GCSE MARKING SCHEME

SUMMER 2023

GCSE
DIGITAL TECHNOLOGY – UNIT 1
3540U10-1

INTRODUCTION

This marking scheme was used by WJEC for the 2023 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 GCSE DIGITAL TECHNOLOGY

SUMMER 2023 MARK SCHEME

It should be remembered that candidates are writing under examination conditions and credit should be given for what the candidate writes, rather than adopting the approach of penalising him/her for any omissions. It should be possible for a very good response to achieve full marks and a very poor one to achieve zero marks. Marks should not be deducted for a less than perfect answer if it satisfies the criteria of the mark scheme.

For questions that are objective or points-based, the mark scheme should be applied precisely. Marks should be awarded as indicated and no further subdivision made.

Mark schemes often list points which may be included in candidates' answers. The list is not exhaustive. The inclusion of *'Credit any other valid response.*' (or similar instruction) within mark schemes allows for the possible variation in candidates' responses. Credit should be given according to the accuracy and relevance of candidates' answers.

Appropriate terminology is reflected in exemplar responses in mark schemes. However, unless there is a specific requirement within a question, candidates may be awarded marks where the answer is accurate but expressed in their own words.

Banded mark schemes

For band marked questions, mark schemes are in two parts, the indicative content and the assessment grid.

The indicative content suggests the range of points and issues which may be included in candidates' answers. It can be used to assess the quality of the candidate's response. As noted above, indicative content is not intended to be exhaustive and candidates do not have to include all the indicative content to reach the highest level of the mark scheme.

However, in order to reach the highest level of the mark scheme a candidate must meet the requirements of the highest mark band. Where a response is not creditworthy, that is, it contains nothing of any significance to the mark scheme, or where no response has been provided, no marks should be awarded.

In GCSE Digital Technology, each question will address one assessment objective: from AO1 and AO2. For each assessment objective, descriptors will indicate the different skills and qualities at the appropriate level.

Candidates' responses to questions are assessed against the relevant assessment objectives.

The marking of banded mark questions should always be positive. This means that, for each candidate's response, marks are accumulated for the demonstration of relevant skills, knowledge and understanding; they are not deducted from a maximum on the basis of errors or omissions.

Examiners should first read and annotate the candidate's answer to pick out the evidence that is being assessed in that question. The mark scheme can then be applied. This is done as a two stage process.

Stage 1 – Deciding on the band

Beginning at the lowest band, examiners should look at the candidate's answer and check whether it matches the descriptors for that band. If the descriptors at the lowest band are satisfied, examiners should move up to the next band and repeat this process for each band until the descriptors match the answer.

If an answer covers different aspects of different bands within the mark scheme, a ‘best fit’ approach should be adopted to decide on the band and then the candidate's response should be used to decide on the mark within the band. For instance, if a response is mainly in band 2 but with a limited amount of band 3 content, the answer would be placed in band 2, but the mark awarded would be close to the top of band 2 as a result of the band 3 content.

Examiners should not seek to mark candidates down as a result of small omissions in minor areas of an answer.

Stage 2 – Deciding on the mark

During standardising (the marking conference), detailed advice from the Principal Examiner on the qualities of each mark band will be given. Examiners will then receive examples of answers in each mark band that have been awarded a mark by the Principal Examiner. Examiners should mark the examples and compare their marks with those of the Principal Examiner.

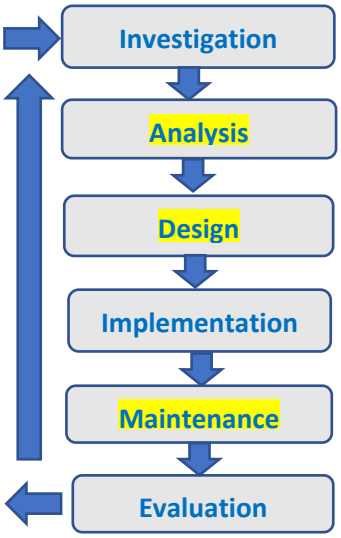
When marking, examiners can use these examples to decide whether a candidate's response is of a superior, inferior or comparable standard to the example. Examiners are reminded of the need to revisit the answer as they apply the mark scheme, in order to confirm that the band and the mark allocated is appropriate to the response provided.

