GCE MARKING SCHEME

SUMMER 2017

INFORMATION & COMMUNICATION TECHNOLOGY
IT1
1241/01

INTRODUCTION

This marking scheme was used by WJEC for the 2017 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was 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 conference was to ensure that the marking scheme was 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' conference, teachers may have different views on certain matters of detail or interpretation.

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GCE IT1

INFORMATION AND COMMUNICATION TECHNOLOGY

SUMMER 2017 MARK SCHEME

<table>
<tr><th>Q</th><th>Section A</th><th>marks</th></tr>
<tr><td>1.</td><td>Award 1 mark for example of information and 1 mark for example of knowledge x2

Example: Information Race times Swimmer 1 63.6s, Swimmer 2 59.3s,
Swimmer 3 59.7s
Knowledge: Swimmer 2 is the fastest and consequently wins.

Example: Information, John’s birthday is 11th May 1999
Knowledge, John is 18 and so now he can vote in the next election.

The rule must be stated or implied. (answer to show two stages) and
evidence of application of rule.</td><td>2x2</td></tr>
<tr><td>2.</td><td>Award 1 mark for description of any <u>suitable device AND concrete use</u>,
Award 1 mark for advantage,
Award 1 mark for disadvantage x2
Needs to be clear that candidates are describing a use of a device.
Advantage must be relevant to use.
If cannot see UI (or wrong type) is being answered cannot award advantage/disadvantage

<table>
<tr><th colspan="2"><u>Touch sensitive device</u></th></tr>
<tr><th>Device</th><th>Use</th></tr>
<tr><td>Tablets</td><td rowspan="2">to select applications/navigation
to type on keyboards
to dial or display information</td></tr>
<tr><td>Mobile (phones)/phones</td></tr>
<tr><td>POS</td><td>to enter info in shops</td></tr>
<tr><td>TOUCH panels/screens /consoles</td><td><u>buying tickets</u> at railway stations

In museums to allow children to gather information

In shopping centres to get information about shops</td></tr>
<tr><td>Lamps</td><td>To turn lights on or off</td></tr>
<tr><td>ATM/cashpoints</td><td>Withdraw cash
See balance
etc.</td></tr>
</table>

Advantage
Saves having to type, quicker to enter information/fixed list of options
Empowering for disabled people to …, no need for mouse and keyboard,
Used in hostile environments because keyboards can get sticky.
Frees staff to complete other jobs.
Screens can be embedded in larger fixed devices <u>so more secure</u>/less likely to be stolen than laptop.
No need for mouse or keyboard which can be more easily stolen or broken.
Intuitive to use</td><td>2 x 3

3</td></tr>
</table>

Disadvantage
Might not have all the options needed.
Dirty/damaged screen/ wet fingers
Screen requires recalibration.
Icons too small on some displays/accessibility issues
NOT Interactive whiteboards or dangerous to use when driving

Games Playing Device (Not consoles)

Device	Use
Joysticks	to control a plane in a flight simulator,
Steering wheels	to control a simulation of a car,
Motion sensors (accelerometers and gyroscopes)	Alarms systems monitoring vibration in motors Automatic defibrillators etc
Line of motion sensors (camera tracking motion)	rotoscoping photogrammetry etc
Virtual Reality Interface	Virtual tours etc
Omnidirectional treadmill	immersive virtual environment virtual reality game production etc
Game pads/Controller	**Controlling** a (computer based) game Etc

Advantage
Saves having to type, quicker to enter information/fixed list of options
Greater realism in the game playing/more interactive/feedback
Greater accuracy/sensitivity/complexity in the movements
Aids fitness
Not just *'more fun'* by itself or you can play with people all over the world
Disadvantage
Makes the game more addictive
Cost of purchasing the device
RSI in finger joints (strain)

3.	**Award 1 mark for process Award 1 mark for example) x2** **NOT** *aiding the decision making process or spotting trends* ***No Process no example mark*** ***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.	2x2
4.	**Award a maximum of 6 marks** **Cost, Stage and Example (2)** **Cost and example (1)** **Stage and example (1)** **Cost and stage (1)** **Only use time, human resources/people /staff /employees and financial cost once each** **Must have a different stage with each cost.** Three of the following stages with appropriate cost with example **Designing/Creating Data Collection sheets** e.g. Pay someone to create the forms. Takes time to trial the sheets before using for real. **Data Collection** e.g. New staff have to be employed to go and ask people questions or get people to fill in forms. (NOT just collecting information) Training needed to show the team how to collect the data. **Data Entry** New staff have to be employed to type in the results of the data collection. OMR devices have to be purchased. It takes time for someone to type in the data which takes them away from another job. **Processing** e.g. New software/hardware has to be written/purchased to allow the results to be obtained before the data gets out of date. **Maintenance/Updating** Staff have to be employed to keep the hardware running and to modify the software when legislation changes or bugs are found. NOT to just look after the system	3x2

