CONFERENCE VERSION – 07/09/2023

CONFIDENTIAL

GCE AS MARKING SCHEME

SUMMER 2024

AS
BUILT ENVIRONMENT – UNIT 1
2509U10-1

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WJEC GCE AS BUILT ENVIRONMENT – UNIT 1

SUMMER 2024 MARK SCHEME

Question	Answer	AO1	AO2	AO3	Total Marks
1a	*Describe the term "building life cycle"*	4			4
	Award **one** mark for a limited describe of the term building life cycle, for example: • The life cycle of a building describes the building from the beginning to the end its life. Award **two** marks for a basic description of the term building life cycle, for example: • The stages a building or other structure go through during their lifetime from strategic definition to demolition. Award **three** marks for a more developed description of the term building life cycle, for example: • The stages a building or other structure go through during their lifetime which begins with strategic definition at the beginning of the design stage, followed by the construction stage and then the building in use with the final stage of demolition of the building. Award **four** marks for a fully developed description of the term building life cycle, for example: • The stages a building or other structure go through during their lifetime which begins with strategic definition at the beginning of the design stage, followed by the construction of the building or structure. The next stage is the operation of the building through its occupation, use and maintenance. The final stage is the demolition or re-purposing of the building which can include the refurbishment, extension and alteration as well as potential recycling of materials. No more than two marks if stages are listed.				

Question	Answer	AO1	AO2	AO3	Total Marks
1b	*Outline **two** activities which take place during the operation stage of the life cycle of a building.*	4			4
	Award **one** mark for a basic outline of each activity, for example: • Operation of heating, cooling and lighting systems. • Regular scheduled maintenance is planned. • Repair of building components subjected to damage caused. Award **two** marks for a more developed outline of each activity, for example: • Monitoring and controlling of heating, cooling and lighting systems used efficiently. • Regular scheduled maintenance is planned to prevent decay and damage caused by aging, weather, and general use. • Repair of building components subjected to damage caused through corrective maintenance work.				
2a	*Describe the role of an architect.*	2			2
	Award one mark for each correct point to a maximum of two marks. Answers may refer to the following aspects of the role of an architect: • Designing the layout and the aesthetics of the building. • Development of the technical aspects of the building. • Leading the design team and integrating the work of other consultations. • Make applications for statutory approvals. • Liaise with key stakeholders for building design, such has client. Credit any other valid response.				

Question	Answer	AO1	AO2	AO3	Total Marks
2b	Outline **two** benefits of RIBA membership for an architect.	4			4
	Award **one** mark for basic detail of each main benefit, for example: • Demonstrates achievement of a high standard within architecture. • Training and regular professional development. • Promote profession to wider world. • Networking opportunities. Award **two** marks for a more developed detail of each main benefit, for example: • Demonstrates achievement of a high standard within architecture which ensures employers know that architects are qualified to a particular standard and have a set amount of experience. • Training and regular professional development to keep up to date with new developments within industry. • Promotion of the profession to wider world to gain more awareness of benefits of hiring an RIBA chartered architect. • Networking opportunities through organised events with other professionals.				
3a	*Describe **two** examples of information needed for foundation design.*	4			4
	Award **one** mark for a basic description of each piece of information, for example: • Density of soil • Soil classification per layer • Ground water condition and level • Chemical analysis of soil. Award **two** marks for a more developed description of each piece of information, for example: • Density of soil to ascertain bearing capacity and compaction levels. • Soil classification per layer to ascertain geotechnical properties and bearing capacity. • Ground water condition and level for seasonal variability and health and safety planning for site working. • Chemical analysis of soil for health and safety of site operatives and future occupants.				

Question	Answer	AO1	AO2	AO3	Total Marks
3b	*Explain the main factors to be considered when designing a retaining wall*		8		8

	Answers may refer to the following considerations when planning the construction of a retaining wall:
	• Type of retaining wall required:
	  ○ Gravity retaining wall relying on mass to retain the material.
	  ○ Cantilever retaining wall linking wall to slab converting horizonal pressures to vertical pressures.
	  ○ Gabion wall utilising cages of wire filled with crushed rock.
	  ○ Sheet piled wall using interlocked sheets of steel or concrete directly next to each other.
	• Methods of resisting overturning.
	• Draining of retained soil.
	• Jointing in solid walls.
	• Tanking/Waterproofing.
	• Nature of the soil conditions to be retained.				

