



Rewarding Learning

General Certificate of Secondary Education

Construction and the Built Environment

Unit 1

Introduction to the Built Environment

[GCN11]

Assessment

**MARK
SCHEME**

General Marking Instructions

Introduction

Mark schemes are intended to ensure that the GCSE examinations are marked consistently and fairly. The mark schemes provide markers with an indication of the nature and range of candidates' responses likely to be worthy of credit. They also set out the criteria which they should apply in allocating marks to candidates' responses.

Assessment Objectives

Below are the assessment objectives for Construction.

Candidates must:

- AO1** recall, select and communicate their knowledge and understanding of concepts, issues and terminology;
- AO2** apply skills, knowledge and understanding in a variety of contexts and in planning and carrying out investigations and tasks; and
- AO3** analyse and evaluate evidence, make reasoned judgements and present conclusions.

Quality of candidates' responses

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity which may reasonably be expected of a 16-year-old which is the age at which the majority of candidates sit their GCSE examinations.

Flexibility in marking

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

Positive marking

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 16-year-old GCSE candidate.

Awarding zero marks

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

Marking calculations

In marking answers involving calculations, examiners should apply the "own figure rule" so that candidates are not penalised more than once for a computational error.

Types of mark schemes

Mark schemes for tasks or questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

Other questions which require only short answers are marked on a point for point basis with marks awarded for each valid piece of information provided.

Levels of response

Tasks and questions requiring candidates to respond in extended writing are marked in terms of levels of response. In deciding which level of response to award, examiners should look for the “best fit” bearing in mind that weakness in one area may be compensated for by strength in another. In deciding which mark within a particular level to award to any response, examiners are expected to use their professional judgement. The following guidance is provided to assist examiners.

- **Threshold performance:** Response which just merits inclusion in the level and should be awarded a mark at or near the bottom of the range.
- **Intermediate performance:** Response which clearly merits inclusion in the level and should be awarded a mark at or near the middle of the range.
- **High performance:** Response which fully satisfies the level description and should be awarded a mark at or near the top of the range.

Quality of written communication

Quality of written communication is taken into account in assessing candidates’ response to all tasks and questions that require them to respond in extended written form. These tasks and questions are marked on the basis of levels of response. The description for each level of response includes reference to the quality of written communication.

For conciseness, quality of written communication is distinguished within levels of response as follows:

Level 1: Quality of written communication is limited.

Level 2: Quality of written communication is satisfactory.

Level 3: Quality of written communication is excellent.

In interpreting these level descriptions, examiners should refer to the more detailed guidance provided below:

Level 1 (Basic): The candidate makes only a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

Level 2 (Good): The candidate makes a reasonable selection and use of an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is some use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning clear.

Level 3 (Excellent): The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is widespread and accurate use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a sufficiently high standard to make meaning clear.

Candidates are expected to answer **all** questions

**AVAILABLE
MARKS**

1 Answers relating to Northern Ireland

- (a)** 1. Waterfront Hall, SSE Arena, Royal Hospital, Named School or College, or any other suitable answer [1]
2. Peace Bridge, Belfast Harbour, Belfast International Airport, M2 Motorway, or any other suitable answer [1]
3. BT/broadband Network, Electricity Network, Phoenix Gas, water supply, waste water disposal/sewage disposal. or any other suitable answer [1]
- (b)** 1. Any of the following or other appropriate response:
- Design a building
 - Supervise the work on site
 - Apply for planning permission
 - Apply for Building Control approval
 - Prepare the working drawing or drawings
 - Prepare the site plan
 - Appoint a design team
 - Approve interim valuations
 - Tender process
 - Specification of materials
- [1] per response up to a maximum of [3] [3]
2. Any of the following or other appropriate response:
- undertake technical and feasibility studies and site investigations;
 - develop detailed designs;
 - assess the potential risks of specific projects, as well as undertake risk management in specialist roles;
 - supervise tendering procedures and put together proposals;
 - manage, supervise and visit contractors on site and advise on civil engineering issues;
 - communicate and liaise effectively with colleagues and architects, subcontractors, contracting civil engineers, consultants, co-workers and clients;
 - manage budgets and other project resources;
 - lead teams of other engineers, perhaps from other organisations or firms;
 - compile, check and approve reports;
 - review and approve project drawings;
 - use computer-aided design (CAD) packages for designing projects;
 - schedule material and equipment purchases and delivery;
 - attend public meetings to discuss projects, especially in a senior role;
 - ensure that a project runs smoothly and that the structure is completed on time and within budget;
- [1] per response up to a maximum of [3] [3]

