



GCE AS MARKING SCHEME

SUMMER 2023

**AS
BUILT ENVIRONMENT – UNIT 1
2509U10-1**

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 GCE AS BUILT ENVIRONMENT – UNIT 1

SUMMER 2023 MARK SCHEME

Question	Answer	AO1	AO2	AO3	Total marks
1.	<p><i>A local developer wishes to convert an 1850s country house into a block of luxury apartments. Describe four issues that the developer needs to consider for this project.</i></p>	8			8
	<p>Award one mark for identifying an issue and one further mark for an expanded description referring to any of the following issues that should be considered when refurbishing a building that was constructed pre-1919:</p> <ul style="list-style-type: none"> • Planning permission will be required • Additional space requirements for upgrading technologies within existing building • Building regulations approval • Asbestos survey and removal • Structural work required for increased loads • Phasing of works, by floor, area • Coordination of metric to imperial dimensions on materials such as brickwork • Matching colour and texture of existing façade materials • Listed building status and matching materials like for like, planning constraints <p>Accept any other relevant content</p>				

Question	Answer	AO1	AO2	AO3	Total marks
2.	<i>Identify the five key activities carried out during the design stage of a building life cycle. Give an example of work carried out during each activity.</i>	10			10
	<p>Award one mark for each activity identified and one mark for an example of an activity</p> <p>Key activities example:</p> <ul style="list-style-type: none"> (a) Strategic definition (b) Preparation of project brief (c) Concept design (d) Developed design (e) Detailed technical design <p>Activity example:</p> <ul style="list-style-type: none"> (a) Develop a business case (b) Establish project objectives, project outcomes and budgets (c) Architectural concept design, outline structure and services designs (d) Design developed including structural and M&E designs. Leads to planning permission application (e) Material and performance specification, application for Building Regulation approval 				

Question	Answer	AO1	AO2	AO3	Total marks
3.	<i>During the construction phase, temporary services to the site are required. Describe two of these services and their purpose on site.</i>	4			4
	<p>Award one mark for a basic description of each service required (up to two), for example:</p> <ul style="list-style-type: none"> • Water is required for construction work and welfare facilities • Power is needed for site functionality • Communication services will be required for site personnel <p>Award two marks for a more developed description of each service required, for example:</p> <ul style="list-style-type: none"> • Water is required for construction works such as washing down and mixing of materials. It is also essential for welfare facilities that provide drinking water and showering capabilities. • Temporary supply of power is needed for site functionality which will required three phase for heavy plan, single phase for welfare facilities and LV supplies for site lighting. • Communication services will be required for site personnel which will include a potential land line and internet connection 				

Question	Answer	AO1	AO2	AO3	Total marks
4.	<p><i>A local developer wishes to explore types of building foundation to suit a variety of subsoil and ground conditions.</i></p> <p><i>Complete the table:</i></p>	6			6
	<p>Award one mark for each correct description</p> <ul style="list-style-type: none"> • Mass trench fill – A shallow foundation used to provide continuous level support to a load bearing wall • Raft – A reinforced concrete ground slab which spreads the load over a wide area, likely the entire footprint of a building • Pile – A deep foundation formed by a long columnar element <p>Award one mark to reference to one of the following subsoils or conditions that would result in that foundation being selected</p> <ul style="list-style-type: none"> • Mass trench fill soil and ground conditions <ul style="list-style-type: none"> a. Good bearing capacity b. High Water Table c. Loose soil d. Course or Sandy subsoil e. Some clay subsoils are also suitable for a trench fill, dependent on tree location • Raft <ul style="list-style-type: none"> a. Soft clay or compressible fill b. Settlement or differential settlement is likely • Pile <ul style="list-style-type: none"> a. The upper layers of subsoil have poor bearing capacity b. Very loose soils c. High water table d. Stable sub soils preventing collapse of excavation 				

Question	Answer	AO1	AO2	AO3	Total marks
5.	<p><i>Describe the following structure types:</i></p> <p>(a) <i>Skeleton frame</i></p> <p>(b) <i>Cavity wall construction</i></p>	4			4
	<p>Award one mark for a basic description, for example:</p> <p>(a) Skeleton frame – A system of load bearing columns and connecting beams.</p> <p>(b) Cavity wall construction – Two skins of masonry separated by a cavity.</p> <p>Award two marks for a more developed description, for example:</p> <p>(a) Skeleton frame – A system of load bearing columns and connecting beams that support internal floors and external walls.</p> <p>(b) Cavity wall construction – Two skins of masonry separated by a cavity, the inner skin is structural transferring loads through to the foundation and weather protection.</p>				

