GCSE MARKING SCHEME

SUMMER 2024

GCSE
INTRODUCTION TO THE BUILT ENVIRONMENT – UNIT 1
3509U10-1

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 GCSE INTRODUCTION TO THE BUILT ENVIRONMENT – UNIT 1

SUMMER 2024 MARK SCHEME

Guidance for examiners

Positive marking

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.

Candidates' responses to questions are assessed against the relevant assessment objectives. In GCSE Built Environment, each question will address one assessment objective.

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.

Question		Answer	AO1	AO2	AO3	Total Mark
1.	The built environment sector includes infrastructure, such as roads and bridges.					
	(a)	Identify **two** other civil engineering products that form part of the built environment. Award **one** mark for each correct civil engineering product, to a maximum of two marks, for example: • Railways • Tunnels • Water supply • Sewerage systems • Electrical grids • Telecommunications • Pathways • Embankments *Credit any other valid response.*	2			2
	(b)	Name **two** plumbing services and explain how each service affects the health and wellbeing of building occupants. Award one mark for identification of a plumbing service and one mark for an explanation of its benefit to public health/wellbeing x 2 = 4marks. • Water supply – supply of clean water for drinking, washing, cleaning • Domestic hot water supply – for personal hygiene, showers, baths, dishwashing • Sanitation – supply of clean drinking water, • Central heating – for maintaining a constant heat supply, aids comfort of the building occupants • Drainage of waste (sewage) – removal of used water, toilet waste • Stormwater drainage - removal of excess rain and ground water. *Credit any other valid response.*	4			4

Question		Answer	AO1	AO2	AO3	Total Mark
2.	The construction sector is dependent on the extraction of raw materials from the earth.					
	(a)	State the industry that extracts **each** of the following raw materials. Only acceptable responses: (i) Limestone - Quarrying condone Mining (ii) Timber - Forestry (iii) Gravel - Mining condone Quarrying	3			3
	(b)	Name **two** common construction components that are manufactured from steel. Award one mark for each appropriately named steel components, to a maximum of two, for example: • Columns • Beams • Fixings • Fastenings • Lintels • Purlins • Rails • Profiled sheeting • Cladding • Bars/Mesh (reinforced concrete) • Frames • Partitions • Joists *Credit any other valid response.*	2			2

Question		Answer	AO1	AO2	AO3	Total Mark
3.	Maintenance is essential to ensure buildings retain a good appearance and operate efficiently. Describe the following forms of maintenance.		4			4
	(a) (i)	Planned and preventative maintenance Award **one** mark for a basic description, for example: Timetabled maintenance, carried out on a regular basis. Award **two** marks for a more developed description, for example: Timetabled maintenance carried out on a regular basis, in order to keep something in working order or extend its life.				
	(ii)	Corrective maintenance Award **one** mark for a basic description, for example: Repairing something that has broken. Award **two** marks for a more developed description, for example: A maintenance task performed to identify, isolate, and rectify a fault or problem. *Credit any other valid response.*				

Question		Answer	AO1	AO2	AO3	Total Mark
	(b)	Outline the purpose of a Building Operation and Maintenance Manual. Award **one** mark for a basic outline of the purpose of a Building Operation and Maintenance Manual, for example: Is given to the client on completion of a project and contains **information** about the building. Award **two** marks for a more developed outline, for example: Is given to the client on completion of a project and contains important information **such as data sheets, product user guides and maintenance instructions.** Award **three** marks for a comprehensive outline, for example: Is given to the client on completion of a project and contains important information **such as product user guides and maintenance instructions as well as information on the decommissioning** and subsequent **demolition** of a building. **Indicative content:** • Description of the Buildings Construction, or Installation • 'As Built' Drawings and Specifications • Product Data Sheets/User guides • Cleaning & Maintenance Instructions - including manufacturers health and safety information • Testing and Commissioning Certification • Guarantees and Warranties • Mechanical and Electrical services • Details of the building's construction - such as finishes, cladding, doors and windows, roof construction, and so on • The manual may be developed over the building's life cycle to record changes that take place or details of maintenance • May also include a non-technical 'building user's guide with information for users about environmental controls, access, security and safety systems, etc.	3			3

