by making the job easier/ more interesting / answer any queries - Spell out the implications of the new system (meetings)– to help stop rumours which give people stress / allow staff to express worries - Opportunity to learn new skills – enable staff to improve their job prospects - Involvement in the development of the new system – so that the staff can have a system which is straightforward to use. - Keeping social groups together / not disrupt working relationships – less stress / work together as a team	4
13	1 mark for brief description of the factor and 1 mark for further explanation or an example x 2 - Identify potential risks - e.g. viruses / fire / natural damage / hacking / systems failure / fraud, etc - Likelihood of risk occurring - some things such as power cut are inevitable but explosions much less likely - senior managers have to assess the likelihood of each risk occurring and put in the necessary security - Short and long term consequences of threat - resources (staff equipment, etc) need to be directed towards recovering the data / may have to pay compensation / financial loss due to loss of business through not being able to take orders / embarrassment/ prosecution / loss of integrity / bankruptcy / cost of replacing equipment - How well equipped is the company to deal with the threat (What procedures are in place) - has to be reviewed periodically because of changing needs - disaster recovery programme – backup strategy **NB Should not be talking about H &** S	4
14	*1 mark for the correct name and brief explanation for each strategy* *1 mark for the benefit/advantage of the method* *1 mark for a drawback/limitation/disadvantage of the method x 2* **Direct changeover** – stop using the old system one day and start using the new system the next day (1). Element of risk particularly if the hardware and software are cutting edge (1). If the system fails then it can be disastrous to the business (1). Requires fewer resources (people, money, equipment) and is simple, provided nothing goes wrong (1). **Need more than easiest/quickest and not just cheapest** **Parallel changeover** – Old ICT system is run alongside the new ICT system for a period of time until all the people involved with the new system are happy it is working correctly (1). Used to minimise the risk in introducing a new ICT system (1). Can compare results and be sure it is working properly (1) Disadvantages: lots of unnecessary work (as the work is being done twice) and is therefore expensive in people's time (1). It also adds to the amount of planning needed for the implementation (1). *Accept also:* **Phased conversion** – a module at a time can be converted to the new system in phases until the whole system is transferred (1). Advantage that IT staff can deal with problems caused by a module before moving on to new modules (1). Disadvantage: is only suitable for systems consisting of separate modules (1). **Pilot conversion** – this method is ideal for large organisations that have lots of locations or branches where the new system can be used by one branch and then transferred to other branches over time (1). Advantage: implementation is on a much smaller and manageable scale (1). Disadvantage is that is takes longer to implement the system in all the branches (1). **QWC**	6

15	Any two of the following methods: **Perfective maintenance** (1) – improving the performance of the software (1). Examples: Configuring the network management software to improve performance such as improving access times to data, speed at which reports are produced, etc. (1). Software may need to be modified to improve the user interface upon feedback from users who are finding it more difficult to use than it needs to be (1). Developing on-line tutorials and more help screens to help new staff learn the software (1). The software provider provides upgrades which will improve the performance of the software (1). **Corrective maintenance** (1) – bugs in the software which were not discovered during testing may need correcting (1). Example: A piece of software may crash when being used with another piece of software (1). A piece of software may crash when used with a particular item of hardware (1). Software may present a security risk which needs correcting (1). Problems with reports not being printed out properly (1) **Adaptive maintenance** (1) – software may need to be changed owing to the changing needs of the business or organisation (1). Example: Software may need altering so that it is more flexible in supplying the managers with information which was not envisaged at the time of development (1). Changes to values such as the percentage rate of VAT or changes to income tax rates will result in changes to the software (1). The organisation expands so the software needs to be altered so it is able to cope with an increased number of users (1). Adapting the software to work with newly developed operating systems software or new hardware (1). A new virus threat/hacker threat means that the software will need to be adapted to protect against this (1) **QWC**	6

16	Any **three** well developed points from: Second mark for good example or expansion x 2
	• Accuracy and relevancy of the data
	   ➢ The data used from the transaction systems that supply data to the management system must be accurate.
	   ➢ Avoid information overload by not producing any data that is not needed as this can waste time and make the information harder to use.
	• Flexibility of the system
	   ➢ Managers of different sections have different requirements and the MIS must be able to cope with this.
	   ➢ Managers of different parts of the business such as marketing and finance have vastly different needs.
	   ➢ Allows individual project planning.
	   ➢ Managers can set up their queries own quickly
	• Providing data/information in an appropriate form (not format)
	   ➢ Managers will need the data presented in the easiest form for them to interpret, some will want it in tabular form and some in graphical.
	• Accessible to a wide range of users
	   ➢ Can be used by managers who have a range of ICT skills and knowledge.
	• Give information when required
	   ➢ Timing is critical as there is no point in giving good information after the date it is needed for.
		6

17	A primary key is <u>unique</u> and used to identify a <u>record/table</u>. / and other fields depend on it	1
	A foreign key is a field of one table which is also the <u>primary key of another table</u> / used to establish relationships/links between tables.	1

18	2 x (1 mark table name, 1 mark for primary key field, 1 mark for foreign key) and 1 mark for 2 other fields in each table
	
	      BOOK [BookNo, Title, Author, Genre, ISBN, etc]
	      LOAN [LoanID, BorrowerID#, BookNo#, StartDate, Length, etc]
	
	        Where underlined are primary keys and # are foreign keys
	If candidates have produced a fully working real solution using more than three tables full marks can still be awarded.
		7

