



*Rewarding Learning*

**General Certificate of Secondary Education  
2018**

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## **Construction and the Built Environment**

Unit 1

Introduction to the Built Environment

**[GCN11]**

**WEDNESDAY 13 JUNE, AFTERNOON**

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# **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.

		AVAILABLE MARKS
<b>1</b>	<p><b>(a)</b> The Health and Safety at Work Order (NI) 1978 (Regulations or Act) [1]</p> <p><b>(b)</b></p> <ul style="list-style-type: none"> <li>• Provide a safe place to work and a safe way to get to and from the work area including signage</li> <li>• Provide and maintain safe machinery and equipment</li> <li>• Provide information, instruction, training and supervision</li> <li>• Make sure people are safe when working with articles and substances</li> <li>• Have a written safety policy and ensure all employees are aware of it.</li> <li>• Provide welfare facilities and safety equipment (PPE)</li> </ul> <p>Or any other reasonable response [1] per response up to a maximum of [3] [3]</p> <p><b>(c)</b> Carry out all construction activities in a safe way Do not do anything on site which could harm others Follow Health and Safety instructions provided Wear all PPE provided by employer on site Do not dismantle scaffolding unless directed to do so by site manager Use all power tools and equipment in a safe way [3] Report risks Or any other appropriate response  [1] per response up to a maximum of [3]</p> <p><b>(d)</b> Head Protection/Hard Hat/gloves/respiratory equipment Foot Protection/Steel TOE-CAP boots High Visibility Vest/eye protection  Or any other reasonable response [1] per response up to a maximum of [3] [3]</p> <p><b>(e)</b></p> <ul style="list-style-type: none"> <li>• Keep back straight</li> <li>• Keep arms as close to the body as possible</li> <li>• Place hands under the load and pull the load close to body</li> <li>• Grip firmly using the whole hand and not just fingers</li> <li>• Use legs to lift the load and not back.</li> </ul> <p>Or any other reasonable response [1] per response up to a maximum of [5] [5]</p>	15
<b>2</b>	<p><b>(a) Bricklayer</b> Price work Marks out small buildings Puts in foundation concrete Builds the sub-structure Building super-structure Building brickwork Build concrete blocks Put/build in lintels/heads/sills (3 separate answers) Build in wall ties Place insulation Order materials Measure up/quantities Read drawings Building chimneys Building fireplaces Meeting with client  Or any other reasonable response [1] per response up to a maximum of [3] [3]</p>	

			AVAILABLE MARKS
	<b>(b) Plumber</b>		
	Price work		
	Mark out position of radiators etc.		
	Carry out first fix plumbing		
	Carry out second fix plumbing		
	Fit a heating system (heat recovery/air con)		
	Fit a bathroom		
	Fit a boiler		
	Service a heating system		
	Fix an existing system		
	Bends and shapes copper and lead		
	Design layout		
	Or any other reasonable response		
	[1] per response up to a maximum of [3]	[3]	6
<b>3</b>	<b>(a) Labour (workforce)</b>		
		[1]	
	The people required to design and construct a building	[1]	
	Examples include Craft operatives or Technical and Managerial	[1]	
	<b>(b) Finance (money)</b>	[1]	
		[1]	
	The money required by the client to pay for any construction project	[1]	
	Examples include mortgage, bank loan or government funding	[1]	
	<b>(c) Materials</b>	[1]	
		[1]	
	The products required to construct a building	[1]	
	Examples include any product used to construct a building	[1]	9
	Labour, finance and material are the three resources however marks should be awarded for any other reasonable response. (site)		
<b>4</b>	<b>(a) Stainless steel, sand, cement, water, DPC, insulation, stone, brick, block, mortar, plasterboard, plaster, concrete, steel, wood, lintels, sill</b>		
	Or any other reasonable response		
	[1] per response up to a maximum of [4]	[4]	
	<b>(b) Self finish:</b>		
	This is a finish which is inherent in the material and does not have to be specially applied on site	[1]	
	An advantage:		
	• Minimises shrinkage occurring		
	• Uniform in colour and size		
	• Faster construction method		
	• Will not require to be replaced		
	Or any other reasonable response		
	[1] per response up to a maximum of [1]	[1]	

