



**General Certificate of Secondary Education
2018**

Construction and the Built Environment

Assessment Unit 1

The Construction Industry for the 21st Century

[GCB11]

WEDNESDAY 13 JUNE, 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’ 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 (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
Answer **all** questions

- | | | | |
|----------|---|--|--|
| 1 | <p>(a) Cavity wall construction [1]</p> <p>(b) Cellular Construction [1]</p> <p>(c) Four of the following materials:</p> <ul style="list-style-type: none"> • Sand • Cement • Water • Aggregate (stone/recycled materials) • Recycled aggregates such as crushed glass • Ash <p>[1] per material up to a maximum of [4] or any other appropriate answer [4]</p> <p>(d) Wall ties [1]</p> <p>(e) Stainless steel or Nylon [1]</p> <p>(f) Load bearing [1]</p> <p>(g) Wall plate [1]</p> | | |
|----------|---|--|--|

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MARKS

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2 (a) Contracts Manager

Any of the following or other appropriate response:

- Ensure that all aspects of site operations run smoothly
- Ensure Health and Safety on site
- Represent the construction company on site and at meetings
- Organise plant, labour, and resources on site
- Ensure project is completed within the stipulated time frame
- Order materials/quality control.

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

[3]

(b) Joiner

Any of the following or other appropriate response:

- Prepare a quotation for the cost of joinery work
- Erect roof structure
- Fit door frames
- Fit window frames
- Fit sheeting to floors
- Fix plasterboard to walls and ceilings
- Hang doors
- Carry out joinery related to specialist areas such as kitchen/hotpress
- Order materials.

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

[3]

Plumber

Any of the following or other appropriate response:

- Order materials
- Prepare a quotation for the cost of plumbing work
- Fitting heating pipes first and second fix
- Fitting sanitary ware/and associated waste pipes
- Fitting kitchen appliances
- Fitting the hot water cylinder
- Fitting oil burner/water pump
- Plumbing related to specialist items such as unvented system
- Provide final certificate.

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

[3]

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3 (a) Tolerance on scaled dimensions only ± 100 mm

(i)	Length	5500 mm	Width	4300 mm	[4]
(ii)	Width	11000 mm			[2]
(iii)	Length	4300 mm	Width	3700 mm	[4]
Tolerance ± 100					
(b)	48.24 square metres	Tolerance ± 1 square metre			[3]
(c)	Width	3400 mm			[1]

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4 (a) The following or other appropriate response:

A private staircase is a stairway which serves one dwelling, or for private use only

[3] for a very good response up to a maximum of [3]

[3]

[2] for a good response

[1] for a basic response

(b) The following or other appropriate response:

From finished floor level where the bottom of the stairs start to the finished floor level where the top of the stairs will end.

Measure height one stair and multiply by number of steps.

[2] for a very good response up to a maximum of [2]

[2]

[1] for a basic response

(c) 100 mm

[1]

(d) [1] per correct label up to a maximum of [7]

(i) Handrail

[1]

(ii) Riser

[1]

(iii) Going

[1]

(iv) Newel Post

[1]

