



Rewarding Learning

**General Certificate of Secondary Education
2023**

Construction and the Built Environment

Unit 1

Introduction to the Built Environment

[GCN11]

MONDAY 5 JUNE, MORNING

**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.

- 1 (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 load bearing.
 • Load bearing walls carry the load to foundation and surrounding bearing strata.
 [1] per explanation up to a maximum of [3]. [3]
- (c)** Any of the following or other appropriate response:
 • Brick
 • Block
 • Stone
 • Mass/in situ concrete
 [1] per explanation up to 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 of the following or other appropriate response:
 A BIM co-ordinator 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.
 • Co-ordinating the project teams and liaising with the design team and client to ensure success.
 The BIM co-ordinator 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 and laying the foundations for the ongoing management of the completed building.
 [1] per explanation up to a maximum of [4]. [4]

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- 2 (a) Royal Institute of British Architect's Plan of Work or RIBA Plan of Work. [1]
- (b) 2013 or 2020 [1]
- (c) 8 stages. [1]
- (d) This will involve outlining in detail some of the following issues:
- Who is the client representative (Project manager. [in-house/consultant]/architect etc.).
 - Who is the design team leader? (usually the architect).
 - What are the communication channels?
 - What will the communication media be?
 - Include contact details with email and postal addresses for all parties involved.
 - Regularity of meetings between design team members.
- Any [1] per description up to a maximum of [2] for each stage. [2]
- (e) This will involve outlining in detail some of the following issues:
- Once the project is declared feasible, the Architect will usually prepare some alternative proposals taking consideration of the Client's general considerations. These are then presented to the Client. The information should include:
 - Outline drawings showing the design.
 - Explanation of the main decisions that have been made.
 - Expectation of costs and time scale.
 - Further consideration of the proposed procurement route.
 - After consideration of these proposals and perhaps some amendment the Client should instruct the design team to proceed.
- Any [1] per description up to a maximum of [2] for each stage. [2]
- (f) This will involve outlining in detail some of the following issues:
- The agreed scheme plans/elevations etc. will be finalised and passed on to the structural and services engineers.
 - Architectural and structural detailing work is done at this stage.
 - The architect must co-ordinate the design process and ensure that all the interested parties receive the relevant information as and when required.
 - All drawings should be checked by the QS to ensure compliance with the cost targets.
 - All the drawings and structural calculations must be submitted for building control for approval.
- Any [1] per description up to a maximum of [2] for each stage. [2]
- (g) This will involve outlining in detail some of the following issues.
- Constructor organises the site.
 - Responsibility for legislation and regulations.
 - Contractual obligations.
 - Site handover.
 - Any construction activity.
 - Programming of work.
 - Stage payments.
 - Testing of equipment and preparation for handover to the client.
 - Practical completion certificate.
- Any [1] per description up to a maximum of [2] for each stage. [2]

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- (h) Any of the following or other appropriate response:
- A row or street of houses/occupied by different tenants. Separate doors/ houses joined together. Usually 2–3 stories.
- [1] per response up to a maximum of [2].

[2]

- (i) Any of the following or other appropriate response:
- Design the social housing dwellings.
 - 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]

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3 (a) Material 1: Brickwork Or any other appropriate response

Secured across a cavity to the timber frame with flexible metal ties. Flexible wall ties are used to allow for differential movement between the brick cladding and the timber frame. Movement should be accommodated for at window sills and roof structures.

Material 2: Roofing tiles Or any other appropriate response

They are hung on timber battens which have been secured to the plywood. These battens must be treated with a timber preservative prior to being secured to the plywood.

[1] per material and [2] for fixing method. [6]

- (b)** 1. With the platform frame method each storey is framed up as a separate operation making use of each floor as an erection platform. [2]
2. With the balloon frame method the building is fabricated from wall sections two stories high. [2]

(c) Advantages

- Timber frame houses are usually made in factories under controlled conditions into large wall sized units which make economic use of the materials.
- Timber framed construction allows for the use of semi-skilled labour for the manufacture in factory-controlled conditions.
- Manufacture isn't affected by inclement weather.
- Speed of erection on site as fewer wet trades involved.
- Higher levels of insulation. The use of low thermal capacity linings absorbs less heat than masonry walls making it easier to reach the required comfort temperature more quickly.
- Flexible, easy to modify or add to.
- Many types of cladding available.
- Construction method simple to insulate.

Disadvantages

- Greater fear of combustibility.
- Relatively poor sound insulation if building timber framed semi-detached housing.

Level 1 ([1]–[4])

Candidates compare advantages and disadvantages of using a timber framed construction when building domestic housing. Candidates will show an understanding of the advantages and disadvantages as listed above. Their level of accuracy for spelling, punctuation and grammar is limited. They discuss advantages and disadvantages 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 ([5]–[7])

Candidates compare advantages and disadvantages of using a timber framed construction when building domestic housing. Candidates will show an understanding of the advantages and disadvantages as listed above. Their level of accuracy for spelling, punctuation and grammar is satisfactory. They discuss advantages and disadvantages 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 ([8]–[10])

Candidates compare advantages and disadvantages of using a timber framed construction when building domestic housing. Candidates will show an understanding of the advantages and disadvantages as listed above. Their level of accuracy for spelling, punctuation and grammar is excellent. They discuss advantages and disadvantages in an excellent form and style of writing. Their discussion is coherent and very well organised and they use a wide range of specialist terms.

When a response is not worthy of credit [0] should be awarded.

[4] of the total marks awarded for quality of written communication. [10]

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4 1. Labour [1]

The people required to design and construct a building. [2]

Examples include craft operatives or technical and managerial roles. [1]

2. Plant [1]

The machines used to help with all aspects of construction work. [2]

Examples include any type of machine or hand tool. [1]

3. Materials [1]

The products required to construct a building. The procurement of materials begins at the tender stage. Consideration of storage, security and handling. [2]

Examples include any product used to construct a building. [1]

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Plant, labour and materials are the three resources, however marks should be awarded for any other reasonable response given to explain including examples.

| | | | AVAILABLE MARKS |
|--------------|---|--|-----------------|
| 5 | <p>(a) The Health and Safety at Work Order (NI) 1978. [1]</p> <p>(b) • Take care, not put themselves or other people at risk. • Co-operate with employers. • Use any equipment and safeguards provided by their employer. • Not misuse or interfere with anything that is provided for their health and safety. [1] per response up to a maximum of [2]. [2]</p> <p>(c) Ensure that the building is designed and built so that it doesn't create a Health and Safety hazard for the construction team or end user. Provide information on this. [2]</p> <p>(d) • Head protection/hard hat. • Foot protection/steel toe-cap boots. • High visibility vest. • Ear protection. • Eye protection. • Gloves. [1] per response up to a maximum of [2]. [2]</p> <p>(e) Any of the following or other appropriate response: • 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's 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. Checks it's not dirty, wet and the pins are in place. Check the casing isn't cracked. • Check the voltage of 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. [2] per explanation up to a maximum of [6]. [6]</p> | | 13 |
| 6 | <p>Any of the following 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. • Sound insulation properties. [2] per evaluative discussion up to a maximum of [6]. [6]</p> | | 6 |
| Total | | | 80 |
| | | | |