5.a	**Award 1 mark per feature 1 mark per benefit (do not award the same benefit more than once)** The benefits may come out in a good example **Template** Pre-prepared page / layout with pictures, words which are going to be reused [1] e.g. Letterhead with Trust information and logo (common info or set layout), *must be clear that a template has been used*. Stored master document with a pre-defined layout (or implication) which can be used as a basis for other documents, e.g. pre-defined letter for sending information to patients. Invoices for private treatment/ staff contracts / appointments other documents related to a hospital. **NOT** Letter headed notepaper <u>Benefit</u> Saves time / Not having to start from scratch / faster to produce documents House style maintained/ greater consistency in documentation Do not have to constantly design letters Allows concentration on content Mailmerge Incorporating data automatically from a store into an outline document. [1] (Linked to fields, implied automatic) e.g. Creating a set of letters informing patients of their test results. (Letter must have a real purpose) <u>Benefit</u> Saves time Less errors in address etc. Easier to keep patient details accurate and up to date **Macro** Any of: A reusable (stored) list of instructions which is used to <u>*automate a task*</u>, code, program storing a sequence of keystrokes and menu choices <u>*which can be repeated*</u> by running the macro. A small program to perform a repetitive task and which can be created and *stored for later use by a user.* Example (or similar) Automatically adding a manager's / consultant's signature to a letter. Could be used to call up a particular template and automatically position the cursor where data has to be entered. <u>Benefit</u> *See Italics above as benefit* automate a task which can be repeated stored for later use Can be reused in many documents	3x2

5.b	**Award 1 mark** each for up to 4 points (can give 2 for any one that is well developed , within the 4 mark total) Responses may include • Expect users to have extensive training (1) • Much greater control over the layout of the pages (1) • Use of layers to organise items (1) • Rotation of lines or boxes with their content in 0.001 degree increments (1) • Curving text along a line (1) • More complex designs possible (1) • Based around frames (1) blocks within a page into which text or images can be dropped (1) • Professional level typesetting options - such as kerning (1), where you can finely adjust the spacing between characters (1) • Plug-ins - Extensions can be bought for the software which can be used for a particular industry (1). For example, you can buy a plug-in specifically for the production of newspapers (1). • Ability to program the DTP software (1) - in the same way that applications can be built by programming using a database as the core, some DTP packages can be programmed./ newspaper companies have a team of programmers who program more functions into the DTP software (1) • A more standard file/data format (1) - this makes it much easier for printers to use the files directly without adjustment (compatibility) (1) NOT more sophisticated	4

6.	**Award up to 5 marks in total** **Award 1 mark Definition** **Award 1 mark method and field/data, Award 1 mark for type of error/ example). x2** Validation is the automatic checking of data entered into a computer system. or Validation is the checking that the information is sensible/reasonable/legal (**BUT** not valid/correct). **Check digit** on account number(1) to prevent mistyped/ invalid account numbers being entered./ transposition of numbers (1) **Range check** on date of birth / amount allowed to be transferred (1) prevent silly numbers such as 13 month or negative sum or a sum which is too large (1) **Presence check** on certain (specified) field. (1) eg to ensure that a postcode has been entered because its mandatory/required (1) *Example must be sensible and relevant to online banking.* NOT Presence check on a field that is not sensible. NOT Length check on names or Postcode. NOT data type check.	5

7.	**Award 1st mark** for naming the act and giving purpose x3 **Award 2nd mark** for any extra point on purpose/malpractice or crime or consequence x3 **Award 1 final mark** for any extra point on purpose/ malpractice or crime or consequence of any act Cannot use the same consequence twice. A group summary of consequences maximum of 1 mark *Data Protection Act, Copyright Act, Computer Misuse Act, Malicious Communication Act* (Could mention *Freedom of Information Act, Regulation of Investigatory Powers Act* and *Intellectual Property Rights).*]	7

Naming the act and giving purpose Purposes are interchangeable	**Extra purpose/malpractice or crime**	**Consequence**
The Computer Misuse Act was introduced to make it illegal for people **hacking** into your computer	illegal to use the information you see for blackmail purposes Identity theft. Spreading viruses, Phishing.	FINE and you could get a further (£2000) fine PRISON
The DPA makes companies who keep personal data keep the data secure	Onus on companies in *DPA* to register. Currency of data. Obtain data lawfully. Used for given purpose. *Personal data shall be <u>accurate and where necessary, kept up to date</u>* *Personal data shall not be kept <u>for longer than is necessary</u> for that purpose*	FINE PRISON LOSS OF REPUTATION LOSS OF BUSINESS
Copyright Act – to make sure people do not copy software / images / music.	Must have a licence for any software you use so cannot copy more than license permits. Cannot copy music from a CD to your MP3 player – law has been changed back. Plagiarism cannot copy off the internet and claim it as their own	FINE PRISON LOSS OF ARTISTS INCOME LOSS OF REPUTATION

Do NOT credit: Pornography, Cyberbullying, Paedophilia.

8.a (i)	**Award 1 mark** for any 2 (Max 2 marks) Central venous pressure, Blood gases, Breath gases, Brainwave pattern (brain activity), Electrical activity of the heart (ECG), Fluid level, Intracranial pressure, Heart rate, Pulse, respiration rate, blood sugar, hormone, amino acid and vitamin.	2
8.a (ii)	**Award 1 mark** for any 2 (Max 2 marks) from • If Patient's condition worsens an alarm will sound as doctor can rush to aid • Doctors can study the information and spot trends and change the treatment • More accurate and regular readings • Frees up staff to do other jobs and to handle more urgent cases • Automatically adjusts the medication NOT lowers wage bill	2
8.a (iii)	**Award 1 mark** for any 3 (Max 3 marks) from • Newborn babies/patients are each given a wristband containing a sensor that activates an alarm if wristband taken off • Controlling the rate of flow of a drip • Automatic syringe drivers • Controlling the doors into a secure area (restricted areas) • Ensuring patients get the right blood/drugs • Robotic floor cleaning • Robots talking to patients • Automatic doors in a **situation** (e.g. hospital porter) • Fire alarm/intruder alarm • Life support systems	3

