GCE MARKING SCHEME

INFORMATION & COMMUNICATION TECHNOLOGY
AS/Advanced

JANUARY 2012

INTRODUCTION

The marking schemes which follow were those used by WJEC for the January 2012 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.

IT1

1.(a)	Knowledge is derived from information by applying rules to it. Data is 120/60, 135/65, 140/70 Information these are blood pressure readings Knowledge patients conditions worsening *Or similar examples* Data is L1 56.4, L2 57.5, L3 54.5, L4 57.9, L5 64.4. L6 55.1 Information these times are from a swimming race Knowledge is that the winner was in Lane 3	1 3
(b)	**Any two from:** • fewer transcription errors / greater data consistency / easier to validate • less hard disk space required / takes up less room on the hard drive / less memory needed • Processing is faster (because less RAM required) / faster to search (pattern matching) • CONDONE More data can appear on the screen **NOT faster to spot trends** **Encoding is NOT encryption**	2
(c)	**Any one of the following, with an appropriate example.** *Note - A well argued example could gain both marks.* Problem Encoding can coarsen data Limited choice leading to less accurate data Limited choice leading to loss of precision Example - Not enough categories when representing eye colour, or age groups (when finding the mean have to assume all at the midpoint for grouped data) **BUT not just answers like bracketing 34 year olds with 26 year olds causes problems.** Value judgements fitting into a category and subjectivity / Value judgements can lead to inconsistency e.g. hair colour, opinion on politicians, etc. **Examples of one mark answers** Coarsening data leading to loss of precision Limited Choice leading to less accurate data Value judgements can lead to inconsistency Examples of two mark answer Coarsening data can lead to loss of precision if dark brown, mousy brown, light brown are all classed as brown. Value judgements can lead to inconsistency for example if asked “Was the meal ‘excellent’, very good’, ‘good’, or ‘poor’?” One person’s excellent meal is only good for another. **NOT** unable to understand the code or mixing up the code	2

2.(a)	Accurate data is correct / truthful / has no errors	1
(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 (must refer to a specific check to gain second mark)** 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. (1 mark) 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 clearly showing the differences worth two marks as above**	2
(c)	**Any two of (written in a sentence). Either an example or a detailed definition (just 2 factors named - 1 mark)** • Correctly targeted, e.g. if asking for information about motorbikes there is no point asking car drivers. No good asking vegetarians about meat eating. • Understandable, e.g. if the information is in a very complicated format then it will waste time and people could draw the wrong conclusions from it. • Relevant, there is no point using information about babies from people whose children are in their late teens. No good collecting information on ice-cream sales in Alaska in the winter if you want to open your kiosk in California. • Complete, all the data is there e.g. letters not having postcodes take longer to deliver. • Up-to-date means that the data is not too old i.e. a travel company would not have much profit from using 10 year old data on holiday patterns to decide which resorts to offer this year. **Accept** Reliable if it relates to the source of information **NOT timely unless distinctly different from up to date**	2
(d)	**1 mark for process 1 mark for example** **NOT** *aiding the decision making process* *Process:* Monitor progress *Example:* A shop analyses the performance of its POS terminal operators and warns operators who are too slow or make too many mistakes. Information obtained by market research and sales figures can help achieve this. *Process:* Can target reasoning and strategy (resources) making to gain advantage over competitors *Example:* Buy more of a certain commodity because sales are good. Advertising and marketing a product should be aimed at people likely to buy it otherwise it is a waste of time. *Example:* Information can identify gaps in a particular market which can then, on the basis of sound information be filled. *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:* Spot trends *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	2

