



General Certificate of Secondary Education
January 2015

Construction and the Built Environment

Assessment Unit 1: The Construction Industry
for the 21st Century

[GCB11]

WEDNESDAY 7 JANUARY, AFTERNOON

**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. The mark schemes should be read in conjunction with these general marking instructions.

Assessment Objectives

Below are the assessment objectives for Construction and the Built Environment.

Candidates must:

- recall, select and communicate their knowledge of construction and the built environment and understanding of a range of contexts (AO1);
- apply skills, knowledge and understanding in a variety of contexts and in planning and carrying out investigations and tasks (AO2); and
- analyse and evaluate evidence, make reasoned judgements and present conclusions (AO3).

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.

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.

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.

Quality of written communication

Quality of written communication is taken into account in assessing candidates' responses 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 (Limited): The level of accuracy of candidates presentation, spelling, punctuation and grammar is limited. The candidate makes 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.

Level 2 (Satisfactory): The level of accuracy of candidates presentation, spelling, punctuation and grammar is satisfactory. The candidate makes a satisfactory selection and use of an appropriate form and style of writing supported with appropriate use of diagrams as required. Relevant material is organised with some clarity and coherence. There is some use of specialist vocabulary.

Level 3 (Excellent): The level of accuracy of candidates presentation, spelling, punctuation and grammar is excellent. The candidate successfully selects and uses the most appropriate form and style of writing, supported with precise and accurate use of diagrams where appropriate. Organisation of relevant material is excellent. There is excellent use of appropriate specialist vocabulary.

Section A

			AVAILABLE MARKS
1	(a) Natural slate – slate – roofing slate	[1]	
	(b) Dark brown plastic fascia board or plastic	[1]	
	(c) Any one of the following, [1] each up to a maximum of [7] Weather Exclusion Security Fire Resistance Thermal resistance Noise reduction Privacy Durability Access Appearance or any other suitable answer	[7]	
	(d) Head	[1]	
	(e) Stile/s or Jamb	[1]	
2	(a) Candidates should relate the following responses to the pre-release material. Quantity Surveyor Any three from the following: <ul style="list-style-type: none"> • Cost control function during the design process of the dwelling shown in the pre-release material. • 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.. [1] per main role up to a maximum of [3] or any other suitable answer.	[3]	
	(b) Joiner Any three from the following: <ul style="list-style-type: none"> • Prepare a quotation for the cost of the work • Carry out first fix joinery work on site like setting a door frame or putting on the roof in the dwelling shown in the pre-release material • Second fix joinery such as hanging doors • Install the kitchen in the dwelling • Screw fix plasterboard to ceiling • Fit the skirting board or architraves in this dwelling. [1] per main role up to a maximum of [3] or any other suitable answer.	[3]	

Site Manager

Any **three** from the following or other appropriate response:

- Plan operations to be carried out on site prior to work commencing.
- Secure site on Health and Safety grounds for dwelling shown in pre-release materials
- Mark out and manage excavation of site to a reduced level.
- Mark out and manage excavation of foundations for dwelling
- Supervise construction operations on site
- Order materials for the dwelling
- Chair site meetings
- Manage handing over the building to the client
- Hiring labour
- Payment of labour.

[1] per main role up to a maximum of [3] or any other suitable answer.

[3]

9

AVAILABLE
MARKS

- 3 (a) For each of the following answers, the dimensions must be accurate and given in **millimetres** only.

If a dimension is provided within tolerance or with an incorrect unit then only [1] will be given.

Tolerance on scaled dimensions only ± 100 mm

- | | | | | | | |
|-------|--------------------|--|-----------|---------|-----|----|
| (i) | Length | 6900 mm | Width | 6400 mm | [2] | |
| (ii) | Width | 10400 mm | | | [2] | |
| (iii) | Length | 10800 mm | Width | 2000 mm | [4] | |
| (b) | 7 | (award [1] for ± 1) | | | [2] | |
| (c) | 9.6 m ² | (award [2] for ± 0.25 m ²) | 9.36–9.84 | | [4] | 14 |

AVAILABLE
MARKS

14

4 (a) Any **one** of the following, [1] each up to a maximum of [4]