8.b	**Award 1 mark** for any 5 (Max 5 marks) **Award 1 mark** for any 5 (Max 5 marks) For maximum marks you need to give one similarity or one difference From • Both are made up of a number of slices through the body • Both reduce the risk of post operation infections • Over reliance on their use may result in the loss of traditional diagnostic skills not just over reliance • Both can produce 3D images (of soft tissue) inside the body • CAT suited for bone injuries and chest/lung scans • Cancer detection • MRI more suited to soft tissue evaluation e.g. ligament/tendon/spine /brain • MRI provides more detail of soft tissue than CAT • MRI very claustrophobic • CAT scans take a few minutes whilst MRI take much longer • CAT scan produce X-rays • MRI scans are made up of magnetism and radio waves • CAT X-rays which can be dangerous if over used.-radiation exposure • People with pacemakers/ artificial joints cannot go into MRI scanners • Other medical conditions which can include pregnancy, tattoos • Cost MRI more expensive to purchase • Both MRI and CAT scans are expensive • Both need extensive training or be experts in using the device • MRI noisier and needs headphones	5
8.c	**Award 1 mark** for naming development and **Award 1 mark** for description/example x3 Robotic Surgery (1) give surgeons greater control and precision and allows for less invasive surgery (1) Expert Systems (1) program that helps diagnose illness (1) Cochlear implants (1) sensors pick up vibrations that can be used to reproduce hearing for the deaf (1) Retinal implants (1) sensors pick up light that can be used to reproduce images for the visually impaired (1) Laser eye surgery (1) laser operated remotely by the surgeon can be used to repair tears in the eye's retina (1) Nano-technology (1) application of nanoparticles or nanorobots to make repairs at cellular level 3D printing (1) application of hip replacements/prosthetics/facial reconstruction Bionics (1) Replacement limbs Video technology (1) for facial reconstruction NOT blood barcoding or admin Any reasonable answer	3x2

9.	**Award up to 4 marks** Hardware Need for a <u>supercomputer</u> to process the data quickly or parallel processing **(1)** **Data (Award 1 mark for any 2 Named)** • Atmospheric pressure • Rainfall • Wind speed/strength • Cloud cover • Humidity • Sunshine intensity/hours • Wind direction **Advantages x2** Only takes 1 hour to produce a 6 day forecast. Can predict path of hurricanes, etc. Can help farmers plan work / Local councils plan / etc.	4
10.a	**Award up to 4 marks** **What (1) and Why (1) x2** Examples: My **<u>Count</u>** 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 of a set of numbers by giving you the number to divide the total by (1). COUNTIF, etc, are also acceptable **<u>RAND</u>** 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) NOTE The use of RAND to generate a unique number is incorrect I used SINGLE IF in cell E14 on page 5 to work out if the account holders were overdrawn =IF (D2 <0, "ACCOUNT OVERDRAWN", "Account in credit") the message "ACCOUNT OVERDRAWN" appears and if the amount is not negative then the message "Account in credit" appears. (Both branches of 'IF' for what and why)	4
10.b	**Award up to 2 marks** **What (1) and Why (1)** On page one you can see my user interface which allows customers to choose the section of the company that they want to work on (1) this makes it easier for a novice to navigate their way around the system (1)	2

10.c	**Award up to 4 marks** **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 (on their own example) (1) reducing data entry errors (1) increasing efficiency/speed/knock on automatic process (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 (on 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. / Faster to automatically enter data (1) **Not** *'Error reduction'*	4
10.d	**Award up to 2 marks per section, maximum of 6**	
(i)	**<u>SORT</u>** **What and why** I sorted the names of my customers on page 13 as it made it a lot easier to look for people when their surnames **were** in alphabetic **order**/to make a list ready for Vlookup.	2
(ii)	**<u>Search</u>** I used search 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) **NOT** use of Find and Replace	2
(iii)	**<u>Absolute referencing</u>** **What and why** I used absolute addressing to help with the use of VAT in my calculations. This can be seen on page 5 cell a13. If the rate of VAT changes all I have to do is to change the value in this cell and it changes the total price of every other component.	2

A CT scanner sends X-ray beams through the body as it moves through an arc taking many pictures. A CT scan sees different levels of density and tissues inside a solid organ, and can provide detailed information about the body, including the head (brain and its vessels, eyes, inner ear, and sinuses), chest (heart and lungs), skeletal system (neck, shoulders and spine), pelvis and hips, reproductive systems, bladder and gastrointestinal tract.

Advances in CT scanning include increased patient comfort, faster scanning times and higher resolution images. As scans become quicker, X-ray exposure has decreased, providing better images at lower doses. The average CT scan today exposes patients to less radiation than what airline passengers receive on long flights. That said, anyone having a CT scan should talk to their doctor about the risks from radiation exposure versus the benefits of early diagnosis.

Unlike CT scans, which use X-rays, MRI scans use powerful magnetic fields and radio frequency pulses to produce detailed pictures of organs, soft tissues, bone and other internal body structures. Differences between normal and abnormal tissue is often clearer on an MRI image than a CT. And while there is no radiation involved in an MRI scan, it can be a noisy exam and takes longer than a CT. A specially trained radiologist can interpret either scan, helping to achieve a quick and accurate diagnosis.

A **CT Scan** (or **CAT Scan**) is best suited for viewing bone injuries, diagnosing lung and chest problems, and detecting cancers. An **MRI** is suited for examining soft tissue in ligament and tendon injuries, spinal cord injuries, brain tumors, etc. CT scans are widely used in emergency rooms because the scan takes fewer than 5 minutes. An MRI, on the other hand, can take up to 30 minutes.

