



*Rewarding Learning*

**General Certificate of Secondary Education  
2022**

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## **Construction and the Built Environment**

Unit 1

Introduction to the Built Environment

**[GCN11]**

**TUESDAY 17 MAY, 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.

### **COVID-19 Context**

Given the unprecedented circumstances presented by the COVID-19 public health crisis, senior examiners, under the instruction of CCEA awarding organisation, are required to train assistant examiners to apply the mark scheme in case of disrupted learning and lost teaching time. The interpretation and intended application of the mark scheme for this examination series will be communicated through the standardising meeting by the Chief or Principal Examiner and will be monitored through the supervision period. This paragraph will apply to examination series in 2021–2022 only.

- 1 (a) Royal Institute of British Architect's Plan of Work 2013 or RIBA Plan of Work 2013 or RIBA POW, 2013.

[1] for name and [1] for year [2]

- (b) 1. Strategic Definition  
 2. Preparation and Brief Accept Preparation or Brief  
 3. Concept Design  
 4. Developed Design  
 5. Technical Design  
 6. Construction  
 7. Handover and Close Out Accept Handover or Close Out  
 8. In Use

They do not need to be stated in order.

[1] per response up to a maximum of [8] [8]

- (c) Evaluate the complete process from initial design to completion. This evaluation is carried out in order to make informed decisions about how design and construction teams can best carry out similar projects in the future. Used by the client/end user. [2]

- (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.  
 • The project is divided into well-defined stages; therefore a step by step approach is adopted.  
 • In each stage individual members of the design team can be given different targets, preventing an overlap of work and enabling progress.  
 • Each design team member knows what will be expected of them in their respective job roles; enabling realistic deadlines to be set.  
 • Encourages good communication between team members.  
 • Logical and systematic process.  
 • The design work will be mostly complete before construction work commences.  
 • The process enables clients who are not familiar with construction projects to keep track of the project.  
 • Achievable completion dates can be set.  
 • Enhances budgetary controls.  
 • Encourages a culture of cooperation and teamwork.  
 • The client will establish a well-defined brief; therefore the design team will accomplish his requirements from the commencement of the process.  
 • Increased job satisfaction.  
 • Architects fees can be based on the completion of the various stages, therefore the client will get value for money.

or any other reasonable answer.

[2] per response up to a maximum of [6] [6]

- (e) Detached – This is a building which is not connected to any other buildings/ sits in its own site.

[1] Per response up to a maximum of [2] [2]

- (f) Any of the following:
- 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
- or other appropriate response.

[1] per response up to a maximum of [3]

[3]

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**2 (a) Quantity Surveyor**

Any of the following:

- Cost control function during the design process of the dwelling shown in the speculative housing development
  - Give advice to the client on cost
  - Prepare a Bill of Quantities for all materials associated with the building
  - Prepare the tender documents
  - Evaluate the tenders when they are returned
  - Measure up work for payment on site during the construction process
  - Prepare interim valuations
  - Prepare final accounts
  - Calculate quantity of materials required
- or other appropriate response.

[1] per response up to a maximum of [2]

[2]

**(b) Rectangular Framed Structure**

[1]

- (c)
- The beams and columns of this structure can be welded together.
  - The beams and columns of this structure can be bolted together.

[2] per explanation up to a maximum of [4]

[4]

**(d) Advantages**

- Foundations can be constructed while frame is being fabricated off site.
- Metal section easily obtainable in standard lengths.
- Speed and ease of erection.
- Building can be quickly closed in and made watertight.
- Framework prefabricated in a workshop and not affected by weather.
- 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, infill panels of structural.
- Staircase/lift shaft.

**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.

**Level 1 ([1]–[4])**

Candidates compare advantages and disadvantages of using rectangular framed construction when building a new three-storey apartment 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])**

Candidates compare advantages and disadvantages of using rectangular framed construction when building a new three-storey apartment 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])**

Candidates compare advantages and disadvantages of using rectangular framed construction when building a new three-storey apartment 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 organized 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]

(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 answer.

[2] per evaluative discussion up a maximum of [6] [6]

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			AVAILABLE MARKS	
<b>3</b>	1	<p>Finance, Cost, Budget, Money [1]</p> <p>The money required by the client to pay for any construction project. Finance also required for statutory applications such as building control. [2]</p> <p>Examples include mortgage, bank loan or government funding [1]</p>	12	
	2	<p>Plant Machinery [1]</p> <p>Essential resource to help with all aspects of the production work. Used to satisfy Health and Safety requirements. Reduces Labour and saves time. Hired or purchased. [2]</p> <p>Examples include any machinery used to construct a building [1]</p>		
	3	<p>Materials [1]</p> <p>The products required to construct a building. The procurement of materials begins at the tender stage. Consideration of storage, security and handling. [2]</p> <p>Examples include any product used to construct a building [1]</p>		
<p>Plant, finance and materials are the three resources however marks should be awarded for any other reasonable response given to explain including examples.</p>				
<b>4</b>	(a)	<p>timber, roofing felt, slate, concrete roof tiles, clay tiles, insulation, steel nails, lead, stone, glass, glue</p> <p>or any other reasonable answer.</p> <p>[1] per response up to a maximum of [4] [4]</p>		
	(b)	<p>Self-finish:</p> <p>This is a finish which is inherent in the material and does not have to be specially applied on site. Minimises shrinkage occurring. Uniform in colour and size. Faster construction method. [2]</p> <p>An example: Tiles, laminated board, veneered wood, carpet, uPVC</p> <p>[1] per response up to a maximum of [1] [1]</p>		
	(c)	<p>Applied finish:</p> <p>This is a finish which is actually applied on site. Considerable drying out time. Possible shrinkage/expansion problems. [2]</p> <p>An example: Plaster, paint, varnish, oil, wallpaper</p> <p>[1] per response up to a maximum of [1] [1]</p>		
				10

5 Any **two** from the three stated below:

Mandatory Signs

[1]

They tell you something must be done. They have a white symbol on a blue circular background.

[2]

Prohibition Signs

[1]

They tell you something must not be done. They have a white background inside a red circle with a red line through it.

[2]

Safe Condition Signs

[1]

They give you useful information. They have a white symbol on a green background.

[2]

6

6 Any of the following or other appropriate response:

- Installing insulation will reduce heat loss.
- Retain heat and reduces heat escaping, therefore reduced usage of fossil fuels.
- Financial saving.
- Insulation of hot water cylinder will save around £45 per year.
- Reduce the risk of pipes freezing in extreme cold conditions.

[2] per evaluative discussion up a maximum of [6]

[6]

6

**Total**

**80**

AVAILABLE  
MARKS