Question		Answer	AO1	AO2	AO3	Total Mark
4.	Buildings and structures in the Built Environment are categorised according to their characteristics and purpose.					
	(a)	Add each of the buildings in the list below to the correct column in the table. *Coffee shop, Semi-detached house, Factory* Only acceptable responses: **Religious** | **Commercial** | **Industrial** | **Communal** | **Residential** | | Coffee shop | *Factory* | | *Semi-detached house*	3			3
	(b)	A new rail network is being constructed in the Cardiff area to improve connections with nearby towns and villages.				
	(i)	Outline **one** economic benefit and **one** social benefit of this type of development. ***Economic benefit:*** Award **one** mark for a basic description of an economic benefit, for example: • Provides jobs for construction workers. • Creates new jobs in the new railway network. • Easier for commuters to reach their workplace. • Goods can be transported more easily. • Local population can reach local businesses more easily. Award **two** marks for a more developed description of an economic benefit, for example: • Provides jobs for construction workers, which helps local economies with increased employment. • Creates a variety of new jobs to help with the daily running of the new railway network. • Expansion of labour markets due to improved mobility of labour force • Quicker and more efficient moving of goods around the railway network. • Potential for local businesses to make more profit due to the increased mobility of local population. *Credit any other valid response.*	4			4

Question		Answer	AO1	AO2	AO3	Total Mark
		Social benefit: Award **one** mark for a basic outline of a social benefit, for example: • Easier for people to travel to the cities. • Less overcrowding on existing train services. • Better than continually updating existing rail lines. • Reduced road traffic. Award **two** marks for a more developed outline of a social benefit, for example: • Allows easier access to recreational and cultural facilities in city centres. • Relieves overcrowding on existing train services due to additional capacity • Avoids disruption associated with the repair and updating of existing infrastructures. • Reduced road traffic will improve the air quality for residents in that area (Low Emission Zones). *Credit any other valid response.*				

Question		Answer	AO1	AO2	AO3	Total Mark
	(b) (ii)	Outline one possible drawback of constructing the new rail network. Award **one** mark for a basic outline of a drawback, for example: • Disruption to the existing network during construction phase. • The high cost of construction. • Environmental damage to the area. • Increased carbon emissions. Award **two** marks for a more developed outline of a drawback, for example: • Disruption to the existing network during construction phase can force commuters to use other forms of transport. • The high cost of construction projects like this can drain resources for other infrastructure projects. • Pollution, loss of natural habitats and environmental damage to the area due of the development of the new network. • Increased carbon emissions during the construction and operation of the rail network. Credit any other valid response.	2			2

Question		Answer	AO1	AO2	AO3	Total Mark
5.	Cladding is the non-load bearing “skin” of material fixed to the exterior walls of a building.					
	(a)	Name **two** other components of external walls and give an example of each.	4			4
		Award one mark for each correct component and one mark for each linked example. Suitable responses: **Components:** only acceptable answers are: • Structural element • Insulation **Examples:** **Structural element:** • Load bearing masonry (insulating blockwork), • Structural frame (steel or timber), • Insulated panels (SIP) **Insulation:** • Mineral fibre rolls, • Sprayed foam, • Rigid foam • Slabs *Credit any other valid response.*				
	(b)	A building is to be completed with a flat roof.				
	(i)	Suggest **two** suitable flat roof finishes.	2			2
		Award **one** mark for each suitable roof finish, to a maximum of **two**, for example: • Rubber based sheeting • Rubber membrane • EDPM • GRP fibreglass • Rolled asphalt • Modified bitumen • Built up flat roofs (BUR) • PVC *Credit any other valid response.*				

