



GCE AS MARKING SCHEME

SUMMER 2025

**AS
DIGITAL TECHNOLOGY - UNIT 1
2540U10-1**

About this marking scheme

The purpose of this marking scheme is to provide teachers, learners, and other interested parties, with an understanding of the assessment criteria used to assess this specific assessment.

This marking scheme reflects the criteria by which this assessment was marked in a live series and was finalised following detailed discussion at an examiners' conference. A team of qualified examiners were trained specifically in the application of this marking scheme. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners. It may not be possible, or appropriate, to capture every variation that a candidate may present in their responses within this marking scheme. However, during the training conference, examiners were guided in using their professional judgement to credit alternative valid responses as instructed by the document, and through reviewing exemplar responses.

Without the benefit of participation in the examiners' conference, teachers, learners and other users, may have different views on certain matters of detail or interpretation. Therefore, it is strongly recommended that this marking scheme is used alongside other guidance, such as published exemplar materials or Guidance for Teaching. This marking scheme is final and will not be changed, unless in the event that a clear error is identified, as it reflects the criteria used to assess candidate responses during the live series.

WJEC GCE AS DIGITAL TECHNOLOGY – UNIT 1

INNOVATION IN DIGITAL TECHNOLOGY

SUMMER 2025 MARK SCHEME

Question		Answer	AO1	AO2	Total
1	(a)	<i>Define the term protocol and give one reason why protocols are needed.</i> Protocol are set of rules. Protocols enable computers to communicate with one another.	2		2
	(b)	<i>Describe the TCP/IP protocol</i> TCP (Transmission Control Protocol) – A means of putting datagrams together. – Establishes a reliable connection using a three-way handshake. – Ensures data is delivered in order and without errors. – Retransmits lost packets and detects duplicates. – Controls flow to avoid overwhelming the receiver. NOT establish a secure connection. IP (Internet Protocol) – a means of addressing and routing data packets across a network.	2		2

Question		Answer	AO1	AO2	Total																		
2	(a)	<i>Describe the positive and negative impacts of social media use by individuals.</i> Indicative content Positive impacts • Social networking sites allow people to communicate and remain in contact with friends as well as meet new people. • Used to discuss educational topics. • Allows individuals to find information from organisations. • Is highly mobile and can be accessed through the use of various devices • Career networking • Access information • Community building • Awareness and advocacy • Entertainment and leisure • Mental health support • Cultural exchange • Economic opportunities Negative impacts • Reduces the amount of face-to-face socialising and replaces it with online interaction which is believed to result in low quality relationships with other people. • Cyberbullying can occur, which is where people are bullied online in a public way, the result of which has had serious consequences in the past including suicide and depression. • Identity theft can also occur, which is when a cybercriminal uses the network to gather personal information posted about people. • Oversharing information in the public domain can harm someone's future job prospects.	6		6																		
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	(b)	<i>Describe how organisations use social media platforms to interact with their customers.</i> Indicative content Marketing and Promotion – Product launching – Special offers – Content marketing Customer Service – Real time support – FAQs and How-to guides – Feedback – Updates and announcements – Apologies and remedies Brand building – Community building – Transparency – Creating a “voice” for the brand – Ryanair for example Collaboration and Partnerships – Influencers – Cross promotions	6		6																		
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3	(a) <i>Mair is the manager of a social media site and is looking at implementing a new digital system. Discuss the purpose and activities involved in the following development phases for this new digital system:</i> • <i>Feasibility study</i> • <i>Requirements analysis</i> • <i>Release</i> Indicative content: Feasibility Study Purpose: The primary objective of the Feasibility Study phase is to evaluate the viability of a proposed project. It involves determining whether the project is technically feasible, economically viable, and beneficial to the stakeholders involved. Activities: Conducting market research to assess demand Reviewing available technology to check if the project can be implemented Cost-benefit analysis to understand economic feasibility Political feasibility Legal feasibility Time assessment to gauge the project timeline Requirements Analysis Purpose: The Requirements Analysis phase is where the project team works to define the exact specifications and requirements of the system or product to be developed. Activities: Gathering requirements through interviews, surveys, or focus groups Documenting and categorising the requirements into functional and non-functional Prioritising requirements based on business needs and stakeholder feedback Creating initial design models		9	9