Band	AO2
4	**7-8 Marks** An excellent explanation which shows: • Thorough knowledge and understanding of the consideration of planning retaining wall construction. • A confident grasp of key concepts of the principles of retaining wall construction
3	**5-6 Marks** A good explanation which shows: • Generally secure knowledge and understanding of the consideration of planning retaining wall construction. • A generally secure grasp of key concepts of the principles of retaining wall construction.
2	**3-4 Marks** A basic explanation which shows: • Some knowledge and understanding of the consideration of planning retaining wall construction. • Some grasp of key concepts of the principles of retaining wall construction.
1	**1-2 Marks** A limited explanation which shows: • Limited knowledge and understanding of the consideration of planning retaining wall construction. • Little grasp of key concepts of the principles of retaining wall construction.
	0 Marks Response not creditworthy or not attempted

Question	Answer	AO1	AO2	AO3	Total Marks
4a	Justify the use of a steel skeleton frame for the new building.			8	8
	Answers may refer to the following justifications for the use of a steel skeleton frame: Material Justifications: • Steel frames are quick to erect on site as most work can be prefabricated. • Steel has a high strength to weight ratio, resulting in reduced loadings. • Frames can be designed to any shape and be clad with a wide range of material to suit the aesthetics of the area. • Standard sections and sizes are readily available with a range of jointing methods that can be used. Frame Justifications: • A skeleton frame is a system of columns and connected beans that support internal floor and walls. • Floor areas are generally free of immovable internal walls resulting in more flexible space for a multiuse structure. • Structural frame carries all loads to foundations through columns to base places. • Use of wind bracing for structural stability.				

Band	AO3
4	**7-8 Marks** An excellent response which shows: • Confident and detailed justification of the steel skeleton frame use for the multiuse purpose. • Perceptive and informed consideration of frame and material selection. • Writing is very well structured and organised, using accurate grammar, punctuation, and spelling. • A range of specialist terminology is used with accuracy.
3	**5-6 Marks** A good response which shows: • Thorough justification of the steel skeleton frame use for the multiuse purpose. • Reasoned consideration of frame and material selection. • Writing is generally well structured and organised, using mainly accurate grammar, punctuation, and spelling. • Specialist terminology is used with accuracy.
2	**3-4 Marks** A basic response which shows: • Clear justification of using a steel skeleton frame. • Generally valid consideration of frame and material selection. • Writing shows evidence of structure although some errors in grammar, punctuation and spelling affect meaning. • Basic use of specialist terminology.
1	**1-2 Marks** A limited response which shows: • Little justification of using a steel skeleton frame. • Little consideration of frame and material selection. • Some errors in grammar, punctuation, and spelling, which affect clarity of communication. • Limited use of specialist terminology.
	0 Marks Response not creditworthy of not attempted

Question	Answer	AO1	AO2	AO3	Total Marks
4b	Describe the most suitable intermediate floor construction for the building.	2			2
	Award one mark for a stating a suitable intermediate floor construction: • Precast concrete hollow core plank floors Award two marks for a more developed description of a suitable floor construction • Precast concrete hollow core plank floors are prestressed concrete slabs with continuous voids to reduce weight and cost.				
4c	*Describe **two** types of suitable cladding for the building.*	4			4
	Award **one** mark for a basic description of each cladding type, for example: • Brick cladding – using brick slips. • Timber cladding – using softwood boards on battens. • Composite cladding - insulated core sandwiched between facing material of either metal or plastic. • Metal sheet cladding – used on commercial properties, they come in a range of profiles and finishes. • Curtain walling – non-structural cladding systems that hang from the structural frame. Award **two** marks for a more developed description of each cladding type, for example • Brick cladding – using brick slips to match the aesthetics of conventional brickwork. • Timber cladding – using softwood boards on battens, these can be stained or painted and machined to create a range of profiles. • Composite cladding - insulated core sandwiched between facing material of either metal or plastic, these have good insulating properties • Metal sheet cladding – used on commercial properties, they come in a range of profiles and finishes and are connected to the main structure via steel spacers. • Curtain walling – non-structural cladding systems that hang from the structural frame, generally compromising of a lightweight aluminium frame with glass or composite infill panels.				

Question	Answer	AO1	AO2	AO3	Total Marks
4d	Describe the service requirements for commercial buildings	6			6
	Answers may refer to the following service requirements for a commercial building: • Electrical services which are monitored and controlled, including power distribution and energy consumption as well as security and fire systems. • Communication services required for internet connectivity and for systems to communicate, such as security sensors, CCTV and alarms. • Gas supply for boiler based heating systems and kitchen use. • Water support for drinking, cooking, cleaning and sanitation. • Lifts within the buildings which can either be traction lifts or hydraulic lifts. • Escalators for movement within the building if large numbers of people are expected.				