- **Check body of power tool**
Check that the body of the tool is 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 Portable Appliance Test (PAT) label on the tool. This will show it has passed an electrical safety test, which has been carried out by a competent person.
- **Check cable on power tool**
The cable often lies on the ground in dirt and water and can easily be damaged by treading or driving over it. Check the cable for cuts, abrasions, burns, bare wires and frayed ends.
- **Check plug of power tool**
Check the plug to make sure it is not dirty, wet or covered in grease. Check the pins are in place and not loose or misshapen. Also check the casing of the socket to make sure the spring-loaded cover is not cracked.
- **Check voltage of power tool**
If the plug and cable are coloured yellow the power tool will operate at 110 volts. There may also be labels on the power tool showing 110 volts. To work on building sites, all power tools should be at this reduced voltage or use battery operated tools.
- **Ensure that the power tool is designed for the task intended**
- Appropriate PPE [4]

(b) 110 volts [1]

(c) (i) Any **one** of the following, [1] each up to a maximum of [4]

Employers must

- Provide a safe place to work and a safe way to get to and from the work area
- Provide and maintain safe machinery and equipment
- Provide information, instruction, training and supervision
- Make sure people are safe when working with articles and substances
- Have a written safety policy and ensure all employees are aware of it [4]

Or any other suitable answer

(ii) Any **one** of the following, [1] each up to a maximum of [3]

Employees must

- 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
- Provide a safe place to work and a safe way to get to and from the work area [3]

Or any other suitable answer

AVAILABLE
MARKS

12

5 Appropriate function, [1] each

1. **Wall plate**

Timbers that are fixed to the top of load bearing walls to distribute loads and provide fixings for roof timbers.

2. **Gutter**

The function of a gutter is to collect water running off a roof and distribute it to the downpipe.

3. **Roofing felt**

The water proof membrane found under the slates that prevents water from penetrating the roof.

4. **Slating laths**

The function of this timber member is to provide a batten on which to nail the slates or provide a gap between the slates and the roofing felt.

5. **Fascia Board**

A board fixed vertically to rafter ends, which provides an additional fixing for gutters. It also protects roof members from the weather.

[5]

5

AVAILABLE
MARKS

6 (a) Any **one** of the following, [1] each up to a maximum of [6]

- Electricity
- Gas
- Hot water supply } plumbing
- Cold water supply }
- Communications (telephones)
- IT (computer network)
- Heating
- Water, drainage
- Refrigeration
- Security and alarm systems
- Fire detection and protection
- Medical services (medical gasses)
- Ventilating
- Wind farm

[6]

(b) Any **one** of the following, [1] each up to a maximum of [4]

- Bridges
- Roads
- Water storage and treatment works
- Utility pipes
- Harbours
- Airport
- Windfarm
- Geothermal

or any other suitable answer.

[4]

10

AVAILABLE
MARKS

7 (a) Any **one** of the following, [1] each up to a maximum of [3]

- Safely sustain loads
- Provide a stable structure
- Resistance to the passage of moisture from the ground
- Accommodation of services
- Provide a level surface for various finishes
- Provide resistance to heat loss

[3]

(b) Any **one** of the following, [1] each up to a maximum of [6]

- Strength
- Stability
- Weather exclusion
- Thermal Insulation
- Sound Insulation
- Durability
- Fire resistance
- Appearance
- Security
- Privacy
- Divide rooms
- Support loads

Or any other suitable answer

[6]

Section A

**AVAILABLE
MARKS**

9

70

Section B

AVAILABLE
MARKS

8 The following points should be discussed in relation to the London Olympics as a stimulus for the Society, Economy and the Environment.

- The location of the 2012 Olympics in a rundown area of east London helped regenerate much of the area.
- Created related supply chain opportunities.
- Opportunities were also created to provide new skills for the local population at craft level.
- Jobs at managerial level.
- Provide a legacy of employment opportunities for many years working in the sport and tourism venues.
- The Olympic stadium also provided a legacy in terms of new housing from the reuse of the athletic villages.
- New leisure facilities.
- An area of tourist interest for the local community.
- Regeneration of contaminated brown field site into green areas.
- Long term: wildlife should establish in the green areas.

Or any other relevant point

Level 1 ([1]–[4]) (2 points as shown above)

Candidate will discuss the impact of the 2012 London Olympics as a stimulus for Society, the Economy and the Environment including a limited number of the points above. The candidate's level of accuracy for spelling, punctuation and grammar is limited. The candidate discusses the impact of construction on Society, the Economy and the Environment in a limited form and style of writing. The presentation of the discussion findings is not fully coherent or organised and there is little use of specialised terms.