(v) Nosing

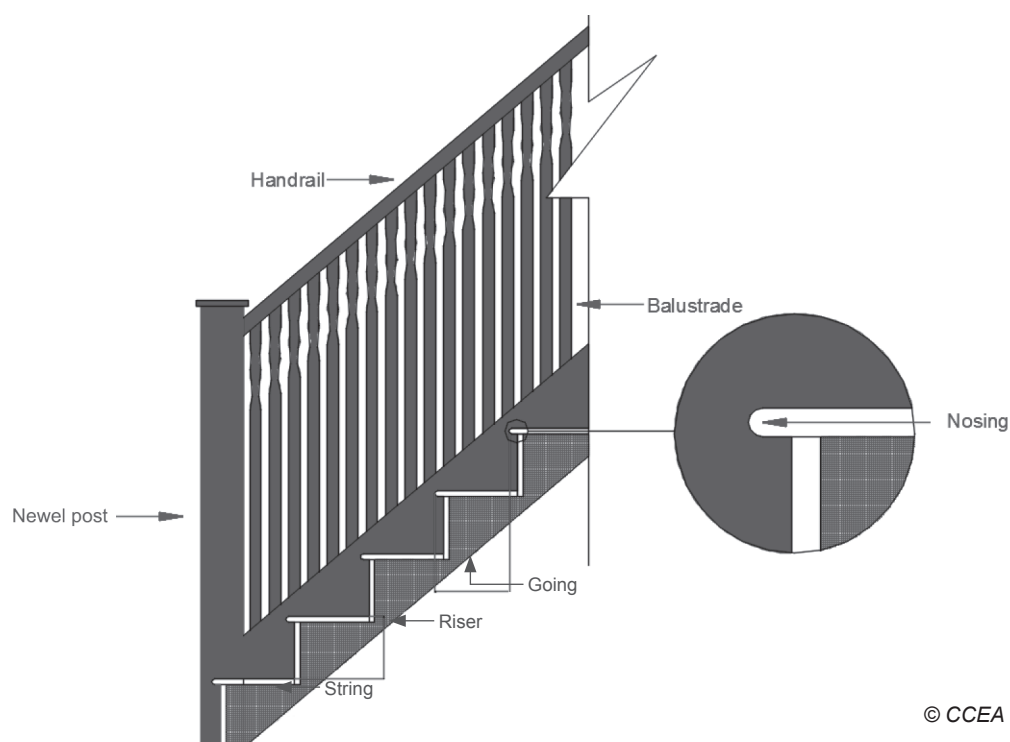
[1]

(vi) Balustrade

[1]

(vii) String

[1]



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5 (a) Any of the following or other appropriate response:

- Let light in
- Ventilation
- Weather Exclusion
- Security
- Provide resistance to air penetration in the form of draughts
- Thermal Insulation
- Sound Insulation
- Privacy (bathroom)
- Durability
- Strength
- Appearance

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

[6]

(b) **Head** The horizontal top member of a window

[1]

Stile The vertical members of a window on the outer edges

[1]

Sill The horizontal base of a window

[1]

Transom The horizontal member in a window frame

[1]

Mullion The vertical member in a window frame

[1]

Accept labelling the diagram.

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6 (a) Any of the following or other appropriate response:

- Steel
- Stainless Steel
- Copper
- Mild Steel (Iron)
- PVC
- Polybutylene (Plastic)
- Polyethene

[1] per response up to a maximum of [4]

[4]

(b) • Insulation is a material used to improve the thermal quality of your home

• Improving the comfort of your home

• Insulation also reduces damp

• Reduced usage of heating fuels. As you will be using less heating fuel, you won't need to buy as much, so you will likely reduce your heating costs (save money).

• Insulation of hot water cylinder to retain heat in water.

• By slipping pipe insulation around exposed hot water pipes the home owner will keep their water hotter for longer.

[1] per requirement up to a maximum of [3] or any other appropriate answer

[3]

(c) Dry finishes are finishes that do not require any drying out time.

Examples of dry finishes:

- Plasterboard
- Timber panelling
- Carpet
- Plastic fascia powder coated gutter

[1] for definition [1] per example of a dry finish up to maximum of [2] or any other appropriate response.

[3]

(d) Wet finishes are finishes which require time to dry out.

Examples of wet finishes:

- Plaster
- Paint
- Wallpaper
- Concrete/screed

[1] for definition [1] per example of a wet finish up to maximum of [2] or any other appropriate response.