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		Release Purpose: The Release phase is the final step in the development process, where the developed software or system is made available to the end-users. Activities: Conducting final testing to ensure all requirements are met and there are no critical bugs Preparing release notes and documentation Packaging the software or deploying it to the live environment Launching marketing or training initiatives to support the release																	
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4	(a)	<i>Olivia understands that the proliferation of Artificial Intelligence (AI) in recent years has been significantly impacted by three main enablers. Identify the three main enablers and describe how each of these have contributed to the widespread adoption and capabilities of AI.</i> Indicative content 1. Exponential Growth in the Speed of Computers: When Moore's Law was first proposed, it was thought that the number of transistors on a microchip would double roughly every two years, increasing computer capability. Computers have generally continued to develop faster and more powerful even as Moore's Law has begun to plateau. Real-time analytics and faster data processing are now possible due to faster computing speeds. This is crucial for AI operations like real-time decision-making, picture recognition, and natural language processing. Thanks to faster computers, deep learning methods, which demand a lot of computing power, are now more viable and effective. This has facilitated developments in fields like real-time language translation and autonomous cars. 2. Huang's Law: According to Huang's Law, named after Jensen Huang, the performance of graphics processing units (GPUs) will double around every two years. The parallel processing activities necessary for machine learning and artificial intelligence are particularly well suited to GPUs. Better GPUs have greatly increased the capability of AI algorithms, particularly neural networks. Many of the advances in deep learning have been made possible by GPUs, which have also made it possible to build models that are more complicated and can perform advanced image and speech recognition. 3. Cloud Computing: Cloud computing refers to the delivery of computing services, including storage, processing power, and applications, over the internet. Cloud platforms offer on-demand access to a vast array of resources and services that are crucial for AI development and deployment. They make it easier and more cost-effective to train, deploy, and scale AI models. Startups to large enterprises can now afford to train complex AI models using cloud resources. Services like AWS's SageMaker or Google Cloud AI provide pre-built environments for machine learning, making AI more accessible.	6		6

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(b)	<i>Olivia is a school's computer network manager. Explain how AI could be used to improve the cyber security of this network.</i> Threat Detection: AI algorithms may be taught to spot patterns and irregularities in network data that might point to a security threat, such as a malware attack or unauthorised access. Olivia's network can identify threats much faster than conventional, rule-based systems by deploying AI-based threat detection software. Avoiding Phishing Attacks: Using information about the sender, the email's content, and any links or attachments contained, AI may examine incoming emails for indications of phishing schemes. By doing this, network users will be prevented from clicking on harmful links or disclosing private information. User Behaviour Analytics: AI can create a baseline of typical user behaviour on the network and notify managers of any out-of-the-ordinary activity, like an unexpected data download or access to private files. Olivia could respond right away if this was recognised as a sign of an inside threat or a hacked user account. Automated Response: When a threat is identified, AI algorithms can automatically carry out predetermined measures, such as isolating impacted devices from the network to stop malware from spreading. By reducing the time between danger detection and response, possible damage is minimised.		6	6											

