GCE A LEVEL MARKING SCHEME

SUMMER 2022

A LEVEL
INFORMATION AND COMMUNICATION TECHNOLOGY - UNIT 3
1530U30-1

INTRODUCTION

This marking scheme was used by WJEC for the 2022 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.

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

WJEC GCE A LEVEL INFORMATION AND COMMUNICATION TECHNOLOGY – UNIT 3

SUMMER 2022 MARK SCHEME

<table>
<tr><td>1.</td><td colspan="2">Award a maximum of 2 marks for each factor x3</td><td>3X2</td></tr>
<tr><td></td><td>Layout appropriate to task</td><td>• There should be standard ‘feel’ to software.
• Doing a repetitive task such as entering orders or holiday bookings means you have less guidance on the screen
• Large/minimal text for a child to minimise reading which builds up user confidence / uncluttered appearance/minimal use of keyboard for children
• Bright colour scheme to attract a young child’s attention
• Lots of graphics/images and sound animation and use fun/friendly pictures
• Customised desktops for people such as CAD software.</td><td></td></tr>
<tr><td></td><td>Onscreen help</td><td>• Tool tips telling the user what to do / popups
• Interactive user manual that answers general FAQ / step by step online guide
• Wizards or online tutorials to take you through the task
• Condone: Rather than wasting time looking in manuals, important if no outside help available when working

No marks if can be read as a Google search</td><td></td></tr>
<tr><td></td><td>Disabled Access

(Must state the disability to match the solution)</td><td>• Visually impaired people can have their screens configured using large fonts.
• Magnify areas of the screen for people with poor eyesight.
• Visually impaired people can also use special Braille keyboards to enter the data and can use Braille printers to produce output which other blind people can read.
• Visual messages on screen instead of sound for the deaf.
• Use of correct colour schemes for colour blind people.
• Use large mouse or trackerball for people with poor co-ordination.
• Blow pipes (sip and puff switches) or eye movements for entering text controlling devices for those who cannot use their arms, etc.
• Brainwave controlled devices for physically handicapped with no arm/hand movement.
• Voice recognition software or foot mouse for users who cannot use their hands / blind
• San serif font for dyslexia
• Blind people can have text read to them
• Trackerball / large mouse for those with poor co-ordination</td><td></td></tr>
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2.	**Answers should discuss the following factors of the two networks.** **Any 6 different comparisons but candidates only need to describe one side to get the mark.** **Only give knowledge factors once and NOT cost**	6

Peer to peer	Client server
Status – All machines have same status/rights	One machine more important than the rest
No network manager is needed – all users take responsibility for the network **(Knowledge)**	Need specialist knowledge Need a person with technical knowledge to manage network
Knowledge – Users need more IT knowledge **(Knowledge)**	Network manager allocates access to resources on the network
Easy to set up – they are the simplest of computer networks, can be set up by anyone **(Knowledge)**	Network operating systems require technical knowledge to set up and maintain
No reliance on a server – no worry about the server breaking down	If server breaks down network is unusable
Peer responsibility – users decide what resources others can use on their computer	Users need little specialist knowledge as administration is performed centrally
Security – Poorer security as resources are shared	Security is better as it is centralised and one person's responsibility (NOT just hierarchy of passwords)
Back-ups cannot be made centrally – this places the responsibility on all the users to back up their own data	Backups and software installation can be done centrally
Harder to find files which are not stored centrally	Centrally stored files are easier to find
Network size – Only suitable for very small networks (15 or less)	More efficient / load tolerant for large networks

3	**Award 1 mark per factor up to a max of 6** • 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.**	6

4	**Award up to 8 marks** **Award 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.** **To access 8 marks response must have at least 2 of each.** **Award 3-5 marks** **Candidates briefly describe features or processes, but responses lack clarity. There are a few errors in spelling, punctuation and grammar.** **Award 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.** **Award 0 marks** **No appropriate response.** **Award 1 mark per advantage and 1 mark per disadvantage (For 8 marks must have at least 2 of each)** **Advantages** • Cost efficiency- elimination of investment in standalone software/servers/ save on licensing costs • Convenience and continuous availability – services are available wherever the end user is located/server uptime better • Backup and Recovery – process is simplified as not on a physical local device • Environmentally friendly – takes fewer resources to compute hence saving energy and local machine not on all the time • Resiliency and Redundancy – built on robust architecture and automatic fall-over between hardware platforms • Scalability and Performance – scalability is built in to cloud deployments and customer only pays for what they use instead of having to buy a lot of extra not being used • Increased Storage Capacity – Can store much more data compared to a PC • Device Diversity and Location Independence – can access the data at a variety of devices and from a lot of different locations • Smaller learning curve • Allows for collaborative working **Disadvantages** • Security and Privacy – could argue that a company is giving away private data that might be sensitive and confidential / someone else has control of your data • Dependency – hard to migrate from one provider to another • Technical difficulties and Downtime – If something goes wrong it is out of the user's control • Increased vulnerability – exposed on the <u>public internet</u> / many access points **(NOT just hacking.** • Increasing cost of storage • More complex systems administration of data and services • Need for a fast reliable broadband / if internet goes down cannot work	8

