



General Certificate of Secondary Education
January 2012

Centre Number

71

Candidate Number

Construction and the Built Environment

Unit 1: The Construction Industry for the 21st Century

[GCB11]

WEDNESDAY 11 JANUARY, AFTERNOON



TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.
Answer **all ten** questions.

Questions **1, 2, 3, 4** and **9** should be answered in relation to the enclosed house plans and specifications previously issued as pre-release material. You should **not** bring any of the material previously issued into this examination.

You will be provided with a clean copy of the pre-release material.

INFORMATION FOR CANDIDATES

The total mark for this paper is 120.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in questions **7** and **10**.

A scale rule is required.

| For Examiner's use only | |
|-------------------------|-------|
| Question Number | Marks |
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| 9 | |
| 10 | |

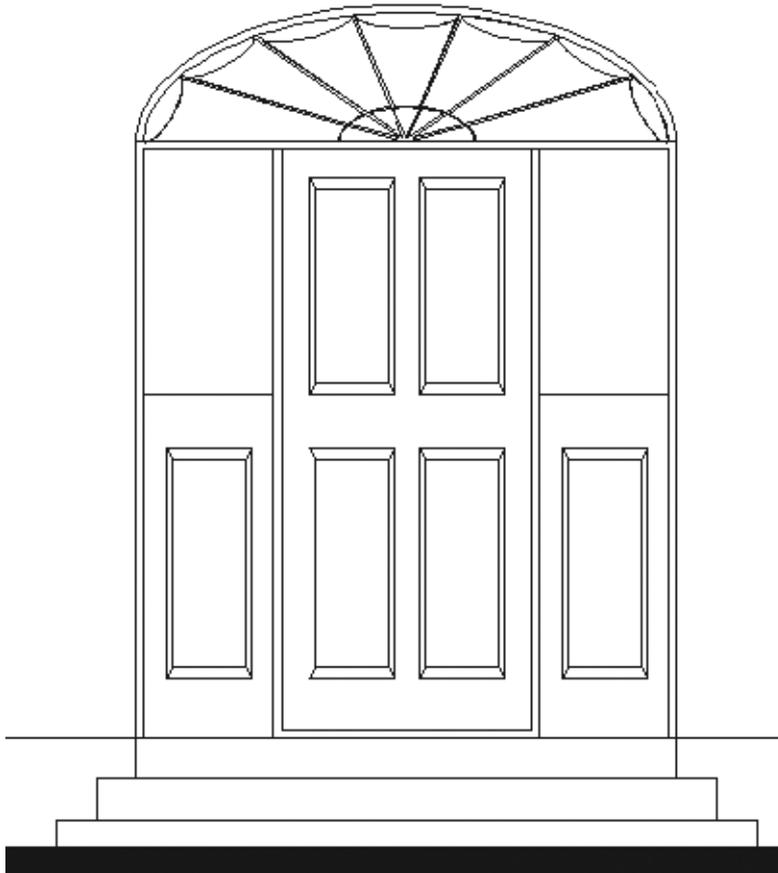
| | |
|--------------------|--|
| Total Marks | |
|--------------------|--|

Section A
Answer **all** questions.

Use the pre-release material (House drawings and Specifications) to assist with answering questions 1, 2, 3, 4 and 9.

- 1 (a)** The following symbols have been used on the Front Elevation, Section and Ground Floor Plan contained within the pre-release material.

Identify what each of these BS1192 symbols or building elements represent:



1. _____

[1]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

(b) Identify the material that is used to construct each of the following building elements.

1. Slate _____
2. Front door _____
3. Type of external render _____
4. Heads above windows _____
5. Ramp to rear door _____
6. Down Pipe _____ [6]

2 The following professionals and craft operatives are employed during the design and construction process of the house shown in the pre-release material.

(a) Identify **three** of the main roles that an Architect would have in relation to this project.

Architect

1. _____

2. _____

3. _____
_____ [3]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

3 Using the attached pre-release material, give the following dimensions in millimetres. Some dimensions may need to be scaled.

(a) The length and width of the Study.

Length _____ Width _____ [4]

The length and width of the Kitchen in the main house.

Length _____ Width _____ [4]

(b) The overall length of the house from the outside of the walls at first floor level.

Length _____ [2]

(c) The width and height of the Kitchen window adjacent to the Granny flat.

Width _____ Height _____ [4]

(d) The total number of wash hand basins within the complete building.