Question	Answer	AO1	AO2	AO3	Total marks
6.	<i>Explain the benefits of timber framed construction when used in residential low-rise developments</i>		8		8
	<p>Answers should refer to the following points of why timber frame is particularly suitable for residential buildings, for example:</p> <ul style="list-style-type: none"> • Prefabricated timber frames can provide a faster method of onsite construction • Prefabrication improves quality • Better thermal performance • Sustainability of material source • Large sections available 				

Band	AO2
	7-8 marks
4	<p>An excellent explanation which shows:</p> <ul style="list-style-type: none"> • Thorough knowledge and understanding of the benefits of timber frame • A confident grasp of key concepts of the principles of timber frame buildings for residential use
	5-6 marks
3	<p>A good explanation which shows:</p> <ul style="list-style-type: none"> • Generally secure knowledge and understanding of the benefits of timber frame • A generally secure grasp of key concepts of the principles of timber frame buildings for residential use
	3-4 marks
2	<p>A basic explanation which shows:</p> <ul style="list-style-type: none"> • Some knowledge and understanding of the benefits of timber frame • Some grasp of key concepts of the principles of timber frame buildings for residential use
	1-2 marks
1	<p>A limited explanation which shows:</p> <ul style="list-style-type: none"> • Limited knowledge and understanding of the benefits of timber frame • Little grasp of key concepts of the principles of timber frame buildings for residential use
	0 marks
	Response not creditworthy or not attempted

Question	Answer	AO1	AO2	AO3	Total marks
7.	<i>State two advantages and two disadvantages of modular construction.</i>	4			4
(a)	<p>Award one mark for each possible advantage of using modular construction:</p> <ul style="list-style-type: none"> • Overall speed of supply and installation • Reduced cost and improved quality <ul style="list-style-type: none"> ○ Economies of scale ○ Reduction of waste ○ Working in a controlled environment • Reduced site time (disruption and noise) • Potential to de-construct for re-location and re-use 				
(b)	<p>Award one mark for each possible disadvantage of using modular construction:</p> <ul style="list-style-type: none"> • Restricted flexibility, module size and shapes can be limited and not user specific • Difficulty in transporting and handling large modules by use of specialist equipment. • Level of investment required to develop designs and manufacturing processes <p>Accept any other relevant content</p>				

Question	Answer	AO1	AO2	AO3	Total marks
8.	<i>Describe the purpose and guidance set out in Building Regulations Approved Document K for the safe design of stairways.</i>	8			8
	<p>Answers should refer to the following points which should be considered when designing stairs:</p> <ul style="list-style-type: none"> • Approved Document K sets out the requirements for safe stair design to prevent slips, trips, and falls • Going <ul style="list-style-type: none"> ○ Total going required ○ Must be equal ○ Each going must be between 220mm and 400mm • Rise <ul style="list-style-type: none"> ○ Total rise required ○ Must be equal ○ Each rise must be between 150mm and 220mm • Headroom over stairs should be at least 2m • Tolerances for fitting pre-made staircases • Handrail and Balustrade requirements <ul style="list-style-type: none"> ○ Between 900 and 1000mm ○ Gaps between elements no bigger than 100mm 				

Band	AO1
	7-8 marks
4	<p>An excellent explanation which shows:</p> <ul style="list-style-type: none"> • Thorough knowledge and understating of the main considerations when designing stairs including references to critical dimensions • A confident grasp of the technical terms for stairs
	5-6 marks
3	<p>A good description which shows:</p> <ul style="list-style-type: none"> • A generally secure knowledge and understanding of the main considerations when designing stairs with some reference to critical dimensions • A generally secure grasp on the technical terms for stairs
	3-4 marks
2	<p>A basic description which shows:</p> <ul style="list-style-type: none"> • Some secure knowledge and understanding of the main considerations when designing stairs • Some grasp on the technical terms for stairs
	1-2 marks
1	<p>A limited description which shows:</p> <ul style="list-style-type: none"> • Limited knowledge and understanding of the main considerations when designing stairs • Little grasp on the technical terms for stairs
	0 marks
	Response not creditworthy or not attempted