		AVAILABLE MARKS	
<p>(c) Applied finish: This is a finish which is actually applied on site</p> <p>A disadvantage:</p> <ul style="list-style-type: none"> <li>• Considerable drying out time</li> <li>• Possible shrinkage/expansion problems</li> <li>• Will need to be replaced in time.</li> </ul> <p>Or any other reasonable response [1] per response up to a maximum of [1]</p>	<p>[1]</p> <p>[1]</p>	8	
<p>5 (a) Royal Institute of British Architect's Plan of Work or RIBA Plan of Work</p>			[1]
<p>(b) 1. Strategic Definition</p> <p>2. Preparation and Brief (either or)</p> <p>3. Concept Design</p> <p>4. Developed Design</p> <p>5. Technical Design</p> <p>6. Construction</p> <p>7. Handover and Close Out (either or)</p> <p>8. In Use</p> <p>They do not need to be stated in order [1] per response up to a maximum of [8]</p>			[8]
<p>(c) • 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</p> <ul style="list-style-type: none"> <li>• 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</li> <li>• Outline Planning Permission could be applied for</li> <li>• The best procurement method chosen.</li> </ul> <p>Or any other reasonable response [1] per response up to a maximum of [2]</p>			[2]
<p>(d) • Accepted as the most suitable plan (industry standard); the process is well known and it is used by architects to achieve high quality workmanship.</p> <ul style="list-style-type: none"> <li>• The project is divided into well defined stages; therefore a step by step approach is adopted.</li> <li>• In each stage individual members of the design team can be given different targets, preventing an overlap of work and enabling progress.</li> <li>• Each design team member knows what will be expected of them in their respective job roles; enabling realistic deadlines to be set.</li> <li>• Encourages good communication between team members.</li> <li>• Logical and systematic process.</li> <li>• The design work will be mostly complete before construction work commences.</li> </ul>			

			AVAILABLE MARKS
	<ul style="list-style-type: none"> <li>• The process enables clients who are not familiar with construction projects to keep track of the project.</li> <li>• Achievable completion dates can be set.</li> <li>• Enhances budgetary controls.</li> <li>• Encourages a culture of cooperation and teamwork</li> <li>• The client will establish a well defined brief; therefore the design team will accomplish his requirements from the commencement of the process.</li> <li>• Increased job satisfaction.</li> <li>• Architect's fees can be based on the completion of the various stages, therefore the client will get value for money.</li> </ul> <p>Or any other reasonable response [2] per response up to a maximum of [6]</p>	[6]	
<b>(e)</b>	<b>Semi-Detached Housing:</b>		
	<p>Two dwellings are under one roof Symmetrical Each dwelling is occupied by different tenants Semi-detached dwellings may be one, two or three storeys high</p> <p>Or any other reasonable response [1] per response up to a maximum of [2]</p>	[2]	
<b>(f)</b>	<b>Any of the following or other appropriate response:</b>		
	<p>Prepare a Bill of Quantities Cost control for the project Prepare tender documents Estimate total costs for the project Prepare interim valuations for payment</p> <p>Or any other reasonable response [1] per response up to a maximum of [3]</p>	[3]	22
<b>6</b>	<b>(a) Client</b>		
	<p>Any <b>three</b> from the following:</p> <ul style="list-style-type: none"> <li>• Owns or leases the site</li> <li>• Advise on the requirement of project by creating a brief.</li> <li>• Advise on financial limitations of the proposed development.</li> <li>• Advise on desired time frame.</li> </ul> <p>Or any other reasonable response [1] per role, up to a maximum of [3]</p>	[3]	
	<b>(b) Rectangular Steel Framed Structure or rectangular framed structure</b>	[1]	
	<b>(c) The beams and columns of this structure can be welded or bolted together.</b>	[2]	
	<b>(d) Advantages</b>		
	<ul style="list-style-type: none"> <li>• Foundations can be constructed while frame is being fabricated off site</li> <li>• Metal section easily obtainable in standard lengths</li> <li>• Speed and ease of erection</li> <li>• Building can be quickly closed in and made watertight</li> <li>• Framework pre-fabricated in a workshop and not affected by weather</li> </ul>		

- Site works such as drainage, roads, etc. can be carried out until framework is ready for erection
- No weather hold-up during erecting the framework.
- Connected together in factories by welding
- Site connections are bolted
- Structural stability easily provided through bracing or infill panels

### Disadvantages

- Although steel is incombustible it has a poor resistance to fire as it bends easily when hot
- Subject to corrosion
- Larger rooms can have columns in them restricting space and function
- Space constraints

### Level 1 ([1]–[4]) (1–2 valid points)

Candidates compare advantages and disadvantages of using rectangular framed construction when building a new ten storey office block. Candidates will show an understanding of the advantages and disadvantages in relation to foundations, materials, jointing methods, speed of erection and structural stability. 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]) (3–4 valid points)

Candidates compare advantages and disadvantages of using rectangular framed construction when building a new ten storey office block. Candidates will show an understanding of the advantages and disadvantages in relation to foundations, materials, jointing methods, speed of erection and structural stability. 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]) (5–6 valid points)

Candidates compare advantages and disadvantages of using rectangular framed construction when building a new ten storey office block. Candidates will show an understanding of the advantages and disadvantages in relation to foundations, materials, jointing methods, speed of erection and structural stability. 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. [10]

- (e) Increased structural stability is achieved by:
- The addition of concrete lift shafts
  - The addition of staircases
  - The addition of diagonal bracing of the frame
  - Rigidity achieved by the external cladding.

Or any other reasonable response.

[1] for each method of increasing structural stability up to a maximum of [4]

[4]

20

**Total**

**80**

AVAILABLE  
MARKS