3.	**Zoom:** Allows the architect to see the design in fine <u>detail</u>. **Stress/strain:** Allows the architect to see if there are any load bearing problems with the design before it is built. / Do calculations to see if the building is safe. / Allows the architect to see if the design of the building is safe before it is built. **Walkthrough**: Allows the architect to see in virtual reality what the inside of the building will look like. (Must be clearly referring to internal view). **Hatching/rendering:** Allows the architect to try out different finishes on the building to see the aesthetic affect / it is suitable / to pick the best.	1 1 1 1
4.	**1 mark in each part for description of feature and 1 mark for benefit** (i) <u>Animated transition</u> This is when you give an entry effect (such as fading) when you move from one slide to another. In a tutorial, this could be used to keep the pupil interested / help with the learning process / fun to watch (ii) <u>Templates</u> Are prewritten / master slides with design and some basic information already included and it saves you having to create from scratch. This could be the corporate identity making it look more professional In a tutorial these could contain a layout with the software's colour scheme and logo already placed to simplify the learning process. (iii) <u>Hyperlinks</u> These are objects/text which when <u>clicked</u> upon <u>take you to another file</u>, image, or a different part of your current presentation. (1 mark) Could be used in the tutorial by <u>clicking</u> on an object/text to <u>take them to</u> an online demonstration of some feature. (2 marks)	 2 2 2
5.	**Any four from (have to have at least one of each for full marks)** **Answers must be in context of workplace** Advantages • Messages can be sent across the world for the price of a local phone call. / if got a system cheaper than posting • You can send not only simple text messages but also attached files. • Documents and attachments are editable. • You can (use an address book to) send the same message to several different people for the same cost as one call / at the same time • Don't have to leave the house to send the information (teleworking) / disabled use. • Environmentally friendly / paperless office. • Global accessibility / Can pick it up anywhere (if qualified.) • Can store a copy to have an audit trail / can keep backups • Easier to find a stored email than a filed letter. • Gives a wider audience for advertising. Disadvantages • You are reliant on the recipient having an email account / Users need to be computer literate .(**NOT** Need an internet connection) • There are security and privacy issues. Confidential mail is travelling across a very public network. • E-mail attachments have proved to be a security 'Achilles heel', providing an entry point for destructive viruses • Junk email can clog your system • Distract from work • Damage done by email scams / phishing • Inappropriate use of email e.g. bullying, unsuitable content Security could be given either as an advantage or disadvantage if well argued but do not accept reverse argument for second mark	4

6.	Any 3 points - context with expansion/example. *Do NOT to award marks for duplicate reasons.* • 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	3x2
7.(a)	**Any three from: (If only 3 listed points - 1 mark)** **Software** - Does the software put a big demand on the system - does it work with other software. Relevance to task **Suitability of the OS** - If there is a need for quick up to date information, there is no point running it on a batch processing system. **Insufficient testing** - Has the system been checked in all sorts of situations / volume **Maintenance procedures** - Is there someone whose job is to ensure that the data and software is kept up to date. **Proper backups** – maintaining virus protection *Other factors could be:* Change in circumstances during development Speed of implementation Compatibility - Do the different devices talk properly to each other. Poor communication with the user - Does the final system fit in with what was requested. Competence of users / poor training Post-implementation procedures – Do they use training manuals / error logs / auditing procedures Cost – of maintaining software upgrades – of developing system – of installation Hardware support / reliability - *Care must be taken not to award marks for duplicate reasons.*	3
7(b)	**Any 2 with suitable example 2x2** **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. **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. e.g. mailmerge output from a data source. • Ease of editing. NOT to do with handwriting. • Easier to back up data ..... (Well qualified). • Allows predictive analysis / gives *better* management information	4

8.(a)	**One mark for each component and up to five marks for advantages or disadvantages. Answers have to cover all 3 sections and there has to be at least one advantage, disadvantage and example to get full marks.** **Main components** Knowledge base Inference engine User Interface **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 / constant updating • 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 / more time to deal with serious cases • 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 child 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 • 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. / GIGO • 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. **Do not award contradictory answers**	8