Question	Answer	AO1	AO2	AO3	Total marks
9.	<i>Describe the difference between residential and industrial electrical supply requirements.</i>	4			4
	<p>Award one mark for a basic description of each type of building supply requirements, for example:</p> <ul style="list-style-type: none"> • Residential electrical requirements are for 230V single phase supply • Industrial electrical supply requirements are for 400v 3-phase supply <p>Award two marks for a more developed description of each type of building supply requirements, for example:</p> <ul style="list-style-type: none"> • Residential electrical requirements are for 230V single phase supply which contains a connection from a meter into a consumer unit with a main isolating switch, RCDs and MCB. • Industrial electrical supply requirements are for 400v 3-phase supply as this provides a more stable flow of electricity to large machinery which means that it is more reliable and efficient 				

Question	Answer	AO1	AO2	AO3	Total marks
10.	<i>Describe the components and methods used when creating roads and footpaths.</i>	6			6
	<p>Answers may refer to the following ways in which a road is constructed:</p> <ul style="list-style-type: none"> • Sub-base – bottom layer consisting of crushed stone compacted over subgrade • Base Course – layer immediately below the surface course. It provides load distribution and is exposed to high loads, constructed with granular material which is compacted • Wearing Course – the upper layer of the road which is made from asphalt/bitumen and aggregates. It needs to be durable • Gully drainage required for the removal of water from the wearing course • Falls and cross falls required for adequate drainage <p>Accept any other relevant content</p>				

Band	AO1
3	<p>5-6 marks</p> <p>A very good description which shows:</p> <ul style="list-style-type: none"> • Thorough knowledge and understanding of the main layers of road construction • A confident grasp on the technical terms for road construction
2	<p>3-4 marks</p> <p>A good description which shows:</p> <ul style="list-style-type: none"> • Generally secure knowledge and understanding of the main layers of road construction • A generally secure grasp on the technical terms for road construction
1	<p>1-2 marks</p> <p>A basic description which shows:</p> <ul style="list-style-type: none"> • Some knowledge and understanding of the main layers of road construction • Some grasp on the technical terms for road construction
	<p>0 marks</p> <p>Response not creditworthy or not attempted</p>

Question	Answer	AO1	AO2	AO3	Total marks
11.	<i>Compare the role of a site manager with that of a project manager.</i>		4		4
	<p>Award up to one mark for reference to an aspect of the role of a site manager:</p> <ul style="list-style-type: none"> • To organise work on site to be on time and within budget • Ensure work is completed safely on site • Conduct quality assurance checks <p>Award up to one mark for reference to an aspect of the role of a project manager:</p> <ul style="list-style-type: none"> • To oversee all aspects of a building project • Oversee procurement of labour and materials • To supervise the work programme <p>Award two marks for the comparison of the two roles with reference to any of the following: When roles overlap:</p> <ul style="list-style-type: none"> • Programme of Work overlap with both ensuring the project is completed on time • Ensuring all work is within budget • Quality assurance <p>When roles differ:</p> <ul style="list-style-type: none"> • Site manager is responsible for the health safety and welfare of site personnel • Site manager oversees day to day operations on site • Project manager is involved with procurement and quality assuring supply chain • Project managers can be involved with more than one construction project 				

Question	Answer	AO1	AO2	AO3	Total marks
12.	<p><i>Identify, giving and example of each, three types of small and medium-sized enterprises (SMEs) that operate within the construction industry.</i></p>	6			6
	<p>Award one mark for identification of each type of small and medium size enterprises, for example:</p> <ul style="list-style-type: none"> • Labour only contractors • Domestic subcontractors – a company awarded a contract on a supply and fit basis • Specialist contractors – a company specialising in a particular aspect of the project awarded a contract on a supply and fit basis • Main contractors – a company with less than 250 employees that is employed to oversee and manage the construction of the project. • Local Supply Chain – a company supplying building materials for the project. <p>Award one mark for an example of each type of small and medium size enterprises, for example:</p> <ul style="list-style-type: none"> • Labour only contractors <ul style="list-style-type: none"> ○ Trades such as carpenter, electrician • Domestic subcontractors – a company awarded a contract on a supply and fit basis <ul style="list-style-type: none"> ○ Carpentry company ○ Plumbing company • Specialist contractors – a company specialising in a particular aspect of the project awarded a contract on a supply and fit basis <ul style="list-style-type: none"> ○ Fire protection company ○ Cladding and glazing companies • Main contractors – a company with less than 250 employees that is employed to oversee and manage the construction of the project. <ul style="list-style-type: none"> ○ General Construction company with site managers and project managers overseeing sub-contractors and direct employees • Local Supply Chain – a company supplying building materials for the project such as a builders merchants. <p>Accept any other relevant content</p>				