An MRI typically costs more than a CT scan. One advantage of an MRI is that it does not use radiation while CAT scans do. This radiation is harmful if there is repeated exposure

Comparison chart

CT Scan versus MRI comparison chart		
	CT Scan	**MRI**
Radiation exposure	The effective radiation dose from CT ranges from 2 to 10 mSv, which is about the same as the average person receives from background radiation in 3 to 5 years. Usually, CT is not recommended for pregnant women or children unless absolutely necessary.	None. MRI machines do not emit ionizing radiation.
Cost	CT Scan costs range from $1,200 to $3,200; they usually cost less than MRIs (about half the price of MRI).	MRI costs range from $1,200 to $4,000 (with contrast), which is usually more expensive than CT scans and X-rays, and most examining methods.
Time taken for complete scan	Usually completed within 5 minutes. Actual scan time usually less than 30 seconds. Therefore, CT is less sensitive to patient movement than MRI.	Depending on what the MRI is looking for, and where it is needing to look, the scan may be quick (finished in 10-15 minutes) or may take a long time (2 hours).
Effects on the body	Despite being small, CT can pose the risk of irradiation. Painless, noninvasive.	No biological hazards have been reported with the use of MRI. However, some may be allergic to the contrast dye, which is also

CT Scan versus MRI comparison chart		
	CT Scan	**MRI**
		inappropriate for those suffering from kidney or liver disorders.
Ability to change the imaging plane without moving the patient	With capability of MDCT, isotropic imaging is possible. After helical scan with Multiplanar Reformation function, an operator can construct any plane.	MRI machines can produce images in any plane. Plus, 3D isotropic imaging also can also produce Multiplanar Reformation.
Application	Suited for bone injuries, Lung and Chest imaging, cancer detection. Widely used on Emergency Room patients.	Suited for Soft tissue evaluation, e.g., ligament and tendon injury, spinal cord injury, brain tumors, etc.
Details of bony structures	Provides good details about bony structures	Less detailed compared to X-ray
Acronym for	Computed (Axial) Tomography	Magnetic Resonance Imaging.
Details of soft tissues	A major advantage of CT is that it is able to image bone, soft tissue and blood vessels all at the same time.	Provides much more soft tissue detail than a CT scan.
Scope of application	CT can outline bone inside the body very accurately.	MRI is more versatile than the X-Ray and is used to examine a large variety of medical conditions.
Principle used for imaging	Uses X-rays for imaging	Uses large external field, RF pulse and 3 different gradient fields
Principle	X-ray attenuation is detected by detector & DAS system, followed by math. model (back projection model) to calculate the value of pixelism that becomes a image.	Body tissues that contain hydrogen atoms (e.g. in water) are made to emit a radio signal which are detected by the scanner. Search for "magnetic resonance" for physics details.
Image specifics	Good soft tissue differentiation especially with intravenous contrast. Higher imaging resolution and less motion artifact due to fast imaging speed.	Demonstrates subtle differences between different kinds of soft tissues.
History	The first commercially viable CT scanner was invented by Sir Godfrey Hounsfield in Hayes, United Kingdom. First patient's brain-scan was done on 1 October 1971.	First commercial MRI was available in 1981, with significant increase in MRI resolution and choice of imaging sequences over time.
Intravenous Contrast Agent	Non-ionic iodinated agents covalently bind the iodine and have fewer side effects. Allergic reaction is rare but more common than MRI contrast. Risk of contrast induced nephropathy (especially in renal insufficiency (GFR<60), diabetes & dehydration).	Very rare allergic reaction. Risk of reaction in those who have or have a history of kidney or liver disorders.

CT Scan versus MRI comparison chart		
	CT Scan	**MRI**
Comfort level for patient	Seldom creates claustrophobia	Anxiety, especially anxiety caused by claustrophobia, is common, as is tiredness or annoyance over having to stay still on a hard table for a long period of time.
Limitation for Scanning patients	Patients with metal implants can get CT scan. A person who is very large (e.g. over 450 lb) may not fit into the opening of a conventional CT scanner or may be over the weight limit for the moving table.	Patients with Cardiac Pacemakers, tattoos and metal implants are contraindicated due to possible injury to patient or image distortion (artifact). Patient over 350 lb may be over table's weight limit. Any ferromagnetic object may cause trauma/burn.

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WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

Online marking

WJEC will be using a method of marking examination scripts known as e marker ® for this paper. Under this system, candidates' scripts are scanned and then transmitted to examiners electronically via the internet. Examiners mark on-screen; marked responses and marks are then submitted electronically.

Whilst the basic principles remain unchanged, this method entails some important changes to the way the system operates when examiners mark on paper:

- Examiners do not mark complete scripts. Instead scripts are divided into segments by question (item), and are transmitted to examiners in this form. Therefore, each candidate's script will be marked by a number of different examiners.

- Examiners are required to complete an online standardising exercise. This involves the marking of a number of common candidate responses (roughly 10 of each item) which will be included in examiners' allocations at regular intervals during the process. Should marks given to these items fall outside the tolerance agreed by senior examiners on more than one occasion, examiners will be prevented from further marking of that item until the team leader has been able to resolve the issue.

In terms of technical requirements, examiners participating will need a personal computer running on Windows Version 7 and above and a broadband internet connection. With an Apple Mac a Windows emulator is required.