Level 2 ([5]–[7]) (4 points as shown above)

Candidate will discuss the impact of the 2012 London Olympics as a stimulus for Society, the Economy and the Environment including a satisfactory number of the points above. The candidate's level of accuracy for spelling, punctuation and grammar is satisfactory. The candidate discusses the impact of construction on Society, the Economy and the Environment in a satisfactory form and style of writing. The presentation of the discussion findings is coherent and organised, in most cases and they use a range of specialised terms.

Level 3 ([8]–[10]) (5 points as shown above)

Candidate will discuss the impact of the 2012 London Olympics as a stimulus for Society, the Economy and the Environment including an excellent use of at least five of the points above. The candidate's level of accuracy for spelling, punctuation and grammar is excellent. The candidate discusses the impact of construction on Society, the Economy and the Environment in a very good form and style of writing. The presentation of the discussion findings is coherent and organised, in most cases and they use a range of specialised terms. [10]

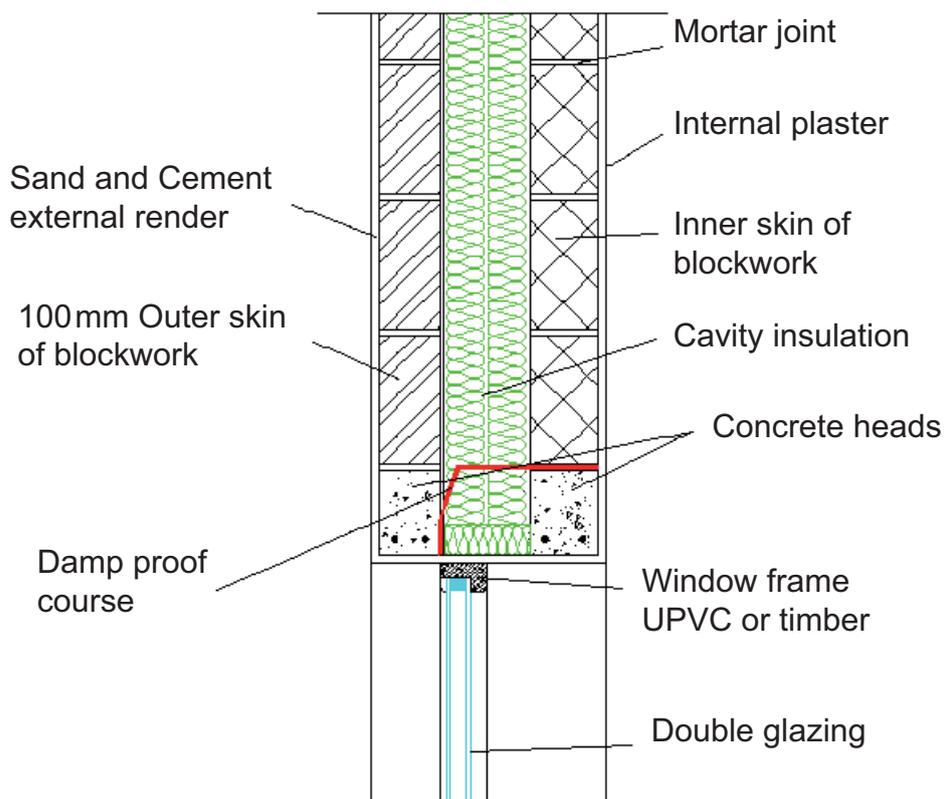
10

9 (a) [1] per element up a maximum of [7] plus quality of drawing maximum [3]

- External skin of blockwork
- Inner skin of blockwork
- Cavity Insulation
- DPC
- Sand and Cement render
- Internal plaster
- Window frame
- Concrete heads
- Double glazing
- Mortar joint

[10]

(b) Labelled correctly [1] per element up a maximum of [10]



[10]

20

AVAILABLE MARKS

- 10 The following points should be discussed in relation to **Wet or Dry finishes**. Candidates should take the thirty week time frame into consideration when planning to build.