[3]

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Section B

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MARKS**7 Six principal stages of the construction cycle****Planning**

Carrying out studies to determine the feasibility of the Client's requirements
 Provide information on cost implications
 Identification of Client's requirements and possible constraints on development
 Preparation of report to enable the Client to decide whether to proceed and to select the probable procurement method

Design

Complete development of Project Brief
 Prepare detailed drawings
 Prepare detailed specifications
 Prepare cost estimate
 Consult with statutory authorities (Building Regulations)
 Prepare tender documentation including a Bill of Quantities.
 Obtain Client approval of the detailed proposals
 Prepare working drawings
 Provide examples of materials to be used helping to inform client about overall appearance, cost estimate.
 Prepare and submit application for full planning permission

Tendering

Prepare tender documents in sufficient detail to enable a Tender or Tenders to be obtained for the construction of the Project
 Quantity Surveyor provides Bill of Quantities
 Seek fixed price tender from a select list of contractors, to see which contractor will be selected to construct the building

Construction Process

Prepare the Building Contract and arrange for it to be signed, appointing the Contractor, issuing of Production Information to the Contractor, and arranging site handover to the Contractor
 Prepare site including principal roads and drainage
 Excavate foundation
 Build substructure to ground floor level
 Pour sub-floor concrete
 Build wall construction to first floor level
 Place floor joist or slabs
 Build wall construction to second floor or roof level
 Put on roof
 First fix building shell in preparation for plastering
 Plastering of all internal and external walls
 Install second fix components, including doors, skirting, radiators, light switch covers (face plate), etc.
 Install kitchen and bathroom
 Complete building

Handover

Clean, test and handover building

Evaluation

Provide drawings and other information for the Health and Safety file
 Give general advice on operation and maintenance of the building

Prepare final valuations and payment to contractor less final retention sum
 Review design information from design team to client and contractor
 Review quality of final projects by evaluating the complete process from initial design to completion
 This evaluation is carried out in order to make informed decisions of how design and construction teams can best carry out similar projects in the future.

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Level 1 ([1]–[4]) (2 principal stages of the construction cycle)

Candidate discusses at least two principal stages of the construction cycle. The discussions should reflect £2.1 million housing project. Candidate will demonstrate why it is necessary to use an ordered process in design and construction of this housing development. Their level of accuracy for spelling, punctuation and grammar is limited. They discuss two stages of the construction cycle in a limited form and style of writing. The presentation of the discussion is not fully coherent or organised and there is little use of specialised terms.

Level 2 ([5]–[7]) (4 principal stages of the construction cycle)

Candidate discusses at least four principal stages of the construction cycle. The discussions should reflect £2.1 million housing project. Candidate will demonstrate why it is necessary to use an ordered process in design and construction of this housing development. Their level of accuracy for spelling, punctuation and grammar is satisfactory. They discuss four stages of the construction cycle in a good form and style of writing. The presentation of the discussion is coherent and organised and there is some use of specialised terms.

Level 3 ([8]–[10]) (6 principal stages of the construction cycle)

Candidate discusses the six principal stages of the construction cycle. The discussions should reflect £2.1 million housing project. Candidate will demonstrate why it is necessary to use an ordered process in design and construction of this housing development. Their level of accuracy for spelling, punctuation and grammar is excellent. They discuss six stages of the construction cycle in an excellent form and style of writing. The presentation of the discussion is coherent and very well organised in most cases and there is very good use of specialised terms. [10]

10

8 (a) [1] for each of the following up to a maximum of [10]

- External skin
- Cavity
- Internal skin
- Insulation
- Concrete sill
- Hatch block
- Hatch insulation
- DPC
- Mortar joints
- Window frame
- Anti-capillary groove
- Insulation behind sill
- Sill board

or any other appropriate answer

[10]

(b) Labels added in the correct locations (shown on p.13):