5.	**Award 1 mark per advantage and 1 mark per disadvantage (For 6 marks must have at least 2 of each)** **Advantages of EDI** **Automated Data entry** Data is entered automatically by EDI software. For instance, when purchase order (PO) from one company is received by another company. Sales order (SO) is automatically generated at other company's system with the help of EDI software. **Receipt verification** Receipt verification can easily be done with help of EDI software. No human intervention is involved so there are minimal chances of error or delay. **Data Validation** Data validation is automatically done. **Availability of free software** Free software is (PDF) available depending upon the EDI format chosen. **Low cost** Lower administrative, resource and maintenance cost. Building long-term relationships EDI helps in building long term relationships with trading partners and hence helps in business growth. **Speed:** The electronic transfer of data ensures more consistency and accuracy without sacrificing pace/ immediate transmission of shipping notices. **Service** Faster processing means better customer service, over all; helping a company expand their customer base; improves relationship with customer as kept better informed **Environmental Issues** Less use of paper/ink etc **Disadvantages of EDI** **Expensive** Setup and maintenance of some of the formats of EDI is expensive. **Initial setup is time consuming** Initial cost to setup EDI is time consuming. **EDI standard changes** The business process depends on EDI standard format. If any of the standard format changes then the business process has to be changed accordingly. **System electronic protection** An EDI system needs electronic protection from viruses, hacking, malware and other frauds.	6

	Staff training cost. Staff needs training in order to run EDI enabled software. **Proper backups should be maintained** as the whole data depends on EDI. In case of any crash of EDI system, proper backup has to be maintained and extra cost is required for it. **Limits your trading partners**. Some organization stops doing business which don't use EDI. **Do nor credit the opposites twice e.g. cost, unless point is very clear and different and well argued**	

6.	**1 mark for each factor and one for each further explanation x 3** **Context must relate to a company or be neutral** **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 sell mortgages, loans etc. / embarrassment/ prosecution / loss of integrity / bankruptcy / cost of replacing equipment / alternative premises / loss of reputation **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 do not credit responses that relate to Health & Safety**	3x2

7.	**1 mark per positive or negative to a maximum of 6 (Must have 1 of each for full marks)**	6

POSITIVES	
Improved crime/criminal detection	• Known terrorists can be prevented from entering country by matching travellers images with those on a terrorist database**.** • When people know they are being watched, they are less likely to commit crimes so the possibility of facial recognition technology being used could deter crime. • business owners are installing facial-recognition systems to watch people and identify subjects of interest when they come in their stores. • Helps track a known criminal
Speed of processing e.g. passengers at passport control	• Since there is no contact required for facial recognition like there is with fingerprinting or other security measures, facial recognition offers a quick, automatic, and seamless verification experience. • Faster than typing your pin/ password on your mobile phone
Increased private security	• There is nothing such as a key or I.D. that can be lost or stolen. • Unique facial tags • Protects access to your mobile phone
Convenience	• Facial recognition can add conveniences. In addition to helping you tag photos in Facebook or your cloud storage via Apple and Google, you will start to be able to check-out at stores without pulling out money or credit cards—your face will be scanned. • Cannot forget it like a password
Fraud Prevention	• Although possible, it's hard to fool facial recognition technology so it can also help prevent fraud.
Entertainment	• Facial recognition and augmented reality on mobile phones are a popular pastime

NEGATIVES	
Security of private data	• Keeping an individual's private data on a database and the security of that database. e.g database containing facial scans used by banks, police forces, and defence firms where breached.
Threat to an individual's privacy.	• Our right to privacy vs public good. • Several cities have considered or will ban real-time facial recognition surveillance use by law enforcement. These cities determined the risks of using the technology outweighed the benefits. Police can still use footage from personally owned devices such as Nest cameras to find criminals; it's just not allowing the government entities to use live facial recognition software. • Want to know what is done with the data
Accuracy	• The technology isn't as effective at identifying people of colour and women as it is white males. One reason for this is the data set the algorithms are trained on is not as robust for people of colour and women. Until this is rectified, there are concerns about the ramifications for misidentifying people with the technology.
Covering up	• How to deal with individuals who cover up to hide their identity from cameras.
Camera angle	• Issues relating to people who quickly change appearance or the camera angle isn't quite right (although they are working on being able to identify a person by only their earlobe). Or the image is blurred. • It's dramatically improving; got 20 times better at finding a match according to U.S. National Institute of Standards and Technology (NIST) facial recognition systems