<table>
<tr><th colspan="2">Question</th><th>Answer</th><th>AO1</th><th>AO2</th><th>Total Mark</th></tr>
<tr><td>1.</td><td colspan="2">Analogue and digital are two main types of data.</td><td></td><td></td><td></td></tr>
<tr><td></td><td>(a)</td><td>Tick (✓) the correct boxes to show whether the following devices are analogue or digital.</td><td>3</td><td></td><td>3</td></tr>
<tr><td></td><td></td><td>Award one mark for each correct tick:

<table><tr><th>Device</th><th>Analogue</th><th>Digital</th></tr><tr><td>Electric guitar</td><td>✓</td><td></td></tr><tr><td>Tablet</td><td></td><td>✓</td></tr><tr><td>Smart watch</td><td></td><td>✓</td></tr></table></td><td>1
1
1</td><td></td><td></td></tr>
<tr><td></td><td>(b) (i)</td><td>State what is meant by analogue data</td><td>1</td><td></td><td>1</td></tr>
<tr><td></td><td></td><td>• analogue data is graphically displayed as a wave / continuous
• data represented in a physical way</td><td></td><td></td><td></td></tr>
<tr><td></td><td>(ii)</td><td>State what is meant by digital data</td><td>1</td><td></td><td>1</td></tr>
<tr><td></td><td></td><td>• digital data is ones and zeros / discrete / binary
• data that is recorded on a computer</td><td></td><td></td><td></td></tr>
<tr><td></td><td>(iii)</td><td>Describe the steps of converting an analogue signal to digital data</td><td>3</td><td></td><td>3</td></tr>
<tr><td></td><td></td><td>• Sampling takes place
• A numeric value is assigned
• Which is stored as binary data</td><td></td><td></td><td></td></tr>
<tr><td></td><td>(c)</td><td>Complete the following table.</td><td>3</td><td></td><td>3</td></tr>
<tr><td></td><td></td><td>Award one mark for each correct answer:

<table><tr><th>Measure</th><th>Name</th></tr><tr><td>1 or a 0</td><td>Bit</td></tr><tr><td>8 bits</td><td>Byte</td></tr><tr><td>1024 bytes</td><td>1 Kilobyte</td></tr></table></td><td>1
1
1</td><td></td><td></td></tr>
</table>

Question		Answer	AO1	AO2	Total Mark
2.	*There are many different software types, functions and backup methods.*				
	(a)	*Describe the difference between bespoke software and applications software.*	2		2
		• Applications software is off the shelf software e.g. word processing software. • Bespoke software is (custom) written for specific purposes / written to perform a task for an individual or a company e.g. stock control system.	1 1		
	(b)	*Give four functions of anti-virus software*	4		4
		• Schedule virus / malware scans to scan the hard drive / computer system • Perform manual virus / malware scans of the disk • Browser extensions to alert of privacy issues such as dangerous websites • Monitor network traffic to and from the computer • Checking all outgoing and incoming emails and attachments • Instant messaging protection • Checking all files downloaded by the user • Warns user of any suspicious files • Pop up blocking • Identity theft protection • Produces a report of known issues • Can quarantine viruses that are found • Gives the user the option to delete viruses that have been quarantined • Maintain an up to date database of all known viruses • Heuristic scanning methods that identify unclassified viruses based on virus like behaviour Credit any other valid response.			
	(c)	*Describe the Grandfather – Father – Son (GFS) backup method.*	3		3
		Award up to **three** marks for a detailed explanation of the method, for example: A full machine backup is performed monthly (Grandfather) and held offsite. A full backup is done on a weekly basis (Father) and held locally. A daily differential backup (Son) is done based on the weekly (Father) backup. Credit any other valid response that refers to a generational backup.	 1 1 1		

Question		Answer	AO1	AO2	Total Mark
3.	*A systems analyst follows the Systems Development Life Cycle when creating a new system.*				
	(a)	*Complete the gaps in the following Systems Development Life Cycle diagram.*		3	3
		Award **one** mark for each correct answer up to a maximum of **three** marks:  	1 1 1		
	(b)	*Give **three** factors that an **Investigation Stage** feasibilty report would contain.*	3		3
		Award **one** mark for each brief description up to a maximum of **three** marks, for example: • The definition of scope of the current system. • The existing hardware and software. • Problems with the existing system. • Observation / Questionnaires / Interviews • User requirements for the new system. • The cost and benefits of introducing a new system. Credit any other valid response.	1 1 1 1 1 1		

Question	Answer	AO1	AO2	Total Mark
4.	*Describe key contributions in digital technology made by Sir Tim Berners-Lee and Lady Ada Lovelace.*	4		4
	Award **one** mark for a basic description, for example: • Lady Ada Lovelace – the first computer programmer. • Sir Tim Berners-Lee – invented the World Wide Web (WWW). Award **two** marks for a more developed description, for example: • Lovelace was the first recognised computer programmer and also the first to realise computers could do more than just calculate numbers. • Also thought to have the first published algorithm ever made for implementation on a computer. • Sir Tim Berners-Lee invented the WWW and he also made the world's first web browser and web server. Credit any other valid response.			