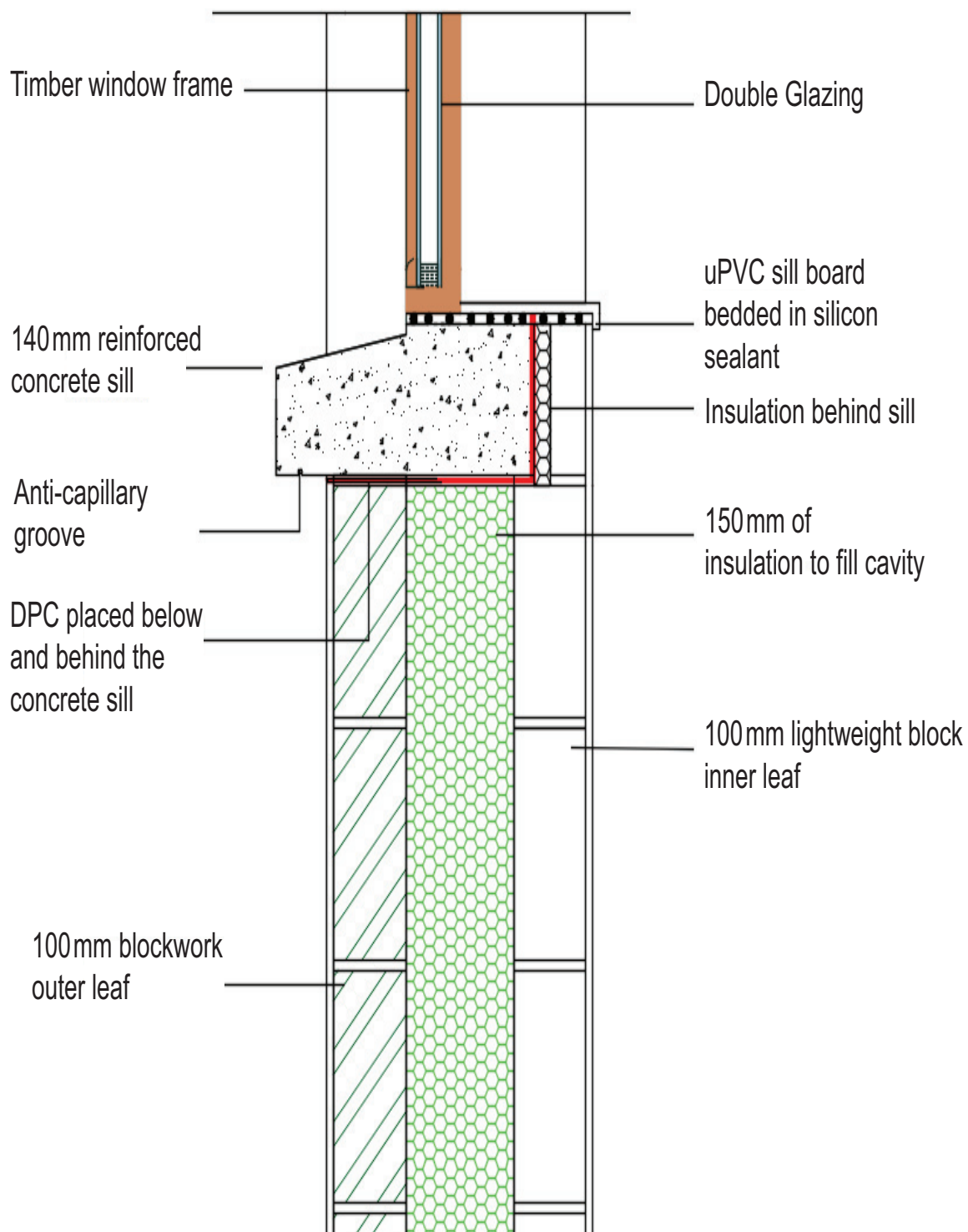
- Timber window frame
- Double glazing
- 100 mm lightweight block inner leaf
- D.P.C placed below and behind concrete sill
- 100 mm blockwork outer leaf
- Anti-capillary groove
- 140 mm reinforced concrete sill
- uPVC sill board bedded in silicon sealant
- Insulation behind sill
- 150 mm of insulation to fill cavity

[1] for each correct label up to a maximum of [10]

[10]

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9 Demonstrate an understanding of:-

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The Town and Country Planning Act 1990

The main principles of planning are now contained in the Town and Country Planning Act 1990. Planning Authorities have a number of roles in relation to planning policy and development control such as:

- They grant planning permission, e.g.
listed building consent, erection of new buildings, change of use
- Preparation of development plans relating to strategic policies with regard to matters such as transport, housing, and industry.

Planning permission

The planning policy in Northern Ireland is administered by the regional council Planning Service.

This department seeks to improve the quality of the environment in which we live by providing Area Plans which set out areas in each town and village for housing, industry, hospitals, schools, etc.