Question	Answer	AO1	AO2	AO3	Total marks
13.	<p><i>A local construction company is considering joining a trade registration and development scheme. Using an example, discuss the purpose of joining such a scheme and the implications this would have for the construction company.</i></p>			8	8
	<p>Answers may refer to the purpose of a trade registration and development scheme and the impact it may have on a construction company, such as:</p> <ul style="list-style-type: none"> - CCS - CSCS - Competent Person Register - ISO registration for quality assurance and construction systems <p>Purpose can include:</p> <ul style="list-style-type: none"> • Raise standards in the construction industry • Build respect within the community by managing impact of a construction project on the neighbours • Minimising negative impact on the natural environment and enhancing the local environment where feasible • Valuing the workforce by creating a supporting inclusive and healthy workplace • Improving the quality of workmanship through training and development • Providing health and safety certification for consistency across the industry in training standards <p>Requirements and Implications includes:</p> <ul style="list-style-type: none"> • The construction company will need to comply with the code of conduct set out by the scheme which can have additional costs to ensure compliance • Registration of the company and the site involves paying a fee • Positive advertisement as companies present image of competence, awareness of environment issues and neighbourliness • Posters and signage for the scheme is required on all sites • Phone numbers of the site manager and the schemes are required to be available via signage • Registered companies are required to display their registration number which allows members of the public to comment on the building sites or register complaints 				

Question	Answer	AO1	AO2	AO3	Total marks
	<ul style="list-style-type: none"> Competitive edge in winning new contracts for work due to demonstrating commitment to creating a positive image of the construction industry and willingness to work with community stakeholders. National awards available through the scheme Independent assessment of the site by industry professionals to ensure compliance with the code of conduct. <p>Accept any other relevant content.</p>				

Band	AO3
4	<p>7-8 marks</p> <p>An excellent response which shows:</p> <ul style="list-style-type: none"> Confident and detailed description of the purpose of one of the schemes Perceptive and informed judgements on the full implications of a scheme on the construction company Writing is very well structured and organised, using accurate grammar, punctuation, and spelling A range of specialist terminology is used with accuracy
3	<p>5-6 marks</p> <p>A good response which shows:</p> <ul style="list-style-type: none"> Thorough description of the purpose of the a scheme Reasoned judgements about the key areas of implications of a scheme on the construction company Writing is generally well structured and organised, using mainly accurate grammar, punctuation, and spelling Specialist terminology is used with accuracy
2	<p>3-4 marks</p> <p>A basic response which shows:</p> <ul style="list-style-type: none"> Clear description of the purpose of a scheme Generally valid judgements about some areas of implications of a scheme on the construction company Writing shows evidence of structure although some errors in grammar, punctuation and spelling affect meaning. Basic use of specialist terminology
1	<p>1-2 marks</p> <p>A limited response which shows:</p> <ul style="list-style-type: none"> Little engagement with the purpose of a scheme Little evidence of judgements about the implications of a scheme on the construction company Some errors in grammar, punctuation, and spelling, which affect clarity of communication. Limited use of specialist terminology
	<p>0 marks</p> <p>Response not creditworthy or not attempted</p>

Specification at a glance

Summer 2023																		
Question			Specification Content										Mark Allocation					
			Section										Part	Total Marks	AO1	AO2	AO3	
			2.1.1	2.1.2	2.1.3	2.1.4	2.1.5	2.1.6	2.1.7	2.1.8	2.1.9	2.1.10						
1	-	-										8		a.b.c	8	8		
2	-	-	10											a	10	10		
3	-	-										4		b	4	4		
4	-	-							6					d.e	6	6		
5	-	-		4										a	4	4		
6	-	-					8							b.c	8		8	
7	-	-					4							d	4		4	
8	-	-								8				c	8	8		
9	-	-										4		a	4	4		
10	-	-											6	d	6	6		
11	-	-			4									d	4		4	
12	-	-				6								a	6	6		
13	-	-				8								g	8			8
			10	4	4	14	12	6	8	8	8	8	6		80	56	16	8