(b)	**8-10 marks**	Candidates give a clear, coherent answer fully discussing the uses with examples, advantages and disadvantages. They use appropriate terminology and accurate spelling, punctuation and grammar.	10
	4-7 marks	Candidates make some points with examples, advantages and disadvantages but responses lack clarity. There are a few errors in spelling, punctuation and grammar	
	1-3 marks	Candidates simply make brief comments but may not give examples, advantages or disadvantages. The response lacks clarity and there are significant errors in spelling, punctuation and grammar.	
	0 marks	No valid response.	
	Indicative content **Must have a methodology mark and an advantage or disadvantage on body scanning, blood tracking, sensors in patient care (not doors) with examples to get full marks.** **MRI**: provide a tremendous level of detail on tissue information, i.e. very good for detecting brain tumours. **CAT**: produces a complete 3D model of a patient's bones and internal organs. **Advantages** Allows (accurate) diagnosis without the need for surgery Leads to faster recovery Removes the danger of post operative infections. Surgeon better prepared as knows what he is going to find before cutting open the body **Disadvantages** Expensive to purchase or to run Can be claustrophobic Could result in the loss of traditional diagnostic skills Have to keep still for long periods in MRI Health risks – increased risk of cancer Patients with pacemakers and metallic limbs cannot go through scanners Need for expert training / interpretation Postcode lottery. Advantages **Blood bar coding** allows the tracking of blood from its donation to its use. **Bracelet with a barcode** worn by patient is matched with bar code on the blood bag / donor. Can track a patient / donor if given bad blood (CJD, hepatitis, cross contamination). Better stock control of the blood. Makes sure patient gets the right type. Disadvantages Damaged bar codes can cause delays **Sensors used in ITU units** such as temperature, blood pressure, central venous pressure, etc, (No more than 1 mark for naming 2 sensors). Advantages Allows 24/7 monitoring Alarms sounding Frees up staff Accurate reading / recording Spotting trends in patient symptoms Allows remote monitoring of patients New born babies and wristbands to prevent being taken from the ward. Disadvantages Calibration needed to check accuracy. **NO GENERAL DISADVANTAGES** e.g. power cuts	
9.	**Description of 4 benefits in context OR 2 marks for benefits in context and 2 for further explanation.** Automatic recalculation (1) if data such as rate of pay changes (1) Can do what if calculations (1) on staffing or different materials/suppliers (1) Can draw graphs for reports(1) to highlight wages of different departments/compare monthly wage bill(1) Accurate calculation of wages/quotes (1) will increase efficiency/save time (1) Setting up templates (1) to work quotes out more quickly (1) Max 2 for 'no context' i.e. two from: ability to recalculate; can show graphically by producing various charts and graphs; accurate calculation, perform 'what ifs'.		4

Before starting to mark question 10 look through the spreadsheet printouts to determine how the candidate has identified pages and screenshots. **In reading each answer to questions 10 (a), 10 (b), 10 (c) and 10 (d) look for the page or printout indicated. If you cannot see the item, look at the page (printout) before and after the one indicated. If you cannot see the item then no mark can be awarded.**		
10.(a)	**What (1) and Why (1) x2** ***e.g.*** My Count formula on page 5, cell D24, counts the number of numbers in cell range A23 to D23 (1) It can help you work out the mean number of each type of meal from the café sales by counting each time each type of meal is sold hence giving you the number to divide the total value of each type of meal by (1) RAND generates a random number between 0 and 1 (1) in my range, on page 10, it is used to generate the number of sales of hot cross buns in cell e25 (1) I used the SUM function (SUM C2:C24) in column C of page 3 to add up all the costs of the different items sold every week (1) to work out my total income (1). **Must be specific and related to work in their sheet.**	2x2
(b)	**What (1) and Why (1) x2** **One mark for stating method and field, and one mark for benefit. Has to be different for each,** e.g. **List boxes / Combo box** 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	2x2
(c)	**What (1) and Why (1) x2** (i) My macro shown on page 4 defined the special print settings in the Page Setup dialog box(1) so that it printed more quickly as I did not have to set them each time (1) (ii) 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/easier/faster (1) **Must be different types of macro**	2x2
(d)	**Any 2 : What (1) and Why (1) x2** I used filter on my sheet to find the crayons that my company sold (1) as I had a request for information of what different ones we sold and at what prices (1) I sorted the names of my customers on page 13 (1) as it made it a lot easier to look for people when their surnames were in alphabetic order. (1) I used a breakeven graph on page 12, (1) this allowed me to find the number of items I had to sell before I was going to start making a profit. (1) I used a range check on quantity on page 5 (1) to make sure that there were no mistakes in the model. (1) (or could give an explanation of why they picked the boundaries) Two branches of IF can count as why **NOT** sort in a VLOOKUP	2x2