Question		Answer	AO1	AO2	Total Mark
5.	*Tomas is using the Internet to complete a school project.*				
	(a)	*Not all information on the Internet is accurate. Explain **two** issues with Tomas using online sources for a school project.*		4	4
		Award **one** mark for a brief explanation, for example: • Biased information. • Out of date information • Facts and statistics can change on a daily basis Award **two marks** for a more detailed explanation, for example: • Wikipedia being updated by someone who does not know all of the facts or deliberately updating a wiki page with incorrect information. • Biased information – one sided views. For example the loser of a World War creating a web site all about the dynamics of the war. • Is the information on the online source opinion or fact? • Out of date information – some information could have been posted a while ago. Out of date surveys. Sites such as Wikipedia not being updated regularly. • The facts on a website may have been correct when the website was published but if it hasn't been updated regularly, will be out of date. Credit any other valid response.			
	(b)	*Explain **two** methods that Tomas can use to verify the information that is found online.*		4	4
		Award marks for a detailed explanation of the following points: **One mark example:** • Checking multiple sources to confirm information found online. • Tomas should only use trustworthy, impartial sites to avoid bias. • Checking the dates of information that has been published. • Ignore points on revision websites that are opinion and not facts. • Reliability of author.			

Question		Answer	AO1	AO2	Total Mark
		Two marks example: • Checking multiple sources to confirm information found online. For example – if one website states a fact, Tomas can check at least one other site to see that the facts are the same and will therefore be reliable. • Tomas should only use trustworthy, impartial sites to avoid bias. For example the BBC website will be accurate, unbiased and up to date. • Checking the dates of information that has been published. If information is outdated or say published five years ago – it may mean it is not relevant anymore. • Ignore points on revision websites that are opinion and not facts. Opinions are biased and therefore should not be used. • Reliability of author – for example an untrustworthy author should not be used. A wiki for example cannot be trusted as anyone can update a site such as Wikipedia. Credit any other valid response.			

Question		Answer	AO1	AO2	Total Mark
6.	*New digital systems can be implemented in many different ways.*				
	(a)	*Describe how the 'big bang' method of implementing a new digital system would work.*	2		2
		Award **one** mark for a basic response, for example: The new system starts immediately. Award **two** marks for a more detailed description, for example: This is where the company stops using the old system and begins to use the new digital system immediately. The new system will go live and all employees will begin to use the new system, on the same day at the same time. The old system is turned off and the new system is immediately used. Credit any other valid response.			
	(b)	*A school is going to implement a cashless system for lunches.* *Identify two advantages and two disadvantages of implementing this system using the 'big bang' method.*		4	4
		Award **one** mark for each identified advantage or disadvantage: **Advantages** • Cost effective due to all of the system being changed on the same day • One set of installation / maintenance costs for implementation. • Shorter implementation time compared to other methods. **Disadvantages** • Temporary lack of productivity due to staff trying to learn the new system and remember their training. • No fall back system if the new system sees problems. • Reverting to the old system would be extremely time consuming and costly should a problem occur. • Full testing is difficult before implementation. • High risk. Credit any other valid response.			

Question	Answer	AO1	AO2	Total Mark
7.	*A large pharmacy in North Wales is piloting the use of autonomous drones to deliver prescription medicines to patients. Explain, giving examples, the advantages and disadvantages of using autonomous drones to deliver medicines.*		8	8
	Indicative content • Patients will receive their medicines faster than other methods • Drones can deliver medicines to remote areas. They avoid traffic to ensure a speedy delivery. • Improved accuracy - a higher success rate of delivery – avoids human error. • Safer during times of self-isolation – avoids human to human contact. • A data protection / security / privacy risk whereby cameras fitted to the drone to film successful delivery of the medicines that would be streamed back to headquarters could pick up images of people and properties not linked to the medicine ordered. • Delivery drones are expensive devices and would require a large capital to invest in the drones. • Battery defects – could be a matter of life or death if the battery ran out. • Could lead to patients being left without their medicine if there is an issue with the drone dropping the prescription medicine by accidentally releasing the medicine. • Risk of patients stealing the drones as they land and release the medicine. This would be extremely costly to the health care system. • Potential job losses or job opportunities due to driving jobs becoming obsolete. • Damage to property could also occur when the drones land at patient's houses. • Lack of human to human contact could lead to isolation of vulnerable people. • Environmentally friendlier • Access for disabled people Credit any other valid response.			