8.	**Award 1 mark for the factor and 1 mark for an extension x3** | Factor	Extension/Example | |---|---| | Definition of the scope of the present system | Organisational chart e.g. ERD diagram Define sources of data Methods of data capture | | Major data processing functions and processes | High level (contextual view) data flow | | Identification of problems with the present system | This could be done through observation, interviews, inspection of records and questionnaires. Operational issues. | | Identify user requirements for the new system | What will be the scope of the project? Will it need to be just in one area or over the whole organisation? (one part v the whole system) Any constraints or an individual example | | Analysis of costs and benefits of the new system | What advantages will the organisation gain and will these outweigh what they have to spend. Evaluation of costs e.g. human, licences etc. |	6

9.	**Remote management is to do with stations not users** **Award one mark each of any six points:** • Check to see right number of licences. • Setting regular times for virus scanning/ check virus scanning has been done. • Check to see no unauthorised software loaded on machines. • Update software/rebuild software on stations / re-setup stations / re-install software. • Install new items of software centrally. • Send instant messages such as warnings related to the stations. • Guide users through problems with station. • Take control of stations. • Check on hardware to see what needs upgrading / updating. • Check on components to see if any failing. • Clearing printer queues at the station. **Do NOT credit - manage passwords / delete files / other tasks normally done at the server OR Monitoring users/access NOT logging off users / shutting down stations**	6

10.	**Award 1 mark per advantage up to a max of 4 and 1 mark per disadvantage up to a max of 4** **Advantages** • Teleworking makes it easier for people to live and work where they choose, as it is possible for (some staff to work from home) (less stressful) • It reduces traffic congestion and carbon dioxide emissions and is therefore 'greener' / this has an environmental benefit since there is no commuting to work • Not having to travel to work saves time/money • Flexibility of working hours / Work your own hours / Fit around family commitments / No need to take time off to see workmen • Ideal (empowers) for disabled • More relaxed hence more productive **Disadvantages** • Home costs such as heating, lighting increase. • Employee may feel isolated. / loss of social interaction at work • Some employers may pay teleworkers less as there is more competition for jobs. • No workmates to go out with /socialise. • Boundary between home and work is lost. • Loss of status for some staff – no plush offices, etc. • May not be a quiet place in the house to work/ can get distracted • Passed over for promotion. Credit any other relevant response	8

11.	**Award up to 8 marks for the descriptions** **Award 1 mark** for statement of change and **Award 1 mark** for explanation of fears workers may have x4 **Indicative content**	4x2

Statement	Explanation
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.
Health risks from working with computers (1)	back problems etc.
Reduction in status and job satisfaction (1)	Management Information systems may mean 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. De-skilling the work force / changing of role-reducing the complexity
Retraining needs /Fear of not having correct skills (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.
Condone: **Change in internal procedures (1)**	may make staff take on extra responsibilities for no extra money.
Condone: **Change in work patterns (1)** **-SHIFTS / HOURS/NIGHT/24/7**	Due to automation – Split shifts or change of hours or night work, 24/7. Means that they may not able to work with the same people that they have worked with before/ new hours might not fit in with their family commitments. Breakdown of social groups.

	Section B Either 12 to 14	
12.	**Award 1 mark for process 1 mark for example x2 maximum 4 marks** **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.	2x2

13.	**Award 1 mark per procedure and award a second mark for relevant example x4 (max 8 marks)**	4x2

Routines for distributing updated virus information and virus scanning procedures	Ensuring virus signatures are updated daily and distributed around the network when a station logs in. Establish firewalls/ proxy-servers
Define procedures for downloading from the Internet, use of removable media, personal backup procedures	How often done, have they got to use special machines, etc encryption of data / memory stick
Establish security rights for updating web pages	Who/what /when
Establish a disaster recovery programme	Who does what and when, including checking the standby equipment. Backup plans, i.e. how often **NOT RISKS ANALYSIS**
Set up auditing procedures (Audit trails) to detect misuse	Who/what /when Contiguous investigation of irregularities Query any transaction out of the ordinary
Logon on procedures / Creating User id's and passwords / set up user accounts (expansion would be to do with rules for passwords)	Allocating access rights, etc Change regularly Don't write it down Use upper and lower case mix, etc
Call back procedures for remote access	Who/what/when or why
Establish procedures for training staff	Who/what/when or why

Accept any reasonable example or expansion such as who or what or when or how.