Question		Answer	AO1	AO2	AO3	Total Mark
	(ii)	Name **one** rainwater component that needs to be fitted to the exterior of the building to protect it from rain.	1			1
		Award one mark for each suitable rainwater component, for example: • Guttering • Downpipes • Drainage pipes • Hoppers *Credit any other valid response.*				

Question	Answer	AO1	AO2	AO3	Total Mark
6	An energy company is seeking permission to install a large number of wind turbines in a rural location in Mid Wales.				
	Explain the potential benefits and limitations of installing the wind turbines.		6		6
	Indicative content: **Benefits:** • Installing a wind turbine can save money by cutting electricity bills; after initial installation, electricity costs should be reduced. • They offer a clean and environmentally friendly source of energy and can therefore help in the fight against global warming. • They can generate power during the day and the night. • Turbines can help to reduce a household's carbon dioxide emissions, which is a major cause of climate change. • As 40% of all the wind energy in Europe blows over the UK, this makes it an ideal country for using wind turbines. • If the turbine is producing more electricity than is needed, the surplus can be sold back to the National Grid. **Limitations:** • The initial cost of buying and raising a wind turbine can be expensive. • Wind turbines aren't particularly attractive to look at; however, attitudes towards their appearance have improved over time. • Wind power can be less consistent and less predictable compared with other types of alternative energy sources; it is more effective in winter as this is the windiest time of the year. • They do have an environmental impact. In the case of most wind farms, trees have to be cleared. Environmentalists have expressed concern about the loss of trees for bird life. • Wind turbines emit a low-frequency noise, meaning noise pollution is an issue. • Planning restrictions can make it difficult to install a wind turbine in a rural location. • Difficulty of transporting to location.				

Band	AO2
3	**5-6 marks** A very good explanation, which shows: • thorough knowledge and clear understanding of the benefits and limitations of the wind power project to the local community. • a confident grasp of a number of benefits and a number of limitations related to wind power.
2	**3-4 marks** A good explanation, which shows: • a generally secure knowledge and understanding of the benefits and limitations of the wind power project to the local community. • a generally secure grasp of some of the benefits and some of the limitations related to wind power.
1	**1-2 marks** A basic explanation, which shows: • a basic knowledge and understanding of the benefits and limitations of the wind power project to the local community. • a limited grasp of either the benefits and/or the limitations related to wind power.
	0 marks Response not creditworthy or not attempted.

Question		Answer	AO1	AO2	AO3	Total Mark
7.	Cellular construction is often used in the construction of blocks of flats and student accommodation.					
	(a)	Describe **two** characteristics of Cellular construction. Award **one** mark for a basic description, for example: Pre manufactured units are placed in position. Award **two** marks for a more developed description, for example: Pre manufactured units are set horizontally and vertically together to create a sturdy structure. **Indicative content:** • Load bearing walls provide the main vertical support and lateral stability for floors • External wall panels, lift shafts or staircases are used to provide stability • Bridging components such as floors, roofs and beams are supported by load bearing walls • Create structurally efficient buildings with high levels of acoustic and fire separation between adjacent rooms • They are suitable for buildings that follow regular grids and repeating floor plans where internal separating or party walls are required, such as in blocks of flats and student accommodation • The main weight of the building is carried through the walls, they must be sufficiently thick to carry their own weight as well as loads from above, and so the potential height of a structure built in this manner is limited.	4			4