1.	**Any 4 of the following well discussed** **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. An example can count as an extension.** **NOT Layout appropriate to the task.** <u>Consistency of signposting and pop up information</u> 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 <u>Clear navigational structure</u> 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. **Note nothing to do with devices** <u>Location of where machine is to be used</u> e.g. No sound in a noisy area. Touch screens in museums / factories / etc (with explanation of why). <u>House Style/Ethos</u> (**NOT** Consistent Layout) e.g. So that it conveys who the organisation is and all the company documents look/feel the same. <u>Specific point about colour blindness</u> e.g. Design to avoid red/green combination - blue/yellow best combination. <u>On Screen / online helpfiles</u> (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. <u>Disabled Access</u> (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. <u>Expertise of the user</u>/ 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. **NOT** age <u>Customisable to suit the needs of the user</u> e.g. Makes it more efficient if the user can change items to suit their work preference. **NOT** Consistent Layout **NOT** age **NOT** Layout appropriate to the task. **CONDONE: Font size – (but not as a factor) readability, appropriate to level of user, avoid eye strain** **List of 4 = 1 mark**	4x2
2.	2 x (1 mark for giving each factor and a second mark for a fuller description) **Size of the organisation (NOT Size of the Network)** • Needs can range from a small LAN to a global WAN. • Some communications media are limited by the distance they have to travel. • Amount of data processing required must also be considered. NOT Need to be able to add more computers to the network **How the system will be used** • What type of applications do users require? / Are the users going to require a wide range of applications? • Will they need large data storage? / Are they going to store a large number of data files? • From where will they operate the network e.g. at home in office or remote access from different locations. / Where does the processing get done? **Existing systems to integrate** • More often networks are not developed from scratch but need to fit in with existing systems. • Sometimes an extension is required e.g. when a new branch office opens. • Therefore any new network must fit in with the existing operating systems and protocols. • It must support any peripherals already in use e.g. bar code readers, printers, etc. • Can the current stock of PC's and peripherals be used on the new network? **Performance in terms of: reliability / user friendliness / capacity / speed of processing** • Different parts of the organisation may have different performance requirements. • Real-time e-commerce system may require greater speeds / capacity / reliability. **NOT just** 'faster networks' ***If candidates only list factors then maximum mark is 1***	2x2

3.	**Answers must mention both ring and star topologies making relative comments for each mark.** **Indicative content:** **These points could be made but must be related to each topology.** **ACCEPT THE OPPOSITE OF ANY OF THESE POINTS BUT NOT TWICE** **Advantages of ring** • Each computer has the same access as the others so no one computer can hog the network • Higher transmission speeds / Data flows in one direction only (so large volumes can be transmitted) • No collisions **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 • Different speeds are possible on different spokes/ arms of the network **Disadvantages of ring** • 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 # • Break in cable and network won't work* **Disadvantages of star** • Higher cost – the large amount of cabling needed makes it more expensive • Dependence on the central server/hub **ACCEPT THE OPPOSITE OF ANY OF THESE POINTS BUT NOT TWICE i.e an advantage of a ring can be a disadvantage of a star e.g only give one of the two * or one of the two #** **NB Do not accept points which are really about *peer to peer* or *client server* networks**	6
4.	**One mark each for any four points** • Using a dialup modem is very slow and limits its use / a download on dialup can take hours compared to download on broadband. • Dialup can be used on a phone line. • Broadband not available everywhere. • If only a light user dialup might be cheaper as only have to pay when you are using it, broadband you pay a monthly subscription whether you use it or not. • Broadband's fast download time means that you can use it to listen or watch films or music. • Broadband does not tie up your phone line. • Search engines work faster with broadband so takes less time to find information. • Broadband always on so it much quicker and safer to keep anti-virus, etc up to date. / Don't have to waste time connecting to the internet • Broadband can make cheap phone calls via the internet • Broadband makes video conferencing possible. • Broadband allows more devices/computers to be connected to the internet at the same time **NOT** wireless or teleworking	4