Note:
This topic is about establishing procedures.
The question is all about the administrative procedures that organisations can put in place to minimise or prevent the threats, which is why we expect answers about updating virus checkers, etc, **NOT** running virus checks.
NOT making sure backups are made, kept offsite, in fireproof boxes, etc, - It is about planning a backup strategy to avoid future problems.
NOT establishing a code of conduct or screening potential employees

14.	**Award (Item 1 mark and problem 1 mark) x3** **NB candidates can mix and match the problem answers but do not award duplicates but if no example cannot award problem.**	3x2

Example	Problem
Responsibilities of the employee to abide by company rules	Don't take laptops on trains and lose them/play games in company time/ personal use of email/misuse of company printers/misuse of company mobile phones Logging off workstation
Respecting rights of others	No cyberbullying or abusive emails
Abiding by current legislation	e.g. Data Protection Act, Equal Opportunities Act, Computer Misuse Act, Copyright Act etc. – *don't sell confidential information about customers on to rivals*
Authorisation and permissions on data access:	What the employee can and can't do to data
Protecting hardware and software from malicious damage	By logging off workstation and locking doors/ not downloading viruses
Complying with licensing agreements	Don't copy software onto home computers/ keep to correct No of copies

Credit any other relevant response

	Or – Questions 15-17	
15.	**Award 1 mark per table name (max 2)** **Award 1 mark per foreign key (max 2). Award 1 mark per primary key (max 2)** Example of possible tables CUSTOMER (Customerid, surname, phone, email etc) HIRE (Hireid, Customerid#, Cottageid#, DateArrive, DateLeave) **Underline = primary, # = foreign** If Cottageid is duplicated then no mark for that key. **NB No mark for a primary or foreign key which is not labelled**	6

16.	**Award 1 mark for a description of any three of the following** **Award a second mark for example/extension x3** **Consistency** - Data consistency is the relationship between the input data, the processed data and the output data as well as other related data. (1) If the system is working properly the data will be correct at each stage and is said to be consistent. (1) 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. (1) 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. (1) OR Data being inconsistent in a flat file due to possibility of different formats etc (1) and being consistent in a RDBMS as each record is only stored once so cannot have different attributes (1) **Independence** Data independence – the data and the applications/programs used to access it are independent/separate. (1) New applications can be developed to access the data without changing the data / New systems can still use existing data. (1) **Integrity** This is the correctness of the data i.e. the extent to which it represents the original real information (1) Since each data item is held only once there is no danger of an item being updated on one system and not on another (1). All users have access to the latest up to data information. (1) OR Data integrity is imposed within a database at its design stage through the use of standard rules and procedures, and is maintained through the use of validation. (1) accuracy. **Credit any other relevant response**	3x2

17.	**Award up to 2 marks per description** **Award 1 mark for area and 1 for example / exemplification up to a maximum of 3** **Indicative content** • **Data warehousing and data mining (1).** For example, in the US, Walmart found that when there was a hurricane warning it sold more strawberry Pop-Tarts. In 2012, a company called Target could tell with a high degree of accuracy, based on the products that were being bought that a customer was pregnant. (1) • **Detecting and preventing fraud (1).** For example, a personal injury claim could potentially include fake medical claims or a staged accident. Companies have seen an increase in sophisticated crime rings to perpetrate auto insurance or medical fraud. These rings may have similar methods of operation that are enacted in different regions of the country or using different aliases for the claimants. Big data analysis can quickly look for patterns in historical claims and identify similarities or bring up questions in a new claim before the process gets too far along. • **Marketing campaigns (1).** Most big companies are already using big data heavily to influence their decisions and improve advertising targeting based on what customers have looked at, their interests, location etc. The more data that can be collected the more accurately you can profile. (1) • **Combining big data with predictive analysis (1)**. This use case help sales and marketers find valuable prospects earlier in the sales cycle, uncover new marketers, prioritize existing accounts for expansion, and power account-based marketing (ABM) initiatives by bringing to the surface accounts that can reasonably be expected to be more receptive to sales and marketing messages. Retailers often use predictive models to forecast inventory requirements, manage shipping schedules and configure store layouts to maximize sales. Airlines frequently use predictive analytics to set ticket prices reflecting past travel trends. Hotels, restaurants and other hospitality industry players can use the technology to forecast the number of guests on any given night in order to maximize occupancy and revenue. **Credit any other relevant response**	6