Question		Answer	AO1	AO2	AO3	Total Mark
	(b)	This Grade II listed historic building is to be renovated. Explain the importance of using heritage and traditional methods when maintaining the historic built environment. **Assess** the quality and appropriateness of the candidate's responses, then: **Award one mark** for each **basic** explanation, for example: *To maintain the history and character of a building.* **Award two marks** for each **more developed** explanation, for example: *To maintain the history, character and value of a building for the benefit of present and future generations.* **Total the marks** for all explanations given to a **maximum of four marks**. *Credit any other valid response.* **Indicative content:** • To reduce the need for new materials / preserve existing high-quality materials. • Matching existing materials and methods of construction where possible • Preserve the original craftsmanship evident in older buildings • The preservation of the trade skills and knowledge required to carry out this work • Retaining the original character of the building can make it more valuable/attractive, for residential or business use • An old building properly maintained may outlast newer buildings • It can cost less to maintain an old building than to demolish it and replace it with a new building.		4		4

Question		Answer	AO1	AO2	AO3	Total Mark
8.	A residential home developer is considering the purchase of a greenfield site.					
	(a) (i)	Describe **two** benefits of a greenfield site to the developer. Award **one** mark for a basic description of a suitable benefit, for example: Greenfield sites tend to be cheaper to develop. Award **two** marks for a description of a suitable benefit, for example: Greenfield sites tend to be cheaper to develop, subject to legal and planning constraints. **Indicative content:** • Have not been built upon previously. • Developers building on Greenfield sites are essentially starting from scratch, so any new buildings can be designed to meet future and current needs, as well as affording much more flexibility in the design process. • There are few clean-up costs associated with greenfield sites and seldom a need to demolish or rebuild existing structures. • The town or city has the opportunity to expand and the population to grow. • Being situated on the edge of a towns or city may mean that a greenfield site has a more pleasant environment and less congestion. Good selling points when homes go on market.	4			4

Question		Answer	AO1	AO2	AO3	Total Mark
8	(a) (ii)	Describe **one** potential drawback of a greenfield site to the developer. Award **one** mark for a basic identification of a suitable drawback, for example: There may be no existing road connections to a greenfield site. Award **one** mark for a more developed identification of a suitable drawback, for example: The increased cost and time necessary for infrastructure works, such as new roads and utility connections must be considered. **Indicative content:** • Valuable rural areas of natural beauty may be lost, natural habitats destroyed and once the land is built on, it is unlikely to be turned back to countryside • Can be controversial and are notoriously slow in gaining planning permission from councils • The expansion of the built environment to greenfield sites inevitably results in increased pollution and traffic congestion.	2			2

Question		Answer	AO1	AO2	AO3	Total Mark
8	(b)	The site is within a protected area. Outline an approach the developer could take to reduce the environmental impact during construction of new houses on the greenfield site. Award **one** mark for a basic response, for example: Limiting the amount of pollution released during construction. Award **two** marks for a more developed response, for example: Limiting the amount of pollution released into water, air or the ground during construction. **Indicative content:** • Developers may try to reduce the impact on nature by building tunnels under roads for newts to use • Creating new roosts for bats when their original roosts are lost because of development • Reducing carbon dioxide emissions • Minimising land disturbance and leaving maximum vegetation cover to prevent erosion and run-off • Controlling dust through use mesh screens and fine water sprays to control dust and dampen down the site. • Covering stores of cement, sand, and other powders, and locating them where they will not be washed into waterways or drainage areas • Using non-toxic paints, solvents, and other hazardous materials wherever possible • Segregating and monitoring toxic substances to prevent spills and site contamination • Collecting any wastewater generated from site activities in settlement tanks and disposing according to environmental regulations • Avoiding the burning of materials on site. • Reducing noise pollution through careful handling of materials; and use modern, quiet power tools • Using sustainable materials.	2			2