Question		Answer	AO1	AO2	Total										
		Patch Management AI can help with patch management by scanning the network for outdated security patches and updating programmes on its own. Maintaining current software will improve the security of Olivia's network by automating this process to make sure that no vulnerabilities are missed.													
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5	<i>Aisha is developing a mobile app that helps students keep track of their homework and exams. Aisha will employ a User-Centred Design (UCD) approach to ensure the app meets the user needs. Advise Aisha how to design an effective mobile app using the four phases of UCD.</i> <i>1. specifying the context of use</i> <i>2. specifying requirements</i> <i>3. creating design solutions</i> <i>4. evaluating designs</i> Indicative content 1. Specifying the Context of Use <u>Who are the users?</u> Aisha should start by identifying the app's primary user base. Since this is a school-based app, the users will mostly be students, but teachers and parents could be secondary users. <u>Conditions of use</u> Will the app be used in a classroom setting, at home, or on the go? Knowing the context can help make design decisions. For example, if students are expected to use the app quickly between classes, the design should be simple and quick to navigate. <u>User Interviews and Surveys</u> Conduct interviews or distribute surveys among potential users to understand their needs, technological proficiency, and the conditions under which they'll use the app. 2. Specifying Requirements <u>Functional Requirements</u> The app must allow users to enter and manage homework tasks. The app must provide reminders for upcoming exams and due dates. It should have a calendar view for better visualisation of tasks. <u>Non-functional Requirements</u> Fast load times for better user experience. Data privacy measures to protect student information. Constraints Compatibility with multiple operating systems (iOS, Android). Budget and time limitations for development and testing. 3. Creating Design Solutions <u>Wireframes and Mockups</u> Before diving into the actual development, Aisha should create wireframes and mockups of the app. This visualises how the app's interface will look and how users will interact with it. Tools like Adobe XD or Sketch could be used for this. <u>User Flows</u> Map out the user journey for common tasks within the app. This will help in identifying any bottlenecks or confusing elements in the design.		12	12

Question	Answer	AO1	AO2	Total																						
	<u>Prototyping</u> Create a clickable prototype to simulate the app's functionality. This helps in internal testing and allows Aisha to make quick design iterations based on feedback. 4. Evaluating Designs <u>Usability Testing</u> Conduct usability tests with a small group of target users. Ask them to perform certain tasks on the prototype and observe where they encounter difficulties. <u>Feedback Loops</u> After the usability tests, Aisha should gather all the feedback and make necessary adjustments to the design. <u>Performance Metrics</u> Identify key performance indicators (KPIs) like user engagement, task success rate, and user retention to measure the app's effectiveness after launch. <u>Iterate</u> The UCD process is iterative. Once the app is live, Aisha should continue to collect data and feedback for future updates and improvements. By systematically going through these four phases, Aisha will be better positioned to create an app that not only meets the requirements but also provides an exceptional user experience.																									
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6	<i>Sam owns a small clothing business. Discuss how the main features and functionalities of Media Sharing Networks could benefit Sam's business.</i> Indicative content Media Sharing Networks: Media sharing networks are social media platforms where users can upload, share, and engage with various types of multimedia content, such as photos, videos, and audio clips. These platforms typically focus on visual content and aim to connect individuals through shared interests, creativity, and entertainment. Examples of media sharing networks include Instagram, Snapchat, and TikTok. Main Features and Functionalities: Photo and Video Sharing: Users can upload and share their own photos and videos, allowing them to showcase their products, services, and behind-the-scenes content. Filters and Editing Tools: Media sharing platforms often offer filters and editing tools to enhance the visual quality of the content before sharing. Stories and Short-form Videos: Many platforms have features like Stories or short-form videos, enabling businesses to create temporary and engaging content that disappears after a certain time. Engagement Features: Users can like, comment, share, and interact with content, fostering engagement and community building. Hashtags and Discoverability: Hashtags are used to categorise content and make it discoverable to a wider audience interested in similar topics. How Sam's Business Could Make Best Use: Sam's clothing business can utilise media sharing networks like Instagram and TikTok to showcase their clothing line through high-quality photos and creative short videos. They can collaborate with influencers or brand ambassadors who have a strong following on these platforms to promote their products. Utilising features like Instagram Stories, Sam can share limited-time promotions, sneak peeks of new collections, and engage the audience through polls and interactive elements. Utilise relevant and trending hashtags to increase the discoverability of their content to a wider audience.		5	5