5.	**Must have at least one advantage and one disadvantage to get full marks** Used for allowing mobile access to email, etc **Advantages** • Can access e-mail, surf the internet from wherever you are (on the move) • Can work more productively because you can do things at once, without having to go back to the office • Can easily modify your plans – flights, trains, hotels • Increase in real time collaborative working / voice conferencing / video conferencing • Can work anywhere in the home or office (teleworking) **Disadvantages** • Affects home / work balance • Can be very expensive if use a mobile phone for the access • Many black spots / poor connectivity • Increased security problems from hacking • Battery life on mobile devices • Network overload at peak demand • Some attachments cannot be opened / worked on • Work progress hampered by distractions **NOT** loss of device through leaving on a train, etc **NOT** saving travel costs	5
6.	**Up to two marks for meaning of an MIS and up to two marks for example** Systems that convert data from internal or external sources (1) into information and resources designed to support the decisions of managers (1). **OR** MIS are organised collections of people, procedures and resources (1) designed to support the decisions of managers (1). **OR** MIS are programs designed to produce timely/up-to-date, relevant and accurate information (1) to help managers make good decisions. (1) **Examples of use similar to the following:** • Looking at pupil attendance figures to try and see if there are patterns (1) and to ensure that less pupils truant. (1) • Looking at exam results (1) to try and find strategies to improve their target figures, etc. (1) • A head teacher in a school analysing those pupils who are falling behind in their work as evidenced by test results and whose attendance is poor (1) so that interviews with parents can be arranged.(1) • The manager of a nationwide parcel delivery service may use an MIS to look at the distance each vehicle has to travel (1) to make the decision on whether they need a new depot. (1)	4

7.	**One mark for <u>description</u> of up to 7 points** **List of three factors 1 mark (can award twice – once for three good factors and once for three bad)** **Factors which make a good MIS** • Accuracy of the data • Flexibility of data analysis • Providing data in an appropriate form • Accessible to a wide range of users and support a wide range of skills and knowledge • Improve interpersonal communications amongst management and employees • Allow individual project planning • Avoid information overload • Allow speedy decisions for urgent situations **Factors which can lead to poor MIS** • Complexity of the system • Inadequate initial analysis • Lack of management involvement in initial design • Inappropriate hardware and software • Lack of management knowledge about computer systems and their capabilities • Poor communications between professionals • Lack of professional standards of software developers **Examples of possible responses** Factors which can lead to a good MIS include the following: • Accuracy of the information produced usually dependent on the accuracy of the data input. • Ability to allow managers to set up their own queries flexibly. • Presents the data in an appropriate form, for example a graph, to make it easy to understand. • Can be used by managers who have differing experience and skills in the use of ICT. • Ability to be transferred to other packages for further processing/analysis such as a spreadsheet package. **Factors which can lead to a poor MIS include the following:** • Inadequate consultation with managers during the analysis of the system to find out what their requirements from the system are. • Lack of training for managers means many managers do not use the system as they should. • Inappropriate hardware or software being used. For example, the network may run slowly when processing the information needed when producing MIS reports. • Inadequate initial analysis. The system does not do exactly what it should do.	7
8.	**1 mark for brief description of the factor and 1 mark for further explanation or an example x 3** **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 – cost (how much they are prepared to spend), use of firewalls – use of anti virus **NB** Should not be talking about Health & Safety	6

9.	DPA puts an onus on the council to keep this information secure (1) because of its potential for misuse (1). **Examples from any 3 of the following categories:** • 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) • Logical (software) methods -- user ids, passwords, levels of access (e.g. who can update web pages) *firewalls*, encryption • 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. Can give *firewalls* in either place BUT not twice **NOT** auditing procedures **Not** accounts and logs and **No** marks for a list.	5
10.	**One mark for each relevant point** Auditing keeps a record of who has done what on the network. (1) – (***General answer)*** Allows the manager or system to manage user accounts by allocation of access levels to users. (1) Auditing is used to identify abuses of the systems by authorised staff. (1) Auditing investigates instances of unauthorised access (i.e. by hackers). (1) **A full answer could cover who, what and when** Auditing keeps records of: **Who (**usernames) logged on (1) **What** details of files accessed / details of changes made / details of from which machine / details of programs they used (1) **When** the times they logged on and off (1)	3
11.	**Up to three marks for what it means** Distributed computing - a series of computers are networked together (1) each working on solving the same problem/a problem/one problem (1) sharing same bandwidth/data processing. (1) **One mark for a basic description of an application with further mark for expansion with more detail** ***EXAMPLES*** The purpose of the SETI *(Search for Extraterrestrial Intelligence)* project is to search for intelligent life outside the Earth (1) and to do this a radio telescope is used. In order to search for the narrow-bandwidth signals lots of computing power is needed. (1) At first supercomputers containing parallel processors were used to process the huge amount of the data from the telescopes. Then someone came up with the idea of using a virtual supercomputer consisting of a huge number of Internet-connected home computers. (1) *Popular Power project: helping to develop flu vaccines (1)* ***NB No mark for just naming application***	5
12.	**At least one advantage and disadvantage for full marks** ***Advantages of distributed computing*** • 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 • To get more processing power you just need to add more PCs. ***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	4