Question	Answer	AO1	AO2	AO3	Total Mark
9.	Electricians, gas engineers and plumbers are classified as building service engineers.				
	Describe the contribution made by **two** of these service engineers to building projects. Award one mark for each relevant description of the contribution made to a maximum of two marks (2x2). **Indicative content:** **An electrician:** • Installs, inspects and tests electrical equipment • Follows relevant safety regulations • Checks electrical systems to make sure they're working safely, • Builds and install control panels that operate electrical systems in buildings, • Installs street lighting and traffic management systems, • Fits electrical wiring, sockets and switches to new-build homes, • Rewires homes and commercial premises during refurbishment. **A gas engineer:** • Installs, inspects and tests gas services and equipment • Follows relevant safety regulations • Follows relevant safety regulations • Installs cold water, hot water, sanitation (toilets), boilers, and central heating systems, • Services gas and oil-fired central heating systems and radiators **A plumber:** • Installs cold water, hot water, sanitation (toilets), and central heating systems • Follows relevant safety regulations • Installs water, drainage and heating systems, • Cuts, shapes and joins pipes and fittings, • Finds and fixes faults, • Installs and repairs domestic appliances like showers and washing machines, • Responds to emergency callouts, like boiler breakdowns or blocked drains.	4			4

Question	Answer	AO1	AO2	AO3	Total Mark
10.	A construction company has been contracted to refurbish a tunnel which is part of a town's sewerage system. The brickwork lining of the tunnel has deteriorated and needs to be repaired. The work will be located in a section of the tunnel which is an enclosed space. The tunnel is 10m below ground level, and 50 metres in length. Analyse the safety issues that will need to be considered during the planning stage of the project including the personal protective equipment (PPE) that will be necessary when working in this situation.			10	10
	Answers may refer to the following main components: **Safety issues:** • Exposure to fumes • Reduced oxygen levels • Flooding/drowning • Health/contamination risks • Danger of roof collapse • Dangers of working with electrical equipment in wet conditions • Gas pipelines/Electrical supply might be channelled through the sewer • Noise levels - working in a confined space • Lack of natural light • Evacuation procedures in the event of accident **PPE:** The following types could be referred to: • Eye protection, gloves, harnesses and hearing protection. • High-visibility and protective clothing. • Respiratory equipment. • Safety footwear and safety helmets PPE may be analysed in relation to the risk of injury to: • Skin – infections, cuts, bruises • Lungs – germs, bacteria, dust • Head – low roof level, falling debris • Eyes – dust, eye infections from contaminated water, loose materials • Ears – noise level in confined space.				

Band	AO3
4	**9-10 marks** An **excellent** analysis which includes strong evidence of thoroughly examining the scenario giving: • a detailed and clear analysis of the safety issues involved when working in an enclosed space. • clear recommendations and analysis of the PPE necessary in this situation. • 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** analysis which includes secure evidence of examining the scenario giving: • a balance of descriptions across the 2 areas given. • 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** analysis which includes some evidence of examining the scenario to: • one example of PPE cited • more than one item per classification • limited linked descriptions on working in an enclosed space
1	**1-2 marks** A **limited** analysis which includes little evidence of examining the scenario to: • limited PPE knowledge • limited knowledge of safety considerations when working in an enclosed space. • some errors in grammar, punctuation and spelling, which affect clarity of communication. • writing shows limited use of health and safety 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	AO3 Marks
		2.1.1	2.1.2	2.1.3	2.1.4	2.1.5	2.1.6	2.1.7	2.1.8					
1	(a)	2								b	2	2	0	0
	(b)	4								c	4	4	0	0
2	(a)		3							a	3	3	0	0
	(b)		2							b	2	2	0	0
3	(a)		4							d	4	4	0	0
	(b)		3							d	3	3	0	0
4	(a)			3						a,b,c	3	3	0	0
	(b)			6						h	6	6	0	0
5	(a)				4					b	4	4	0	0
	(b)				3					b	3	3	0	0
6					6					c	6	0	6	0
7	(a)					4				a	4	4	0	0
	(b)					4				d	4	0	4	0
8	(a)						6			e	6	6	0	0
	(b)						2			b	2	2	0	0
9								4		h,i,j	4	4	0	0
10									10	a,b,c, d,f	10	0	0	10
Total marks		6	12	9	13	8	8	4	10		**70**	**50**	**10**	**10**