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	3	A very good discussion, which shows: - thorough knowledge of media sharing network - a confident advisement of their features and functionalities.			
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7	Describe the four phases in the evolution of the Internet: • connectivity • networked economy • collaborative experiences • Internet of Everything (IoE) Indicative content <table><tr><th colspan="4">Guidance</th></tr><tr><th>Phase 1</th><th>Phase 2</th><th>Phase 3</th><th>Phase 4</th></tr><tr><th>Connectivity</th><td>Networked economy</td><td>Collaborative experiences</td><td>Internet of Everything (IoE)</td></tr><tr><td>Digitise access to information</td><td>Digitise business process</td><td>Digitise interactions (business and social)</td><td>Digitise the world, connecting</td></tr><tr><td> • email • web browser • search </td><td> • e-commerce • digital supply chain • collaboration </td><td> • social • mobility • cloud • video </td><td> • people • process • data • things </td></tr><tr><td>The first phase started over 20 years ago and is referred to as 'connectivity'. Email, web browsing and searching for content was just beginning.</td><td>The second phase started in the late 1990s and was the 'networked economy' phase. This was the birth of e-commerce and digitally connected supply chains. It changed the way we shopped and how companies reached new markets.</td><td>The third phase started in the early 2000s and is known as the 'collaborative experiences' phase. This phase is dominated by widespread use of social media, mobility, video, and Cloud computing. This phase completely transformed the world of work.</td><td>The current phase is called the 'Internet of Everything (IoE)'. This phase connects people, processes, data, and things, turning information into actions that create new capabilities, richer experiences, and unprecedented opportunities.</td></tr></table> Connectivity: The first phase, often referred to as the "connectivity" phase, marked the initial development of the Internet as a means to connect computers and share information. This phase started in the late 1960s and continued through the 1990s. It involved the creation of the underlying infrastructure, including protocols like TCP/IP, which allowed computers to communicate with each other across networks. The focus was primarily on establishing reliable communication channels and enabling data exchange between research institutions, universities, and government agencies. This phase laid the foundation for the growth of the Internet as a global network. Networked Economy: The second phase, the "networked economy" phase, emerged in the late 1990s and extended into the early 2000s. This phase saw the commercialisation of the Internet and the rise of e-commerce, online businesses, and digital marketplaces. The development of user-friendly web interfaces, secure online payment systems, and search engines revolutionised the way people conducted business and accessed information. The dot-com boom and subsequent bust exemplified the rapid growth and subsequent challenges faced during this phase. Companies adapted to the Internet's potential for global reach, creating new business models and strategies to leverage its capabilities.	Guidance				Phase 1	Phase 2	Phase 3	Phase 4	Connectivity	Networked economy	Collaborative experiences	Internet of Everything (IoE)	Digitise access to information	Digitise business process	Digitise interactions (business and social)	Digitise the world, connecting	• email • web browser • search	• e-commerce • digital supply chain • collaboration	• social • mobility • cloud • video	• people • process • data • things	The first phase started over 20 years ago and is referred to as 'connectivity'. Email, web browsing and searching for content was just beginning.	The second phase started in the late 1990s and was the 'networked economy' phase. This was the birth of e-commerce and digitally connected supply chains. It changed the way we shopped and how companies reached new markets.	The third phase started in the early 2000s and is known as the 'collaborative experiences' phase. This phase is dominated by widespread use of social media, mobility, video, and Cloud computing. This phase completely transformed the world of work.	The current phase is called the 'Internet of Everything (IoE)'. This phase connects people, processes, data, and things, turning information into actions that create new capabilities, richer experiences, and unprecedented opportunities.	8		8
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The first phase started over 20 years ago and is referred to as 'connectivity'. Email, web browsing and searching for content was just beginning.	The second phase started in the late 1990s and was the 'networked economy' phase. This was the birth of e-commerce and digitally connected supply chains. It changed the way we shopped and how companies reached new markets.	The third phase started in the early 2000s and is known as the 'collaborative experiences' phase. This phase is dominated by widespread use of social media, mobility, video, and Cloud computing. This phase completely transformed the world of work.	The current phase is called the 'Internet of Everything (IoE)'. This phase connects people, processes, data, and things, turning information into actions that create new capabilities, richer experiences, and unprecedented opportunities.																									