13.	**6-8 marks** Candidates give a clear, coherent answer fully and accurately describing four features or processes. They use appropriate terminology and accurate spelling, punctuation and grammar. **3-5 marks** Candidates briefly describe features or processes, but responses lack clarity. There are a few errors in spelling, punctuation and grammar. **1-2 marks** Candidates simply list a few features or processes or give a brief description of one. The response lacks clarity and there are significant errors in spelling, punctuation and grammar. **0 marks** No appropriate response. **Indicative content** **features/processes (4x1), further detail/expansion (4x1)** • Creating the design specification for software • Design of input methods. This will include the design of forms (data capture / on-screen / switchboard) used to input data • Design of processes – queries, macros, calculations • Design of output - reports / specialist documents such as invoices, payslips, etc. • Design of data and file structures that will allow a useable system to be built. This will include the design of fields and table structure for a relational database. • Design of information systems that will allow users to get relevant information out of the system, which will allow them to make appropriate decisions. (DFD's / ERD's) • Design of networks and transmission issues such as topology, type of cable, protocols, etc. • Personnel issues. Staff will need training and departments reorganising, skill level of the user • Security processes and procedures i.e. registering with the Information Commissioner, where data is stored, access levels, design of backup procedures, etc. • Design of House style/ethos **Marking Guidance** Up to four of the marks in question 13 are allocated for the quality of written communication in candidate responses. • Using the indicative content in the mark scheme look for up to eight points whether features, processes or examples from the indicative content for question 13. • Place a tick in the body of the answer against each point. • Read through the whole answer and consider the use of terminology. If not appropriate drag the comment *Terminology* from the Component Comments tab at the top left of your screen onto the script image. Delete one of your ticks. • Read through the whole answer and consider spelling. If more than three different errors drag the comment *Spelling* from the Component Comments tab at the top left of your screen onto the script image. Delete one of your ticks. • Read through the whole answer and consider punctuation. If more than three different errors drag the comment *Punctuation* from the Component Comments tab at the top left of your screen onto the script image. Delete one of your ticks. • Read through the whole answer and consider the grammar. If more than three different mistakes drag the comment *Grammar* from the Component Comments tab at the top left of your screen onto the script image. Delete one of your ticks. • Do not reduce the mark to less than 2. • Refer back to the mark bands above the indicative content to check that the mark you have arrived at is consistent with the bands and adjust if necessary.	8

14. **To describe management of change needs a brief description of four of the following in an appropriate example/context. One mark for list.** 4

- New skills required
- Changes to the structure of the organisation
- Work patterns being altered
- Internal procedures being changed
- Workforce anxiety

Examples

1. <u>The new skills required and old ones not required</u>

Retraining

Required	Not required
Computer programmers	Typists Many people now word process their own documents
Network managers	Filing clerks data is now stored in databases and accessed across networks
Computer engineers	Internal post clerks Many now contact each other via emails

2. <u>Organisational structures change</u>

- Boundaries between old departmental organisation will become blurred and staff will often be asked to take on new tasks and maybe lose some e.g. a sales person will be asked by a customer about the balance of their account. Before this would have to be referred to the accounts department but now the salesperson would access the account information via the network.
- Staff working groups may be split up affecting friendships
- Staff have to work in different ways e.g. having user names and passwords before they can commence working.
- Departments get restructured which means previously senior personnel get demoted whilst younger staff get promotions.