Total number of wash hand basins _____ [2]

(e) The pitch of the roof for the main part of the house.

Roof pitch _____ [2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

- 4 Fig. 1 shows the construction of a block wall for the dwelling shown in the pre-release material.



Fig. 1

- (a) Name the type of bonding shown in Fig. 1.

- (i) Bonding type

_____ [1]

- (ii) Give **two** reasons why you bond brick or block work.

 _____ [2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |



Fig. 2

(b) Name the type of wall construction shown in **Fig. 2**.

(i) Wall type

_____ [2]

(ii) Give **two** functions of the wall ties shown in **Fig. 2**.

_____ [2]

(c) (i) What is the correct horizontal spacing for wall ties shown in **Fig. 2**?

_____ [2]

(ii) What is the correct vertical spacing for wall ties shown in **Fig. 2**?

_____ [2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

5 The following question relates to windows.

(a) List **seven** different performance requirements of windows.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____ [7]

(b) List **three** different materials windows can be made from.

1. _____
2. _____
3. _____ [3]

(c) Window definitions

Define the following wooden window frame terms.

Head

Sill

Stile

Transom

Mullion

_____ [5]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

- 6 Identify the following building elements from the images provided. State the main reason for having these in a domestic house.



Fig. 3

- (a) (i) Identify the building element shown in **Fig. 3**.

_____ [1]

- (ii) Identify the **two** main reasons for having this element within a two storey dwelling.

1. _____

2. _____ [2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |



Fig. 4

(b) (i) Identify the building element shown in Fig. 4.

_____ [1]

(ii) Identify the **two** main reasons for having this element within a domestic house.

1. _____

2. _____ [2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

8 Fig. 5 shows the substructure construction for a new domestic house.



Fig. 5

(a) (i) List **two** different ways in which you can create a ground floor for this proposed building.

1. _____
2. _____ [2]

(ii) List **five** functions of a ground floor.

1. _____
2. _____
3. _____
4. _____
5. _____ [5]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

- (b) The domestic site shown in the pre-release material is created from a series of rooms like those shown in the drawing below.

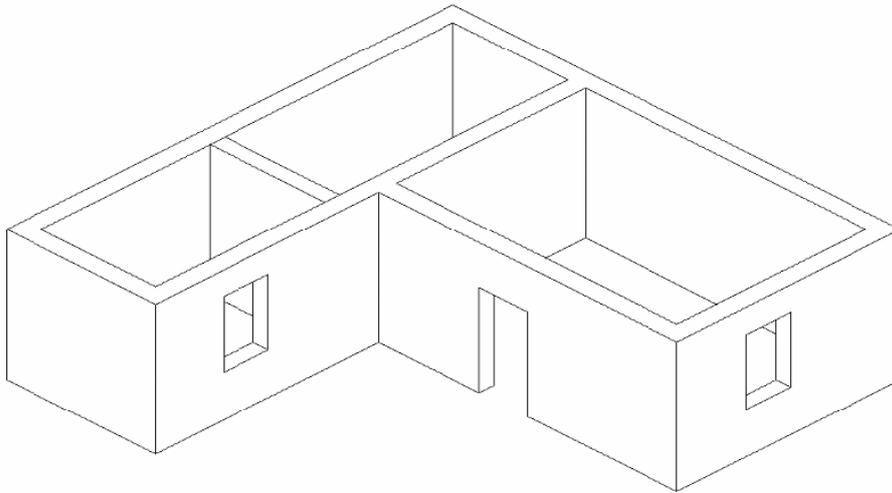


Fig. 6

- (i) Name the type of construction shown in **Fig. 6**.

_____ [1]

- (ii) State **one** material that is often used to construct the walls in this type of structure.

_____ [1]

- (iii) Describe how this type of structure achieves its strength.

 _____ [2]

- (iv) How are the loads of floors, and the roof transferred to the ground in this type of structure?

 _____ [2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

9 Fig. 7 shows an incomplete foundation detail to be used in the construction of the dwelling shown in the pre-release material.

(a) Complete the drawing below by accurately completing the following elements.