Band	AO2
3	**6-8 marks** A very good explanation, which shows: • thorough knowledge and understanding of what an autonomous drone is. • a confident grasp of the positive and negative impacts that autonomous drones delivering prescription medicine would have on the health care system.
2	**3-5 marks** A good explanation, which shows: • generally secure knowledge and understanding of what an autonomous drone is. • a generally secure grasp of the positive and negative impacts that autonomous drones delivering prescription medicine would have on the health care system.
1	**1-2 marks** A basic explanation, which shows: • some knowledge and understanding of what an autonomous drone is. • some grasp of the positive and negative impacts that autonomous drones delivering prescription medicine would have on the health care system.
	0 marks Response not creditworthy or not attempted.

Question		Answer	AO1	AO2	Total Mark
8.	*Businesses can target new and existing customers using a variety of methods in today's digital world.*				
	(a)	*Identify how email can be used by businesses to promote and market their products and services.*	4		4
		Award **one** mark for each correct answer. • Businesses can send special offers to existing and potential customers. • Businesses can send out discount codes. • Businesses can send out new products arriving soon via email. • Businesses can send out sales information via email. • Businesses can send out information on products similar to previously purchased items. • Mass send emails to a list of people • Can be used to personalise communications • Allows for automation Credit any other valid response.			
	(b)	*Explain the different ways in which social media can be used to promote products and attract new custom for a business.*	6		6
		Indicative content: • Businesses can use targeted advertising by tracking a customer's activity on the Internet • Online targeted advertising focuses on interests and preferences of the customer. If a customer searches for a particular artist – targeted advertising can offer t-shirts and other merchandise for the artist. • Social media uses targeted advertising by using data entered to create the profile such as gender, age group and the area the customer lives in. • The adverts can send numerous targeted adverts based on profile details. • Instagram uses celebrities to promote products with social media influencers and celebrities promoting new products in their posts. • YouTube uses popular influencers to promote products such as gaming influencers playing a new game which encourages people to want to purchase the game. • Businesses who use social media can start a competition to gain new followers and promote products by hosting "Retweet and Follow" style competitions whereby the user will retweet the competition post and follow with the chance to win the product. • Focusing marketing towards age-appropriate social media apps. Credit any other valid response.			

Band	AO1
3	**5-6 marks** A very good explanation, which shows: • thorough knowledge and understanding and a confident grasp of how social media can be used to promote products and attract new custom for a business.
2	**3-4 marks** A good explanation, which shows: • generally secure knowledge and understanding and a generally secure grasp of how social media can be used to promote products and attract new custom for a business.
1	**1-2 marks** A basic explanation, which shows: • some knowledge and understanding and some grasp of how social media can be used to promote products and attract new custom for a business.
	0 marks Response not creditworthy or not attempted.

Question		Answer	AO1	AO2	Total Mark
9.	*Parkwood Vale Insurance Group monitors its employees' internet activity.*				
	(a) (i)	*Describe, giving an example, what is meant by an active digital footprint.*	2		2
		• An active digital footprint is data intentionally submitted online via blogs, apps, websites and social media actions. Examples include: • Posting on Twitter, Facebook, Snapchat and other social media platforms. • Buying products or services online. • Agreeing to install / accept cookies when browsing the Internet. • Completing online forms. • Contributing to online forums and discussions.			
	(ii)	*Describe, giving an example, what is meant by a passive digital footprint.*	2		2
		• A passive digital footprint is data collected without a user's knowledge. Examples include: • The user's information being stored on a database including their personal information and IP address. • Apps and websites using a user's geolocation. • Social media likes, shares and comments. • A user's search history. Credit any other valid response.			
	(b)	*Describe how Parkwood Vale Insurance Group may monitor an employee's online activity and the potential impact this might have on the employee.*		4	4
		Employers monitoring a social media page. • Employers can monitor their employees' social media pages to see posts that have been written and any inappropriate photos that have been uploaded – could lead to a warning. • Employers can search history of work devices could lead to a disciplinary for breaking company rules • Employers could look up a potential new candidate's social media sites and it could deter them when choosing a new candidate. • Employees using the work network to search for and download illegal content could lead to a criminal offence and dismissal of the employee • Employers accessing employees internet history when a work device is used at home – could lead to a disciplinary if it was used for non-work purposes. Credit any other valid response.			