<u>3. Work patterns are altered</u>

- Reacting to global markets means being operational for 24 hours a day.
- Teleworking
- Videoconferencing
- Flexible working hours e.g., telesales work when people are home from their work

<u>4. Internal procedures are changed</u>

- Some staff that were internal administrators are now asked to deal with customers directly
- Traditional jobs are dome quickly so they may have to undertake new duties. These changes can cause stress if staff are not involved in decisions about their jobs or given the proper training.
- Many ICT staff have to obey codes of conduct.

<u>5. The workforce (fears introduced by change)</u>

- <u>Fears of redundancy</u> with lost jobs. Staff wages is the biggest cost to companies. Less staff are often needed to do the same amount of work once computers are introduced.
- <u>Fear of reduction in status and job satisfaction</u>. Management Information systems means less middle managers are needed so departmental heads may lose power. Data warehousing means all data is stored centrally and is available to all some departments who used to be asked for the information are downgraded in status.
- <u>Fear of looking ridiculous</u>. Older members may feel their lack of ICT skill and knowledge may make them look incompetent.
- <u>Changes in location</u>. Office space requirements are reduced so need smaller premises with reductions in rents, rates, utility bills. New premises may not be in original location causing problems with journeys to work, Sometimes they are relocated to different cities which could lead to either loss of job or relocation expenses. E.g. some jobs may go abroad to call centres.
- <u>Fear of Health risks</u> from working with computers, back problems etc.

15.	**Evaluation of any valid point one mark (max 10). Very well argued point could be worth two.** **To get full marks must have at least one advantage and one disadvantage** **NB Context must be e-commerce business.** **Services** • Companies can advertise goods and services only • Companies sell goods and services e.g. Tesco home shopping, buying music, making customised t-shirts, betting services, gaming services (not playing games) • Subscription services which sell information e.g. Met Office weather data, research papers, legal cases database • Interactive sites which encourage feedback on products • Auction sites such as Ebay • Secure payment services • Internet banking • Internet share dealing • Internet tutorials • **Advantages to customers** • It enables people to find out what they do and what they sell. • There is no travelling – it can be done from home so saving in costs and time/ delivered to the door • Allows disabled people to do more shopping • Can be done 24/7 * • Much quicker to do a price comparison • Can find obscure goods not available locally • See other customer reviews • Order tracking • Better deals available online • **Advantages to businesses** • People can email them with enquiries, orders, requests. • Technology has advanced and now made a lot more possible. • Overheads cut / Large savings on shops, warehouse and office space / Less money tied up in stock / less stock wastage • Wider customer base / Can reach an international audience. • More efficient customer targeting • Can target sales because you can rivals prices on their website and alter your prices # • Can sell 24/7 (but not if given as an advantage for customers)* • **Disadvantages** • Credit card fraud • Fake websites - goods do not exist • Copycat websites to extract bank account info • Fewer shops on the High Street • Lack of social interaction • Increase in delivery vans • Cost of maintaining a company website • Need for trained staff • Can't fully assess the quality of the goods/ can't try it on • Competitors can see your prices and target your company • **Other effects** • Security issues e.g. hackers stealing bank account details **MAX two marks for services but can still give all 10 for advantages/disadvantages** **Don't give duplicates**	10