For further details, please see the user guide available on e-marker ® when you log on. Instructions on how to log on to the system and your username and password have been sent separately.

GCE ICT

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<table>
<tr><th>Q</th><th>Section A Mark scheme</th><th>Mark</th></tr>
<tr><td>1.</td><td>
Award up to 2 marks for any 3 of the following well discussed
1 mark per factor - 1 mark per description or example (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.

<table>
<tr><td colspan="2">NOT the expertise of users NOT on screen help NOT disabled NOT Consistent Layout NOT age</td></tr>
<tr><td>FACTOR 1 MARK List of 3 = 1 mark</td><td>DESCRIPTION OR EXAMPLE 1 MARK An example can count as an extension.</td></tr>
<tr><td>Layout appropriate to the task

Note Nothing to do with devices</td><td>(There should be standard ‘feel’ to software)
Uncluttered text for young children learning to read
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.
Large empty area for a designer using an architect to maximise the drawing area.</td></tr>
<tr><td>Consistency of signposting and pop up information</td><td>Every ‘Next’ should be in the same place using the same icon
navigation around the program should be clear consistent and easy to follow.
navigation around the program should – intuitive, learn faster</td></tr>
<tr><td>Clear navigational structure
NOT LEARN TWICE if given in consistency above cannot award again</td><td>It speeds things up if there is a similar route through the programs (if it is clear) as users do not have to keep <u>learning</u> things
Helps users <u>learn</u> their way around the system.</td></tr>
<tr><td>Customisable to suit the needs of the user</td><td>Makes it more efficient if the user can change items to suit their work preference.
Change font size (font, colour) – readability, appropriate to level of user</td></tr>
<tr><td>Location of where machine is to be used</td><td>No sound in a noisy area.
Touch screens in museums / factories / etc (with explanation of <u>WHY-DIRTY GREASY ETC.</u>).</td></tr>
<tr><td>House Style/Ethos (Not Consistent Layout)</td><td>So that it conveys who the organisation is and all the company documents look/feel the same.</td></tr>
</table>

CONDONE: Font size – (but not as a factor) readability, appropriate to level of user, avoid eye strain

List of 3 = Award 1 mark
</td><td>3x2</td></tr>
</table>

Q	Section A Mark scheme	Mark
2.	**Award up to 2 marks** per consideration described **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? **Cost** • Can the current stock of PC's and peripherals be used on the new network, or will they have to buy more • This can include cost of the server, cost of cabling, cost of software and costs of third party communications services. Network maintenance, staffing costs, training costs, any one developed.(Award 1 mark for list of three) **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. **Do not credit just** 'faster networks'	3x2
3.	**Award up to 2 marks** for the description Configuration management is to configuring a network to maximise its performance (1) by organising and **maintaining** all the information about a network (1) **Award 1 mark** per Advantage up to a maximum of 4 marks • It is much easier to repair, expand or upgrade the network • The network will run faster as it is optimised • Less network downtime due to better management • Network security is optimised (constant antivirus updates) • It is possible to roll back changes to a previous configuration if changes made to the network badly affect its performance • It (automatically) keeps records of all the changes made to a network so you do not need to write down all the new settings • It allows you to future proof your network	6

Q	Section A Mark scheme	Mark
4.	**Award up to 1 mark** for the explanation Network topology shows how computers are connected together in a wired network / in a wireless network shows how the devices connect to each other. Network topology is the physical /or logical arrangement of elements of a computer network. Condone: it's the physical shape or layout of a network or a drawing of network. **Award up to 5 marks** for the discussion **Answers must either mention both ring and star topologies or imply 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 DO NOT CREDIT 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. • Non-Dependence on the **central** server/hub. **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. • Faults are easier to locate. **N.B. Do not award any marks for points which are really about *peer to peer* or *client server* networks**	6

Q	Section A Mark scheme	Mark
5.	**Award up to 8 marks** for the discussion As a benchmark**:** **Award 1 mark** per Evaluation of any valid point one mark (max 8). **Award 2 marks** for a Very well argued point. (within the 8 mark total) **To award full marks** responses must have at least one benefit and one drawback **NB Context must be e-commerce business.** **Do not credit duplicates (see * and # below)** **Benefits to customers** • It enables people to find out what they do and what they sell / searches. • There is no travelling – it can be done from home so saving time delivered to the door. • Allows disabled people to do more shopping. • Can find obscure goods not available locally / some goods only available online. • Much quicker to do a price comparison. • See other customer reviews. • Order tracking. • Avoid wasting time in queues (must be qualified) e.g. at peak/sales time. • Can be done 24/7*. **Benefits to company** • Can sell 24/7 (but not if given as an advantage for customers)*. • People can email them with enquiries, orders, requests. • Technology has advanced and now made a lot more possible. • Wider customer base / can reach an international audience. • More efficient customer targeting. • Can target sales because you can see rivals prices on their website and alter your prices#. **Drawbacks** • Competitors can see your prices and target your company#. • Credit card fraud. • Fake websites - goods do not exist. • Copycat websites to extract bank account info. • Fewer shops on the High Street NOT less staff needed. • Lack of social interaction. • Increase in delivery vans (but please note do not accept having to rely on delivery companies or any issues with delivery lorries other than environmental ones). • Need to maintain more secure network. • Need for trained staff. • Can't fully assess the quality of the goods / can't try it on. • Hidden charges (if qualified) e.g. import duty on goods being bought from abroad. **Other effects** • Security issues e.g. hackers stealing bank account details **NOT** problem with sending goods back **NOT** problems with delivery companies **NOT** lose/have no internet connection	8