Band	AO2
3	**5-6 Marks** A very good description which shows: • Thorough knowledge and understanding of the service requirements of a commercial building • A confident grasp on the technical terms for services.
2	**3-4 Marks** A good description which shows: • Generally secure knowledge and understanding of the service requirements of a commercial building. • A generally secure grasp on the technical terms for services.
1	**1-2 Marks** A basic description which shows: • Some knowledge and understanding of the service requirements of a commercial building. • Some grasp on the technical terms for services.
	0 Marks Response not creditworthy or not attempted

Question	Answer	AO1	AO2	AO3	Total Marks
5	*State **two** possible advantages and **two** possible disadvantages of using prefabricated building methods*	4			4
	Award **one** mark for each advantage given, for example: • Reduced time on site with more certainty on programme. • Higher cost certainty. • Higher quality and consistency due to factory tolerances in a controlled environment. • Less waste. • Fewer delays due to weather. • Improved safety within factory environment compared to onsite environment. Award **one** mark for each disadvantage given, for example: • Transporting large components due to height and width restrictions on road. • Weight limits on road. • Additional cost of specialist lifting equipment. • Specialist equipment for assembly. • High factory setup costs. • Factory setup for particularly sizes and requirements with limited changeability or variation.				

Question	Answer	AO1	AO2	AO3	Total Marks
6a	Describe the differences between modern masonry structures and traditional masonry structures in reducing damp penetration and heat loss.	8			8
	Answers may refer to the following differences in reducing damp within buildings, Traditional (Pre-1919) Methods: • Use of slate or lead DPC. • Limited materials with no preservatives. • Use of lime mortar and voids which absorb water which evaporates during drying periods. • Voids allow for air movement which support good ventilation to reduce damp, voids traditionally built in walls, floors, chimneys. • Breathable materials used to absorb moisture which then evaporates with air movement. • Heat loss controlled by thickness of building materials and use of internal fabrics to prevent loss through openings. Modern Methods: • Use of plastics for DPC and DPM. • Mass products components with preservatives and high insulation levels. • Wall construction with barriers or cavities to prevent water penetration. • Permanent ventilation methods are reduced as modern methods rely on preventing moisture penetration. • Water does not readily evaporate due to lack of ventilation. • Reduction of cold bridges by ensuring continuous insulation around junctions in building elements • Heat loss controlled through use of insulation in walls, floor and roofs. Heat loss through openings controlled by double/tripled glazed units.				

Band	AO1
4	**7-8 Marks** An excellent description which shows: • Thorough knowledge and understanding of reducing damp and controlling heat loss within masonry construction for both traditional and modern methods. • A confident grasp on the technical terms for reducing damp and controlling heat loss.
3	**5-6 Marks** A very good description which shows: • Generally secure knowledge and understanding of reducing damp within masonry construction for both traditional and modern methods. • A generally secure grasp on the technical terms for reducing damp and controlling heat loss.
2	**3-4 Marks** A basic description which shows: • Some knowledge and understanding of reducing damp within masonry construction for both traditional and modern methods. • Some grasp on the technical terms for reducing damp and controlling heat loss.
1	**1-2 Marks** A limited description which shows: • Little knowledge and understanding of reducing damp within masonry construction for both traditional and modern methods. • Little grasp on the technical terms for reducing damp and controlling heat loss.
	0 Marks Response not creditworthy or not attempted.

Question	Answer	AO1	AO2	AO3	Total Marks
6b	*Describe issues of material compatibility* that may arise *when extending an existing building*	6			6
	Answers may refer to the following compatibility issues that should be considered when extending an existing building: • Matching materials to the same colour and texture of the existing building • Potential changes to materials size with metric to imperial dimensions • Weatherproofing between the two structures • Compatibility between traditional structural frame and a modern frame				

Band	AO2
3	**5-6 Marks** A very good outline which shows: • Thorough knowledge and understanding of issues with material capability when extending an existing building. • A confident grasp on the technical terms for material compatibility.
2	**3-4 Marks** A good description which shows: • Generally secure knowledge and understanding of issues with material capability when extending an existing building. • A generally secure grasp on the technical terms for material compatibility.
1	**1-2 Marks** A basic description which shows: • Some knowledge and understanding of issues with material capability when extending an existing building. • Some grasp on the technical terms for material compatibility.
	0 Marks Response not creditworthy or not attempted.