16.	**A well argued point or detailed example can gain a further mark.** • The Internet is for everybody. • There is little control over the content of the material on the Internet, although some governments have started to control what can be seen. – Censorship / inciting violence /blacklist • There is also no control over the people who can access the material on the Internet. – Privacy / Plagiarism / Hacking. • The lack of 'policing' of the Internet also means that the information is not checked to make sure that it is accurate. Not monitored. Spreading rumours. • It is therefore up to the users of the Internet to check the material's accuracy. • There are a lot of pornographic images/videos on the Internet. • There are laws covering the production and distribution of this material but as much of this material comes from other countries, where the material is perfectly legal, there is not much that can be done to stop it. • The main worry adults have is that young children could accidentally access this material. • This means that unless special software (net nanny/ blocking) is used, children can easily gain access to pornographic or violent images. • Even with a software filter it is hard to be completely sure material is excluded. • If a site is banned it could make it more popular. • Because of the increased commercial value of activities a few media giants could take control of the content of the Internet • Increased risk of stalking / grooming / paedophiles / cyber bullying / misuse of social media • Illegal downloading of music / films / action starting to be taken to prosecute **Any relevant point but be careful not to credit duplicate points**	7
17	A relational database is a large collection of data items/tables and links between them (1 mark) **Plus either of the following for second mark** • structured in such a way that allows it to be accessed by a number of different applications programs • use of primary and foreign keys.	2
18.	**Description of any three of the following with an example/extension 3x2** **1 mark for a list of all 3 terms (if nothing else).** **If the term isn't fully there do not penalise if description is right** **<u>Hierarchy of passwords</u>** limits users to various parts of the program. A receptionist would only have access to basic patient details whilst a doctor would see all information on the patient. **<u>Access rights</u>** to parts of the program only certain users can access and change data. A nurse would see all the information on a patient but be unable to alter the drug dose details whilst a doctor could. **<u>Consistency</u>** - Data consistency is the relationship between the input data, the processed data and the output data as well as other related data. If the system is working properly the data will be correct at each stage and is said to be consistent. OR Data consistency is using one file to hold a central pool of data. A company may hold all its customer data in one file. This avoids the need to input data twice so that if data is changed in one file it won't need to be changed in another and remains consistent. OR Data being inconsistent in a flat file due to possibility of different formats etc and being consistent in a RDBMS as each record is only stored once so cannot have different attributes **<u>Redundancy</u>** Data redundancy is where you store an item of data more than once / A company may hold its data in different files. This is wasteful because some data may need to be input twice and if data is changed in one it will need to be changed in the other. / Data which is repeated unnecessarily is called redundant data. **<u>Independence</u>** Data independence – the data and the applications/programs used to access it are independent/separate. / New applications can be developed to access the data without changing the data./ New systems can still use existing data.	6

19.	**1 mark for description involving:** Large, Archive and used for Decision Making – Look for 2 of these 3 A large company generates huge quantities of data stored in a consistent order to make interrogation more productive.(1) Data is non-volatile and time invariant (archive data).Used to support organisational decision making.(1) **Up to two marks for an example of use** **Examples for one mark** Allows the company to store information about every sale. (1) Allows the company to see who has bought what items and when. (1) Can use it to plan future changes or developments in their business. (1) Allows the company to use data mining. (1) Allows the company to find the most popular product and buy more (1) **Example for two marks** Allows the company to see who has bought what items (and why) and then target them with special offers	1 2
20.	**One mark for the meaning** Data mining is interrogating the data to find patterns in the data which is stored in the warehouse. **Up to two marks for example of use** **Look for the idea of trends, patterns or generating new information** • 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. **Examples worth 1 mark:** Can provide: • the company with a list of customers likely to buy a certain product, which they can then use to target with a mail shot. • comparisons with competitors • useful 'what if' results from modelling exercises • predictions for future sales • analysis of best sites for shops • analysis of sales patterns • returned information can be tested for plausibility. • data if of value can be processed into a report to help decision making. **Examples worth 2 marks:** • Fighting shoplifting in clothing stores – Jaeger used DM to look at transactions and position of item in store – found even with tags most items stolen near doors – led to increased CCTV, more prosecutions and recovery of goods. • Identification of customer needs – Virgin Media use DM to segment and target customers most likely to buy new services or upgrades. • Could allow company to find a previously unknown relationship between regions of the country and food preferences and they can then target special promotions. **The difference here is that the why will refer to a *new connection* between the data or a new conclusion**	1 2

21.	**1 mark each for any three points but must have at least one advantage and one disadvantage** **Must be in context of a company** **Advantages** • If data lost on central site it could be reduplicated from local site • Allows sharing of the data and the results of processing the data • New locations can be added to the database without the need for rewriting the entire database • Faster response to user queries of the database • Non-dependence on one central huge store of data • Easy to backup and copy data from one server to another • If one server fails then the other servers can be used • Reduces network traffic as local queries can be performed using the data on the local server. **Disadvantages** • Software more complex than a centralised database system • If data is transferred it presents more of a security risk from hackers • As all the data is not stored in one location if a local site does not have adequate backup then this data might be lost to others. • If data is stored and updated in more than one place there is an increased chance of data inconsistency. • Heavy reliance on networks and communications which may not always be reliable • Security issues particularly if sensitive personal data is being transferred • If one of the links to a server failed then the data could not be obtained from that server • Increased costs owing to the use of expensive communication lines.	3

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