			AVAILABLE MARKS
<p>3. Any of the following or other appropriate response: Design, install and maintain the services that are needed to allow a building to do what it's designed to. In any building, this includes:</p> <ul style="list-style-type: none"> • acoustics • health and safety • heating • lifts and escalators • lighting • power and supply • security • IT. <p>[1] per response up to a maximum of [3]</p>	[3]	12	
<p>2 Any three of the following or other appropriate response:</p> <ul style="list-style-type: none"> • Do not plug in before checking. If you plug it in and there is a fault with it, you could be seriously injured or killed. • Check body of power tool. Check that it's clean from excessive dirt or grease. This dirt could make the tool more difficult to hold and control. It could also hide other defects. • Check for cracks in the body. Check for loose fittings and missing bits of the tool. Check to see if there is an up to date PAT label on the tool. • Check cable on power tool. The cable often lies on the ground in dirt and water. It can easily be damaged by walking or driving over it. Check the cable for cuts, bare wires etc. • Check plug of power tool. Check it's not dirty or wet and the pins are in place. Check the casing isn't cracked. • Check the voltage of the power tool. If the plug and cable are coloured yellow the power tool will operate at 110 volts. To work on building sites, all power tools should be at this reduced voltage or use battery operated tools. <p>[2] per explanation up a maximum of [6]</p>	[6]	6	

- 3 (a) Cellular Structure/construction [1]
- (b) Any of the following or other appropriate response:
 • A cellular structure consisting of walls
 • Walls joined to its neighbour mostly at right angles
 • External walls form the boundary of building
 • Internal walls divide the structure into rooms
 • Internal walls can be loadbearing.
 • Loadbearing walls carry the load to foundation and surrounding bearing strata.
 [1] per explanation up a maximum of [3] [3]
- (c) Any of the following or other appropriate response:
 • Brick
 • Block
 • Stone
 • Mass/insitu concrete
 [1] per explanation up a maximum of [3] [3]
- (d) The strength of cellular structures is achieved by the large number of short walls that are joined together at right angles. [2]
- (e) Any **two** of the following or other appropriate response:
 A BIM Coordinator will be an integral part of the design team, establishing and managing the BIM project workflow and being responsible for quality, clash detection and data conversion.
 Typical roles include:
 • Developing and maintaining the BIM Model for the project.
 • Ensuring teamwork and goals are delivered on time.
 • Quality control procedures, ensuring all work is fit for purpose
 • Identifying clashes using clash detection software
 • Coordinating the project teams and liaising with the design team and client to ensure success.
 The BIM Coordinator is a key figure in a project team, as they are responsible for the BIM workflow and ensuring that any potential issues are dealt with effectively. They also reduce costs and construction time. The BIM coordinator provides the foundation for the ongoing management of the completed building.
 [2] per explanation up a maximum of [4] [4]

AVAILABLE
MARKS

13

- 4 (i) Any **two** of the following or other appropriate response:
- The Client will first take the decision that something is going to be built and then appoint an Architect to oversee the design and construction of the project.
 - During this stage the design team examines the Client's proposals to make sure that there are no major problems or constraints relating to the proposed type of building and/or the selected site.
 - Outline Planning Permission could be applied for.
 - The best procurement method chosen.
- [2] per explanation up a maximum of [4] [4]
- (ii) Any **two** of the following or other appropriate response:
The Contractor must organise the site so that the construction work can progress smoothly without undue delays and taking into account all legislation which ensures the health and safety of the work force. This might involve the preparation of the Building Contract and:
- Arranging for it to be signed,
 - Issuing of Production Information to the Contractor,
 - Arranging site handover to the Contractor,
 - The QS checks the progress of the works at the periods or stages specified in the contract and the Architect will approve payments to the contractor based on this progress record.
 - When completion is approaching the Designers must provide drawings and other information for the Health and Safety file and may get involved in giving general advice on operation and maintenance of the building.
 - Upon completion, the Architect will issue a certificate of practical completion which marks the start of the defects liability period. At this stage the Client must take over the insurance of the building. A survey of all outstanding items and defects will also be made. The Contractor must complete all the outstanding items and make good any defects
- [2] per explanation up a maximum of [4] [4]
- (iii) Any **two** of the following or other appropriate response:
- At this stage the Architect and Design Team will be involved in identifying defects (flaws and imperfections in workmanship or materials used) following completion and make Final Inspections.
 - At the end of the Defects Liability Period when all the defects are corrected and the works are complete a final certificate can be issued. All outstanding claims made by the Contractor must also be settled.
 - Although the contract is now discharged, it may be resurrected if defects become apparent.
 - They may also be required to provide information required by others for settling the Final Account
 - At this stage the design team should also review the project and determine if any changes could be made in future projects of a similar nature which could result in an improved performance.
 - A post-occupancy evaluation, a structured review of how the building performs, will give the design team and client valuable information on how well the building performs against expectations, and will provide valuable insights for future projects.
- [2] per explanation up a maximum of [4] [4]