The Planning Department set out policy which seeks to:

Protect the natural environment.

Designate conservation areas.

Legislate on special subjects such as formulating a waste plan.

Area Plan

The Area Plan is prepared by the Planning Department for all towns. It consists of maps, diagrams, illustrations and written information showing the expected development in that particular area for industry, housing, schools, hospitals, new roads, etc. The plan forms the basis from which all development will be approved or disapproved in the coming years. The department can alter a development plan at any time if a good reason is given. The department must give adequate publicity to an area plan and allow an opportunity for inspection and representation by any interested parties.

Green Belt

The green belt is a policy for controlling urban growth. The idea is for a ring of countryside where urbanisation will be resisted for the foreseeable future, maintaining an area where agriculture, forestry and outdoor leisure can be expected to prevail. The fundamental aim of the green belt policy is to prevent urban sprawl.

Conservation Area

Article 50 of the Planning (NI) Order 1991 provides the legislation for the protection of buildings of special architectural or historic interest, and for the designation of whole areas of similar interest, the character and appearance of which it is desirable to preserve and enhance. These areas are termed Conservation Areas.

Level 1 ([1]–[4])

(A demonstration of understanding of 2 items of planning policy from the following list.)

The Town and Country Planning Act 1990
 Planning permission
 Area Plan
 Green Belt
 Conservation Area

Candidate will demonstrate through discussion a clear understanding of two items of planning policy. The discussions should reflect the range of planning policy. Their level of accuracy for spelling, punctuation and grammar is limited. They demonstrate their understanding of planning policy in a limited form and style of writing. The presentation of the discussion is not fully coherent or organised and there is little use of specialised terms.

Level 2 ([5]–[7])

(A demonstration of understanding of 4 items of planning policy from the following list.)

The Town and Country Planning Act 1990
 Planning permission
 Area Plan
 Green Belt
 Conservation Area

Candidate will demonstrate through discussion a clear understanding of four items of planning policy. The discussions should reflect the range of planning policy. Their level of accuracy for spelling, punctuation and grammar is satisfactory. They demonstrate their understanding of planning policy in a good form and style of writing. The presentation of the discussion is coherent and organised and there is some use of specialised terms.

Level 3 ([8]–[10])

(A demonstration of understanding of all 5 items of planning policy from the following list.)

The Town and Country Planning Act 1990
 Planning permission
 Area Plan
 Green Belt
 Conservation Area

Candidate will demonstrate through discussion a clear understanding of five items of planning policy. The discussions should reflect the range of planning policy. Their level of accuracy for spelling, punctuation and grammar is excellent. They demonstrate their understanding of planning policy in an excellent form and style of writing. The presentation of the discussion is coherent and organised and there is very good use of specialised terms.

[10]

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10

10 (a) Steel	[1]	AVAILABLE MARKS
(b) Through the steel frame to the foundations	[1]	
(c) (i)–(iv) Any of the following or other appropriate response:		
• Not weather dependent. • Framed structures are easily erected from pre-fabricated members. • These members are easily connected together in the correct sequence to form the structural framework. • Standard components can be easily tailored for the needs of each project. • Allows the building to have fairly large open spaces. • Creates a strong structure. • The structural frame carries the total load of the building and transfers it to the foundation. • Cladding is fixed over the framework, or infill panels are placed between its members, to totally enclose the space within the building. • Suitable for high rise construction.		
[1] per appropriate response up to a maximum of [4]	[4]	10
(d) Any of the following or other appropriate response.		
Wind loads are live loads but their effects are considered separately because they are affected by the location, size and shape of a structure. Wind loading can be defined as all the loads acting on a building that are made by the effect of either wind pressure or wind suction. The wind pressure created on a building is usually one of the most important loads it has to resist with regards to overall stability. A wind load could cause collapse or structural failure of a building if the building wasn't designed properly. The following are examples of how wind loads can be resisted. Core lift shaft spine Diagonal bracing Concrete staircase Cable tension		120
[1] per appropriate response/discussion up to a maximum of [4]	[4]	
Total		