Finishes can be divided into two categories:

Wet finish or
Dry finish

- Wet finishes such as plaster, sand and cement floor screeds, etc. contain water when they are applied.
- Moisture must be allowed to dry out of the floor before floor finishes such as carpet or a timber floor can be laid.
- Moisture must be allowed to dry out of the walls before wall finishes such as wallpaper can be applied, although emulsion paint still allows the walls to continue drying out.
- Applied finish – is a finish which is actually applied on site such as wet dash
- Self-finish – is a finish which is inherent in the material and does not have to be specially applied on site such as natural stone or slate or natural timber floors.
- Dry lining would be the preferred finish for inside the dwelling as it dries out very quickly allowing the project to be completed in 30 weeks.
- The construction team should try to get the dwelling watertight as soon as possible in the 30 week programme.
- Floor screeds have to be a wet finish so they should be installed as soon as possible in the project to allow the building to meet the 30 week completion target.
- The external stone cladding could be constructed in the spring when the weather improves.

Or any other suitable answer.

Examples of dry finishes:

Plaster board
Timber panelling
Carpet
Solid timber floor

The greatest advantage of dry finishes when compared to wet finishes is that no shrinkage will occur during the drying out process. A dry finish should be uniform in colour, size and be true to shape. The application of dry finishes does not prevent occupancy of the building.

Examples of wet finishes:

Plaster
Paint
Wallpaper

One of the major problems with wet finishes is that considerable “drying out time” is required for the building plus expansion/shrinkage problems with timber components.

AVAILABLE
MARKS

Level 1 ([1]–[4]) (2 points as listed)

Candidate will discuss the advantages or disadvantages of wet and dry finishes in relation to a thirty week construction period. Their level of accuracy for spelling, punctuation and grammar is limited. The candidate discusses wet and dry finishes in a limited form and style of writing. The presentation of the discussion findings is not fully coherent or organised and there is little use of specialised terms.

Level 2 ([5]–[7]) (4 points as listed)

Candidate will discuss the advantages or disadvantages of wet and dry finishes in relation to a thirty week construction period. Their level of accuracy for spelling, punctuation and grammar is satisfactory. The candidate discusses wet and dry finishes in a satisfactory form and style of writing. The presentation of the discussion findings is coherent and organised in most cases and they use a range of specialised terms.

Level 3 ([8]–[10]) (6 points as listed)

Candidate will discuss the advantages or disadvantages of wet and dry finishes in relation to a thirty week construction period. Their level of accuracy for spelling, punctuation and grammar is excellent. The candidate discusses wet and dry finishes in an excellent form and style of writing. The presentation of the discussion findings is coherent and very well organised in most cases and they use a very good range of specialised terms. [10]

AVAILABLE MARKS	
	10

11 (a) Any **one** of the following, [1] each up to a maximum of [2]

large number of short walls [1]
 walls joined together at right angles [1] [2]

(b) Any one of the following, [1] each up to a maximum of [1]

External walls carry the load of the roof and intermediate floors to the foundations [1]
 Some internal walls are load bearing which also carry a load to the foundation [1] [1]

(c) Any **one** of the following, [1] each up to a maximum of [2]

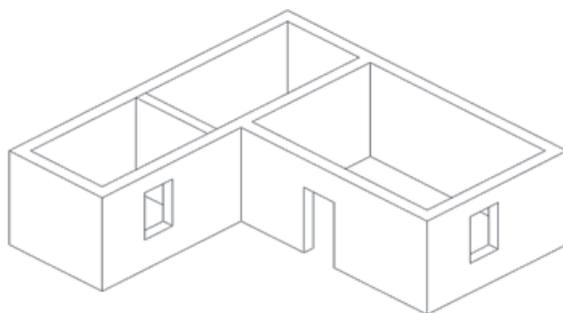
External walls of cellular structures are easily erected from concrete blocks which are usually rendered. ~~3~~

External walls of cellular structures are easily erected from clay facing brick forming the outer skin of a cavity wall. ~~3~~

Occasionally concrete is used as the walling medium; formwork has to be erected to create a mould for the liquid concrete. ~~3~~

Timber framed construction can also be used to construct a cellular construction. [2] [2]

(d) Quality of sketch possible in 2 or 3 dimensional format. [3]



Any **one** of the following, [1] each up to a maximum of [2]

Three or more cells joined correctly
 Short walls joined at right angles. [5]

Section B

Total

AVAILABLE MARKS

10

50

120