Q	Section A Mark scheme	Mark
6.	**Award up to 8 marks** per discussion **To award** full marks there must be at least one positive and one negative effect discussed (max 8 marks in total) **NOT Censorship / Privacy/Control/Obesity /Teleworking** **Positive effects** **Local communities** • Blogs and chats/forums websites can be set up to allow communities to discuss l**ocal** issues such as planning, problem groups, anti-social neighbours and other policing issues, community events / know what's going on in local area (Not just 'brings communities together' needs a purpose/ to do what?)/etc. **Housebound and Disabled** • Housebound members of the community are less isolated as people as they can join in and can contact them easier to check everything is ok **Advertising and employment** • Opportunities for employment can be advertised within the community on local websites **Advice** • Local citizen advice websites can be set up to deal with the problem websites/ new online communities can be established to help e.g. tech sites, netmums/medical sites/revision sites **Donate** • Donate to charities pages can be set up/contributed to. **Making friends and keeping in touch with family** • the number of valuable interactions e.g. keeping people in touch with families whilst travelling using Internet cafes /group chats can help make new friends in communities/dating sites **Worldwide/regional communities** • increased awareness of geographically separated cultures/communications platforms for worldwide communities/brings communities of gamers/hobbyists together	8

Negative Effects

Lack of social interaction	people spend time browsing the internet, playing computer games and communicating with 'cyber' friends rather than spending time with people in the community / 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. / Social isolation: meet people online rather than face to face Addiction to the internet
Local shops shutting Cybercrime	– more orders for goods are placed using the internet so local shops/cinemas close Spreading of viruses /increase in spam and phishing scams /fake websites and fake bank accounts Ransomware/Denial of service attacks Can buy illegal weapons and goods online Redirecting of community police resources to fight cybercrime Copyright if concrete example given or well-argued NOT Just 'illegal downloads' or 'plagiarism' by itself. Must have a consequence.
Undue influence	Exercises undue influence on vulnerable young people e.g. inciting people to become terrorists/radicalisation Pro suicide sites incitement -but not suicide due to cyberbullying Imaging issues using photoediting to promote unrealistic image/Influencing people to be anorexic/image influencing Inciting racism , homophobia/hate speech Fake news/disinformation/trusting accuracy of data Desensitising society to pornography and violence *Not just 'children can see violent /pornographic images'*
Harassment	Increasing problems of cyberbullying and trawling Misuse of social media for online harassment/stalking Exposing children to Grooming /paedophiles/pornography/violent images
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/ information rich and information poor societies

Not just addiction must have to what they are addicted

NB Common Privacy issues hacking/identity fraud/inappropriate images posted on social media may lead them to lose job

No lists

Q	Section A Mark scheme	Mark
7.	**Award up to 2 marks for description 1 mark** per use **Award 1 mark** per advantage **Award 1 mark** per disadvantage **Use (MEDICINE or NEUTRAL)** • Providing a link between patient, doctor and interpreter for those patients who cannot speak English • Helping patients who live in rural locations who find it difficult to come to hospital. • Training medical staff, staff can learn from experts quickly without spending times attending courses a long way away/ Get expert help whilst an operation is under way • Expert consultation with specialists who might not be available in your local area/ Give patient a provisional diagnosis from an expert • For regional meetings where staff would normally have to travel • Doctors in one hospital can show burns victims and the specialist doctors in burns centres can study them and plan the operations and pre-treatment required before the patient has to travel to the specialist unit for reconstructive surgery. • Doctors can set up meetings with face to face communication between people who are not in the same room, building or even country. This means doctors in remote location or doctors without travel money can learn about new developments from each other Not just consult around the globe OR can do it anytime anywhere **Advantages** (up to 1) • Much cheaper as they do not have to pay for transport costs/accommodation for employees • Experts not wasting time travelling • Meetings can be called at short notice without too much planning • Short meetings can be conducted where it would not be feasible for people to travel long distances for such short meetings • Allows staff to attend meeting while out of the country /on holiday • Can give you a better visual image of the product/ skin disease • General facial expressions/ body language can be seen over the telephone	4

<table>
<tr><th>Q</th><th>Section A Mark scheme</th><th>Mark</th></tr>
<tr><td></td><td>
Disadvantages (up to 1)
<table>
<tr><th>Factor</th><th>Possible expansions</th><th>Not to be credited</th></tr>
<tr><td>COST:</td><td>- The cost of <u>specialist/dedicated</u> (videoconferencing) equipment is expensive to buy/install / maintain
- Cost of <u>videoconferencing</u> equipment
- ‘Cost of <u>digital cameras /microphones</u> etc. was expensive’…….. so there is an implied extra cost to the standard system</td><td>Not just ‘cost of equipment.’</td></tr>
<tr><td>QUALITY:</td><td>- Although <u>documents and diagrams in digital form can be passed around, an actual component cannot</u>;
- <u>Cannot feel the quality of materials</u>.
- <u>Physical nuances/body language can be missed</u>.</td><td>Not if given as an advantage</td></tr>
<tr><td>SIGNAL</td><td>- Poor image and sound quality (Must be qualified) e.g. <u>restricted bandwidth/failure of connection/buffering/lag</u>
- Image quality is seldom as you would get with a TV, owing to have to <u>compress and decompress signals over</u> the communication link
- Need for a <u>good/strong/fast internet</u> connection for it to work</td><td>Not just unqualified ‘poor internet or poor broadband signal’</td></tr>
</table>
Do not credit :

problems due to time zones
work life balance
self-conscious

</td><td></td></tr>
</table>

<table>
<tr><th>Q</th><th>Section A Mark scheme</th><th>Mark</th></tr>
<tr><td>8.</td><td>
Award up to 2 marks for the explanation /definition
Award 1 mark per problem (max 4)