- 5 (a)** Any **three** of the following or other appropriate response:
- Pine
 - Fir
 - Spruce
 - Larch
 - Cedar
 - Giant Redwood
- [1] per explanation up a maximum of [3] [3]
- (b)**
- The term softwood refers to the botanical origin of wood and not to density or physical hardness.
 - Softwoods come from cone-bearing trees, often with evergreen needle-like leaves.
 - Softwood trees are usually much faster growing than hardwoods.
 - They grow in cold or cool temperate climates in countries such as Canada or Northern Russia
- [3]
- (c)** Any **two** of the following or other appropriate response:
- Roof timbers
 - Stud walls
 - Decking
 - Any location where timber is used structurally.
- [1] per explanation up a maximum of [2] [2]
- (d)** Any **three** of the following or other appropriate response:
- Horse Chestnut
 - Ash
 - Oak
 - Sycamore
 - Beech
 - Elm
 - Lime
 - Willow
- [1] per explanation up a maximum of [3] [3]
- (e)**
- The term hardwood refers to the botanical origin of wood and not to density or physical hardness.
 - Hardwoods come from broad-leaved trees. Most are deciduous but they can be evergreen
 - Hardwood trees are usually much slower growing than softwoods.
- [3]
- (f)** Any **two** of the following or other appropriate response:
- Furniture
 - Doors
 - Kitchen Doors
 - Exterior timber sheeting
- [1] per explanation up a maximum of [2] [2]

AVAILABLE
MARKS

16

- 6 (a) Any of the following or other appropriate response:
- Insulation is a material used to improve the thermal quality of your home
 - The type used will depend on where you are insulating.
 - Surfaces can be insulated
- [1] per point up a maximum of [2] [2]

- (b) Any **three** of the following or other appropriate response:
- Glass fibre
 - Sheep's wool
 - Polystyrene rigid sheet
 - Styrofoam insulation boards
- [1] per point up a maximum of [3] [3]

- (c) Benefits of insulating or other appropriate response:
- Improving the comfort of your home
 - Reduced usage of heating fuels
 - Environmental benefits: less dependent on fossil fuels
 - Saving money on heating and electricity
 - A quick and efficient way to make your house energy efficient as opposed to renewables
 - Insulation of hot water cylinder easiest way to save energy.

Level 1 ([1]–[3])

Candidates show a limited analysis of the benefits of insulating a building. Candidates will show an understanding of the benefits in relation to energy efficiency, cost savings, pay back periods, environmental benefits and human comfort. Their level of accuracy for spelling, punctuation and grammar is limited. They discuss the benefits in a limited form and style of writing. Their discussion is not fully coherent or organised and there is little use of specialist terms.

Level 2 ([4]–[6])

Candidates show a satisfactory analysis of the benefits of insulating a building. Candidates will show an understanding of the benefits in relation to energy efficiency, cost savings, pay back periods, environmental benefits and human comfort. Their level of accuracy for spelling, punctuation and grammar is satisfactory. They discuss the benefits in a satisfactory form and style of writing. Their discussion is coherent or organised in most cases and they use a range of specialist terms.

Level 3 ([7]–[10])

Candidates show an excellent analysis of the benefits of insulating a building. Candidates will show an understanding of the benefits in relation to energy efficiency, cost savings, pay back periods, environmental benefits and human comfort. Their level of accuracy for spelling, punctuation and grammar is excellent. They discuss the benefits in a satisfactory form and style of writing. Their discussion is coherent and very well organized and they use a wide range of specialist terms.

When a response is not worthy of credit [0] should be awarded. Up to a maximum of [4] marks will be awarded for spelling, punctuation and grammar.

[4] for Quality of written communication. [10]

15

- 7 Any of the following or other appropriate response:
- Increased local housing stock
 - Regeneration of a disused building
 - Local jobs
 - Allows first-time buyers to purchase their own homes
 - Impact on the local area
- [2] per evaluative discussion up a maximum of [6]

[6]

Total

**AVAILABLE
MARKS**

6

80