Question	Answer	AO1	AO2	AO3	Total Marks
7	*Describe the installation and positioning of water supply within footpaths and/or roads.*	4			4
	Award **one** mark for a basic description of any of the following activities, for example: • Colour coding to identify water supply. • Water supply can be placed under either footpath or road at a given depth. • A suitable trench should be dug which excavates through base layers and subsoil. • The trench bottom should have suitable bedding and backfilled with compacted material. • A water service pipe goes from the site boundary to the buildings water main. • The supply pipe is required to connect the building to the service pipe. Award **two** marks for a more developed description of any of the following activities, for example: • Blue colour coding to identify water supply. • Water supply can be placed under either footpath or road at a given depth of a minimum of 750mm below the surface. • A suitable trench should be dug which excavates through base layers and subsoil, potentially by hand to prevent damage to existing services. • The trench bottom should have suitable bedding material and backfilled with compacted granular material to suit road or path classification. • A water service pipe goes from the stie boundary to the buildings water main via an isolating valve. • The metered supply pipe is required to connect the building to the service pipe.				

Question	Answer	AO1	AO2	AO3	Total Marks
8	Outline **two** functions and/or services provided by the local authority planning department.	4			4
	Award **one** mark for a basic outline of each activity, for example: • Pre-application advice and guidance. • Planning Applications. • Conservation of areas, building and trees. • Enforcement. Award **two** marks for a more developed outline of each activity, for example • Pre-application advice and guidance to support developers and homeowners in understanding the planning rules and requirements of an area. • Review and assessing planning applications with the issuing of decisions at the end of a set time-period. • Support the conservation of areas and buildings through planning application support and advice. • Monitor tree protection orders as part of the planning process. • Enforce planning decisions and ensure unlawful construction work is sanctioned.				

Question	Answer	AO1	AO2	AO3	Total Marks
9	*Explain the role of the Construction Industry Training Board (CITB) within the UK's construction industry.*		8		8
	Answers may refer to the following points which explain the role of CITB within the UK's construction industry: • The Construction Industry Training Board (CITB) are a public body and charity funded. • CITB ensure that there is suitable supply of trained and qualified people at all levels within industry. • CITB mainly focus on apprenticeships and career development. • Provide guidance to the government to recognise the industry needs. • Work in partnership with regional bodies to support training needs. • Promote construction careers through Go Construct website and construction content for Careers Wales website. • Identifying skills shortage and creating industry-led action plans. • Open Doors scheme which allows site visits to non-construction personnel to allow for companies to build positive relationships with wider communities. • Providing evidence to Welsh Government committees, such as Economy, Infrastructure and Skills Committee. • Supporting three Regional Skills Partnerships in Wales. • Supporting Qualification Wales on the reform of construction qualifications to serve industry better, such as GCSEs, A Levels and Vocational training.				

Band	AO2
4	**7-8 Marks** An excellent explanation which shows: • Thorough knowledge and understanding of CITB's role within the UK construction industry. • A confident grasp of key concepts of CITB support for construction
3	**5-6 Marks** A good explanation which shows: • Generally secure knowledge and understanding of CITB's role within the UK construction industry. • A generally secure grasp of CITB support for construction
2	**3-4 Marks** A basic explanation which shows: • Some knowledge and understanding of CITB's role within the UK construction industry. • Some grasp of key concepts of CITB support for construction
1	**1-2 Marks** A limited explanation which shows: • Limited knowledge and understanding of CITB's role within the UK construction industry. • Little grasp of key concepts of CITB support for construction
	0 Marks Response not creditworthy or not attempted

Specification at a glance

Summer 2024																
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	a	-	4										a	4	4		
	b	-	4										a	4	4		
2	a	-			2								a	2	2		
	b	-			4								a	4	4		
3	a	-						4					b	4	4		
	b	-						8					f	8		8	
4	a	-		8									a, b, c	8			8
	b	-							2				b, g	2	2		
	c	-							4				e	4	4		
	d	-								6			a	6	6		
5	-	-					4						b	4	4		
6	a	-					8						c	8	8		
	b	-									6		b	6	6		
7	-	-										4	c	4	4		
8	-	-				4							e	4	4		
9	-	-				8							f	8		8	
			8	8	6	12	12	12	6	6	6	4		80	56	16	8