A code of conduct is an agreement made by an employee to obey the rules of an organisation and work within specified guidelines as regards the use of ICT.(2)

Credit reference to any 4 Problems from the following areas
NOT passwords Not viruses
<table>
<tr><td>Abusive email/ offensive use of IT</td><td>Abusive emails to colleagues/cyber bullying/ Distribution of material of a sexually or racially offensive nature about the fellow workers</td></tr>
<tr><td>Illicit purposes</td><td>Use of company data for illicit purposes</td></tr>
<tr><td>Blackmailing and fraud</td><td>Accessing confidential data and blackmailing colleagues or customers /Computer fraud by selling to other organisations. e.g. selling details of customers to a rival firm so they can bombard them with junk mail</td></tr>
<tr><td>Copyright</td><td>Violating terms of copyright or software agreements/ a technician trusted to install software on the network might take it home and install it on his own machine by copying software. / The authentication code could be picked up when he goes on the Internet and the software company may block the use of the software by the company.</td></tr>
<tr><td>Private use</td><td>Using company time for personal email /using company printers for personal work; e.g. perhaps running your own small business/ Company time wasting by using the Internet for e.g. shopping/playing games in company time. /Running up telephone bills for own purposes. / Inappropriate use of company mobiles phones e.g. storing personal photos</td></tr>
<tr><td>Leaving computers logged on</td><td>Leaving computers logged on and allowing unauthorised people to access the data leaving computers unattended or in transport</td></tr>
<tr><td>DPA</td><td>Breaking the Data Protection Act by not keeping data secure</td></tr>
<tr><td></td><td></td></tr>
</table>
</td><td>6</td></tr>
</table>

Q	Section A Mark scheme	Mark
9.	**Award up to 2 marks** for the definition **Award up to 6 marks** for the description of the factors Explanation An organised collection of people, procedures and resources (all three) (1) designed to support the decisions of managers. (1) An organised collection of people, procedures and processes (all three) (1) designed to help managers make decisions. (1) **Award 1 mark for factor and 1 mark for extension x3** **Factors which can lead to a poor MIS include the following:** • Inadequate consultation with managers during the analysis/ lack of management involvement in design stage 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 • Lack of management knowledge about computer systems and their capabilities • Poor communications between professionals • Lack of professional standards of software developers Do not give negative of Good factors. If can see which factor it is from then can award extension	8

Q	Section A Mark scheme		Mark
10.	**Award up to 8 marks for the descriptions** **Award 1 mark** for statement of change and **Award 1 mark** for explanation of why worried x4		8
	Redundancy with lost jobs./loss of jobs (1)	Less staff are often needed to do the same amount of work once computers are introduced. New system may replace staff who performed manual processes e.g. filing, etc.	
	Change in work patterns (1) **-SHIFTS / HOURS/NIGHT/24/7**	- Split shifts or change of hours or night work, 24/7. Means that they are not able to work with the same people that they have worked with before/ new hours might not fit in with their family commitments	
	Reduction in status and job satisfaction(1)	Management Information systems means less middle managers are needed so <u>departmental heads may lose power.</u> Data warehousing means all data is stored centrally and is available to all some departments who used to be asked for the information are <u>downgraded in status.</u>	
	Change in internal procedures (1)	- may make staff take <u>on extra responsibilities for no extra money</u>.	
	Retraining/Fear of looking ridiculous (1)	Established staff members may feel their lack of ICT skill and knowledge may make them look incompetent.	
	Changes in location/Organisational structure (1)	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 Breaking down friendship groups.	
	Health risks from working with computers (1)	back problems etc.	

Q	Section A Mark scheme	Mark
11.	**Award Up to two marks** for the description Distributed computing - a series of computers are **networked** together each working on solving the same problem/a problem/one problem (1) sharing same bandwidth **and** (data) processing. (1) Award up to 2 marks for each advantage and each disadvantage Do not accept cost ***Advantages of distributed computing (Max 2)*** • 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 (max 2)*** • issues with the security of data spread out on so many different computers • heavy reliance on networks or communications which may not always be reliable	6

	Section B **Learners will attempt 12,13 and 14 or 15,16,17,18**	
12.	**Award up to two marks per issue discussed** **Award 1 mark for each area and 1 mark for the extension x3**	**3x2**

Factor	**Possible expansions**
What Gathering and analysing different **user** requirements-Understanding how user use the system and what they require it to do Not just first stage understand the problems of the existing system	How Questionnaires, interviews /computer logs etc.
Model the new system/Setting out the solution in a logical way	Using tools and techniques such as data flow diagrams, data models, process specifications and systems diagrams ERD's
Producing a (design)specification Aims of the (new) system	Produce a detailed listing of what the final solution will cover so that user can agree on what is being produced
Design of hardware	Networks configuration/topology, input and output devices needed, storage requirements, speed of processing, compatibility with existing hardware
Design of software programs requirements	Identify processes and decide what programs are needed to perform these processes. Compatibility with existing operating system (Not just software)
Design of databases **Design of processes**	Including data dictionaries/data structures, validation, relational links queries. Calculations, graphs etc.
Design of network and data transmission issues	Including firewalls, proxy servers. Gateways, protocols etc.
Design of documents to be produced (input and output)	Input: forms, switchboards. Output: report formats, house style, invoices, payslips etc.
Design of personnel , procedures and processes,	Codes of conducts, staff training, organisational restructuring, new staff needed
Design of security and legal issues	Registering with the data protection commissioner, security policies, access rights backup procedures/strategies (not just backups), proxy servers etc.
Design of flow of information systems	To allow organisation to capture the required data and extract the required data in the appropriate *form.*