19	Hierarchy of passwords -- passwords to see separate parts Storage of data separate to programs Access rights to parts of the program.	3
20	<u>Large</u>, <u>Archive</u> and used for <u>Decision Making</u> – Look for two of these three (1 mark) Data warehouse refers to large amounts of data which are stored together, usually in a single location, for further processing (a huge database specifically structured for information access and reporting) (1) or A database used to store an organisation's historical data which is used by a MIS to extract information to help managers make decisions. (1) **Advantages** Allows the council to store information about every book. (1) Allows the council to see who has borrowed books and when. (1) Can use it to plan future changes or developments in their library system. (1) Allows the library system to use data mining. (1) Speeds up searching at the local library. (1) Allows the library to find the most popular book and buy more (1)	3

21	Look for the idea of trends, patterns or generating new information
	Example definitions (1)
	   - is the analysis of a large amount of data in a data warehouse to provide new information. - Is interrogating large amounts of data - is a speculative process investigating potential patterns - involves the presumption that dormant within the data are undiscovered patterns / groupings / sequences / associations. - software uses complex algorithms to search for patterns. - is drilling down into the mass of data so users can understand it more / discover meaningful patterns. - Is looking for meaningful patterns in a large mass of data and presenting results in tables and graphs. Example up to two marks: what (1) and why (1) e.g.
	      Librarians can gather information about the lending habit of individual members (1)
	          use this to plan future acquisitions of books or videos (1)
	          use this to change opening hours, etc (1)
	      Look at book lending habits of particular branches (1)
	          to determine future purchases (1)
		3

22	Issues	18
	• Deliberately setting up websites containing incorrect information – people may rely on and use this information thinking it is correct.	
	• Bullying – in chat rooms, by e-mail, in blogs, by text message is a problem especially for the young.	
	• Inappropriate websites – people are able to view inappropriate material such as pornography, racism, violent videos, how to make explosives, etc.	
	• Using e-mail to give bad news (e.g. redundancy, demotion, firing, etc.) when explaining face-to-face would have been better.	
	• Spreading rumours – it is easy to spread rumours using the Internet. You only have to tell a few people in a chat room and the rumour will soon spread. Normally, if someone started a rumour that was untrue and it caused another person distress, then the person starting the rumour could be sued. When rumours are started over the Internet it is difficult to identify the person responsible.	
	• Plagiarism – copying material without attributing or referencing the source of the information. This could also involve using websites which sell essays or coursework.	
	• Sending spam (i.e., the same advertising e-mail to millions of people) – people waste time deleting spam if the spam filter allows it through.	
	• Companies monitoring staff use of the Internet and e-mail. Some organisations will even read personal e-mails.	
	• Using someone's wireless Internet connection without permission.	
	• Sometimes it is possible to connect to the Internet using an open network. The net result of using the network is to slow the network down for legitimate users.	
	• Mobile phone stalking.	
	• Using photo editing software to distort reality – by using photo/video editing software you can distort reality and you can no longer believe what you see in video, TV, newspapers, magazines and on websites.	
	• Censorship Invasion of privacy by governments.	
	• Privacy issues – social networking sites, e-commerce sites, Internet service provider records, e-mail monitoring at work, etc., all erode a user's privacy.	
	• Gambling addiction – gambling can cause many social problems and it is on the rise with the ease with which bets can be made using the Internet.	
	• Addiction to computer games – many children spend hours playing computer games and their social skills and schoolwork can suffer as a result.	
	Have and have nots – Digital divide	
	Closing down of local stores	
	Example answers	
	Censorship	
	• No-one owns the Internet. It is international. Material which would be illegal if published in hard copy form is freely available on the Internet e.g. racist propaganda, bomb making instructions, pornography. Some say the Internet should be censored but **who will do the censoring and how can centralised control be implemented.**	
	• If you ban sites will they become more appealing so people will search for them more avidly.	

	Issue	Discussion point	
	Accurracy	**Discussion point**	
		• There is no guarantee that any information on the Internet is accurate or true. Some web sites giving medical advice have been known to give wrong information but they are not held liable. Magazines can write untrue stories.	
		• Individuals can spread malicious rumours about people in emails.	
		• What about plagiarism – if you get thrown out of university because you copied an essay of the Internet	
	Privacy	• It is relatively easy to capture internet traffic.	
		• Freedom of speech	
		• Do we have the right to the privacy of our emails and data files?	
		• Do we have the right to encrypt our data?	
		In the light of the increase in Internet crime, security scares and increased terrorist activity should the security services be allowed to monitor all Internet traffic	
	Effects upon communities	• Some argue that the Internet has increased;	
		• the number of valuable interactions e.g. keeping people in touch with families whilst travelling using Internet cafes.	
		• increased awareness of geographically separated cultures	
		• Others argue that it has led to a lack of individual social interaction by frequent Internet users e.g. you can work, shop or bank from home without ever having to mix with others. This could cause small local business to go out of business thus increasing social isolation.	
		• Exercises undue influence on vulnerable young people e.g. inciting people to become terrorists	
	Ownership	• Who owns the Internet?	
		• Who controls the Internet	
		• Because of the increased commercial value of activities on the internet will a few media giants take control and effectively determine content?	
		• The law of individual countries is beginning to address some of the legal issues such as intellectual property rights on the Internet but laws only apply to the country which passed them. International laws may go some way to address misuse of the Internet but this is still a long way off.	
		• If you put a joke on the Internet do you own it?	
	Intellectual property rights- Ownership rights to data.	• If you see a joke on the Internet can you sell that joke to a professional comedian?	
		• If you scan in the text of the book 'The Da Vinci Code' and put it on the Internet for all to be freely read; are you breaking the law?	
		• Can you sue someone who sells you an essay which is full of factual errors?	
		• The growth and exchange of ideas on the Internet has led to many legal disputes and lack of legal clarity as to ones intellectual property rights.	
		• Do the Copyright Laws of one country apply to another country?	