Question	Answer	AO1	AO2	Total Mark
10.	*You have been appointed as the Security Manager for the Parkwood Vale Finance company and have been asked to look at threats to data.* *Explain the various threats to data stored on the company's digital systems, including:* • *How data can be at risk from accidental corruption or deletion* • *How data can be at risk from malicious and deliberate damage* • *Security measures that can protect networks, digital systems, transmitted and stored data. [QWC]*		10	10
	Indicative content: **Accidental destruction:** • Accidentally overwriting a file or deleting a folder causing data loss. This could be due to lack of staff training. • Leaving a laptop on a train would lead to loss of hardware and potentially loss of data. • Natural disasters including flooding, earthquakes and fire. This could lead to loss of data. **Malicious and deliberate damage:** • A disgruntled employee deleting data on purpose. • An employee deliberately planting a virus onto the system that could attach itself to other computer programs with the intent to delete or damage data held on the system. • Malware – to deliberately sabotage or delete data. • Phishing – if an employee received what looked to be a genuine email and handed out usernames and passwords or other confidential data, this could lead to data loss. • Social engineering – the psychological manipulation of people into revealing personal or confidential data / information. • Brute force attacks – repeatedly trying combinations of characters in usernames and passwords in order to gain access to data on a computer system. • Denial of service attacks. • Data interception and theft / hacking **Security measures that can protect networks, digital systems, transmitted and stored data:** • Encryption – either encoding data symmetrically or asymmetrically in order to prevent access to the data / information. • Firewalls – network security system that monitors incoming and outgoing traffic based on pre-determined rules. • Anti-virus software / spyware / ransomware abd malicious website detection software – to protect these threats from entering the businesses systems. • Hierarchical access levels – ensuring that employees have access to certain and necessary parts of the system depending on their role. • Backups and archives. Credit any other valid response.			

Band	AO2
4	**9-10 marks** An excellent explanation, which shows: • Thorough knowledge and understanding of the range of threats to data. • An excellent description of the security methods used to protect the data that the company could put in place. • Writing is very well structured and organised, using accurate grammar, punctuation and spelling. • A range of specialist terminology is used with accuracy.
3	**6-8 marks** A good explanation, which shows: • Generally secure knowledge and understanding of the range of threats to data. • A good description of the security methods used to protect the data that the company could put in place. • Writing is generally well structured and organised, using mainly accurate grammar, punctuation and spelling. • Specialist terminology is used with accuracy.
2	**3-5 marks** A basic explanation, which shows: • Some knowledge and understanding of the range of threats to data. • A basic description of the security methods used to protect the data that the company could put in place. • Writing shows some evidence of structure though some errors in grammar, punctuation and spelling affect meaning. • Basic use of specialist terminology.
1	**1-2 marks** A limited explanation, which shows: • Limited knowledge and understanding of the range of threats to data. • A limited description of the security methods used to protect the data that the company could put in place. • Writing shows little evidence of structure though some errors in grammar, punctuation and spelling affect meaning. • Limited use of specialist terminology.
	0 marks Response not creditworthy or not attempted.

Mapping of questions to specification content and assessment objectives

Unit 1

Question		Specification content (main focus)							Mark allocation		
		Section						Part	Total Marks	AO1 Marks	AO2 Marks
		2.1.1	2.1.2	2.1.3	2.1.4	2.1.5	2.1.6				
1	(a)	5						(x)		5	
	(b)	4								4	
	(c)	3								3	
2	(a)		2							2	
	(b)		3							3	
	(c)		4							4	
3	(a)		3								3
	(b)		4								4
4							4			4	
5	(a)			4							4
	(b)			4							4
6	(a)				2					2	
	(b)				4					4	
7							7				7
8	(a)				3					3	
	(b)				6					6	
9	(a)					4					4
	(b)					4					4
10						10					10
Total marks		12	16	8	15	18	11			**40**	**40**