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	Collaborative Experiences: The third phase, often referred to as the "collaborative experiences" phase, emerged in the mid-2000s and continued into the 2010s. This phase was characterised by the rise of social media, user-generated content, and collaborative platforms. Websites and applications enabled users to share, create, and collaborate on content, fostering new forms of online interaction and community building. Social networking sites, video-sharing platforms, and other collaborative tools facilitated communication, content sharing, and engagement among individuals across the world. This phase emphasised the power of user-generated content and the democratisation of information. Internet of Everything (IoE): The fourth phase, the "Internet of Everything" (IoE) phase, represents the current and ongoing stage of Internet evolution. This phase involves the interconnection of not only computers and people but also everyday objects, devices, and systems. The IoE encompasses concepts like the "Internet of Things" (IoT), where various objects are embedded with sensors, software, and connectivity to collect and exchange data. The IoE goes beyond just connectivity and includes data analysis, automation, and intelligent decision-making based on the data collected. This phase has the potential to transform industries, cities, and daily life through smart devices, interconnected infrastructure, and advanced analytics. Each of these phases has built upon the previous one, leading to the complex and interconnected digital landscape that we experience today.																	
	<table><tr><th>Band</th><th>AO1</th></tr><tr><td></td><td>7-8 marks</td></tr><tr><td>4</td><td>An excellent description which shows: - thorough knowledge of all four phases - a confident grasp of the developments in each phase </td></tr><tr><td>3</td><td>A good description, which shows: - good knowledge of at least three of the four phases - a good grasp of the developments in each phase </td></tr><tr><td>2</td><td>A basic description, which shows: - generally secure knowledge of at least two of the four phases - a generally secure – grasp of the developments in each phase </td></tr><tr><td>1</td><td>A limited description, which shows: - some knowledge of at least one of the four phases - some grasp of the developments in each phase </td></tr><tr><td></td><td>0 marks - response not creditworthy or not attempted. </td></tr></table>	Band	AO1		7-8 marks	4	An excellent description which shows: - thorough knowledge of all four phases - a confident grasp of the developments in each phase	3	A good description, which shows: - good knowledge of at least three of the four phases - a good grasp of the developments in each phase	2	A basic description, which shows: - generally secure knowledge of at least two of the four phases - a generally secure – grasp of the developments in each phase	1	A limited description, which shows: - some knowledge of at least one of the four phases - some grasp of the developments in each phase		0 marks response not creditworthy or not attempted.			
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Question	Answer	AO1	AO2	Total
8	<i>Suggest a maintenance task for each of the following. For each task, outline why the maintenance is important for keeping the system running smoothly:</i> <i>Data</i> <i>Software</i> <i>Hardware</i> Indicative content: Data Maintenance: Example: Regular Data Backup Main Points: Data is a crucial component of any computer system, and ensuring its safety is essential. Regularly backing up data involves creating copies of important files and storing them in a separate location. This task is important because it helps safeguard against data loss due to hardware failures, software glitches, or accidental deletions. In case of any unexpected issues, having a recent backup allows you to restore your data and continue working without significant disruptions. Example: Ensuring data is correct and up to date Explanation: It is important to ensure data is correct and companies are legally required to do this. Software Maintenance: Example: Software Updates Main Points: Software, including operating systems and applications, requires ongoing maintenance to stay secure and functional. Regularly updating software ensures that you have the latest bug fixes, performance enhancements, and security patches. These updates are released by software developers to address vulnerabilities that could be exploited by hackers or to improve overall user experience. Keeping your software up to date not only enhances performance but also helps protect your system from potential security threats. Hardware Maintenance: Example: Dust and Debris Cleaning Main Points: Hardware components, such as the central processing unit (CPU), graphics card, and cooling systems, can accumulate dust and debris over time. Regularly cleaning the hardware helps prevent overheating and performance issues. Dust can block airflow and cause components to operate at higher temperatures, which can lead to reduced performance and even hardware damage. Cleaning the hardware with appropriate tools, such as compressed air, can extend the lifespan of your computer and maintain optimal performance.	7		7