13. **Award up to 3 marks** *per each of the two alternative changeover strategies* 6
1 mark for a brief explanation/example for each strategy
1 mark for the benefit/advantage of the method
1 mark for a drawback/limitation/disadvantage of the method x 2

EXPLANATION /EXAMPLE	ADVANTAGE	DISADVANTAGE
Direct changeover – stop using the old system one day and start using the new system the next day.	Requires fewer resources (people, money, equipment) and is simple, provided nothing goes wrong. fast to implement and minimum duplication of data and effort **Need more than easiest/quickest and not just cheapest**	Element of risk particularly if the hardware and software are cutting edge. If the system fails then it can be disastrous to the business. Backup needs a consequence There will be a period of time where no system is available because can't have old one working while new one is being switched on Have to transfer all of the data to the new one before the old one can be switched off There will be a period of upheaval while the system is brand new and staff are finding their way around it
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.	Used to minimise the risk in introducing a new ICT system. Minor faults can be corrected without too much disruption or risking whole system/ If error in new system then data or transactions is recorded so errors in new system can be corrected without data loss. Can compare results and be sure it is working properly Less stress for staff as they still have the security of the old system /Workers have time to familiarise themselves with the system	lots of unnecessary work (as the work is being done twice) Is therefore expensive in people's time/work/equipment/ Adds to the amount of planning needed in implementation One system can become out of sync. with the other

Cannot give direct opposites as it is simple duplication but can give time in one and work or equipment in the other.

Pilot Operation -:
The pilot operation changeover method involves implementing the complete new system at a selected location/dept. of the company. The old system continues to operate for the entire organisation including the pilot site.

- After the system proves successful at the pilot site, it is implemented in the rest of the organization, usually using direct cutover method.
- Pilot operation is combination of parallel operation and direct cutover methods.
- Pilot site assure the working of new system and *reduces the risk of system failure*.
- This is also *less expensive* than the parallel operation as only at one section both system works for limited period.

Phased Operation -:
Implementation of new system in modules or stages is phased operation. But in this approach the entire system is provided to some users instead a part of system to all users.

- In phase operation the risk of errors or failures is limited to the implemented module only
- phased operation is less expensive than the full parallel operation

Phased operation can cost more than a pilot approach where the system involves a large number of separate phases.

14. **Award up to 2 marks per type of software explained** 6
Accept any three of the following methods: One mark for naming and description (1) and one mark for example(1) x 3
If no name/description, can still award example if sure which maintenance method it refers to

1 mark	1 mark only
Perfective maintenance – 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 – 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- 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)

15.	**Award 1 mark per definition** 1. A primary key is a field that is used to uniquely define a particular record or line/row in a table 2. A foreign key is a field of one table which is also a the primary key of another table	2
16.	**Award up to 7 marks** for the two tables discussed (1 mark for each table name, I for each primary, I for each foreign key) x2 and 1 mark for having 2 extra fields in both tables VAN [Vanid, RegNo, Hire Rate, Model, Colour, ……..] Where Vanid (RegNo could be used instead) is Primary key HIRE [Hireid, Vanid#, Customerid#, Dateof Hire, Length ……..] Where Hireid is a primary key (could use a composite) and Vanid and Customerid are Foreign Keys	7
17.	**Award up to 6 marks** for the advantages and disadvantages **To get full marks candidates need to have at least 2 advantages and 2 disadvantages (i.e. 2/4 , 3/3 or 4/2)** **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 (shops) 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 van hire company's server. **Disadvantages** • More complex and consequently cost more to install and maintain • Increased security risk because files are transferred across the network/multiple branches • If one of the servers fails, then it can have an effect on the database and staff may not be able to access some of the data • The system relies on data communications, so if a communication line fails, then the data may not be able to be accessed • As large numbers of staff access the access the database, there is a chance that you could get inconsistencies in the data	6

18. **Award One mark for the meaning (patterns / trends / generating new information)** 3

Data mining is interrogating the data to find patterns in the data which is stored in the warehouse.

Alternative wording for above might be:

- Is the analysis of a large amount of data in a data warehouse to provide new information?
- 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.

Award Up to two marks for the explanation of the benefits of its use (Need what and why)
Advantage of data mining –

What?	Why?
Answers worth two marks	
Could allow organisation to find a previously unknown relationship between regions of the country and food preferences (1)	And they can then target special promotions. (1)
Fighting shoplifting in clothing stores e.g. Jaeger used DM to look at transactions and position of item in store (1)	– found even with tags most items stolen near doors (1) or – led to increased CCTV, more prosecutions and recovery of goods.(1)
Analyse buying patterns / Identification of customer needs e.g. Virgin Media use DM to segment and target customers (1)	Most likely to buy new services or upgrades. (1)
Answers worth one mark	
The organisation with a list of customers likely to buy a certain product, which they can then use to target with a mail shot.	*No extended 'what' although a similar why to above What is the purpose of the mailshot?* *why are they sending them mailshot- is needed for second mark*
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.	