Question	Answer	AO1	AO2	Total
	Band	AO1		
	3	6-7 marks A very good description, which shows: - thorough knowledge of all the three maintenance tasks - a confident understanding of the importance of each task		
	2	3-5 marks A good description, which shows: - generally secure knowledge of at least two of the three maintenance tasks - a generally secure understanding of the importance of each task		
	1	1-2 marks A basic description, which shows: - some knowledge of at least one of the three maintenance tasks - some understanding of the importance of each task		
		0 marks response not creditworthy or not attempted.		

Question	Answer	AO1	AO2	Total
9	<i>Describe the environmental impact of the ongoing proliferation of devices.</i> Indicative content: The proliferation of devices, driven by technological advancements and increasing consumer demand, has significant environmental impacts across their entire lifecycle – from manufacturing to use and disposal. These impacts are closely linked to the consumption of finite resources. Here's an overview of the environmental consequences associated with each stage: Manufacturing: The production of electronic devices involves mining, extraction, and processing of raw materials such as metals (e.g., gold, silver, copper), minerals, and rare-earth elements. These processes contribute to habitat destruction, soil and water pollution, and energy-intensive activities that emit greenhouse gases. The mining of minerals often results in habitat disruption and deforestation, affecting biodiversity and ecosystem health. Use: The operation of electronic devices requires energy, primarily sourced from fossil fuels in many regions. As more devices are used, energy consumption increases, contributing to carbon dioxide emissions and exacerbating climate change. Moreover, excessive use of devices can lead to overconsumption of electricity, leading to higher utility bills and a greater demand for power generation. Disposal: Obsolete and discarded devices contribute to the growing problem of electronic waste (e-waste). Improper disposal of e-waste, often containing hazardous materials like lead, mercury, and flame retardants, can lead to soil and water contamination. Burning e-waste for metal recovery releases toxic fumes and pollutants into the atmosphere. E-waste also presents challenges for waste management systems, as many components are not biodegradable and can persist in the environment for years. Consumption of Finite Resources: The production of devices relies on a range of finite resources, including rare-earth metals, which are essential for technologies like smartphones, laptops, and renewable energy applications. The extraction of these resources can lead to environmental degradation and geopolitical tensions due to resource scarcity. As the demand for devices continues to grow, the pressure on these finite resources increases, risking resource depletion and further environmental harm.	11		11

Question	Answer		AO1	AO2	Total
	Band	AO1			
		9-11 marks			
	4	An excellent description which shows: - thorough knowledge of the environmental impacts of the ongoing proliferation of devices - a confident description of the impacts in terms of manufacture, use and disposal.			
		6-8 marks			
	3	A good discussion, which shows: - good knowledge of the environmental impacts of the ongoing proliferation of devices - a good description of the impacts in terms of manufacture, use and disposal.			
		3-5 marks			
2	A basic description, which shows: - generally secure knowledge of the environmental impacts of the ongoing proliferation of devices - a general understanding of the impacts in terms of manufacture, use and disposal.				
	1-2 marks				
1	A limited description, which shows: - some knowledge of the environmental impacts of the ongoing proliferation of devices - some understanding of some of the impacts in terms of manufacture, use and disposal.				
	0 marks				
	response not creditworthy or not attempted.				