- | | |
|--------------------------------------|------------------------------|
| Foundation | Internal skin of cavity wall |
| Hardcore | Outer skin of cavity wall |
| Plaster | Wall insulation |
| Sand and cement screed | Floor insulation |
| Cavity fill, concrete or solid block | |

[9]

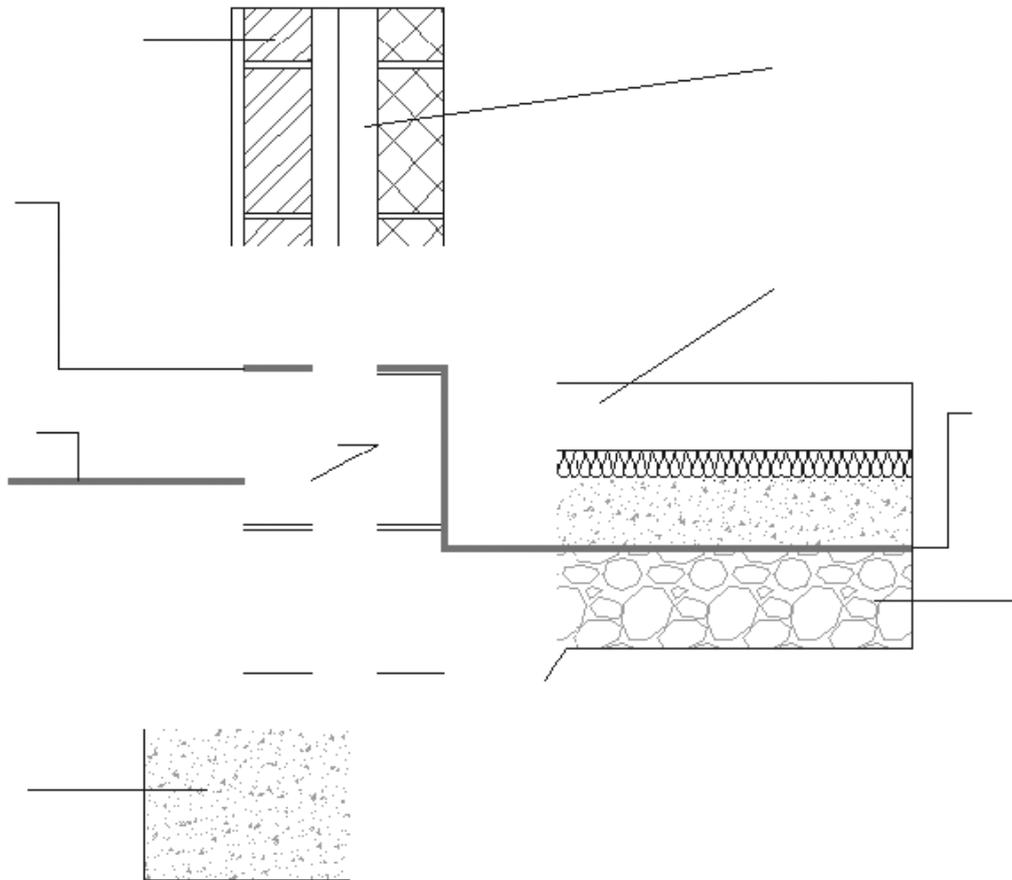


Fig. 7

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

- (b) Add the following labels to the drawing you have completed in part (a).
Leader lines have been provided for your guidance.

High density concrete block

Existing Ground Level

Damp Proof Course

150 mm well compacted hardcore

1200 gauge Damp Proof Membrane

100 mm sand and cement screed

60 mm cavity wall insulation

600 mm × 300 mm concrete foundation.

[8]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

Permission to reproduce all copyright material has been applied for.
In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA
will be happy to rectify any omissions of acknowledgement in future if notified.



General Certificate of Secondary Education
January 2012

Construction and the Built Environment

Pre-Release Material

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

[GCB11]

WEDNESDAY 11 JANUARY, AFTERNOON

You must use **this** clean copy of the Pre-Release Material in the examination and **not** your own annotated copy.

Construction and the Built Environment

Introduction

A copy of the pre-release information for this examination is included in the following pages.

The materials contain drawings and specifications relating to a house and a Granny flat.

The drawings and specifications pertain to a house which has been constructed close to a river in a provincial town. The site is slightly elevated.

The client is a private client who has employed the following people to oversee the design of his development:

- Architect
- Site Engineer
- Quantity Surveyor

The contractor will be appointed on the basis of selective tendering. The contractor will employ the following team:

- Site Engineer/Manager
- Bricklayers
- Joiners
- Plasterers
- Plumber

Your client has asked the design team to look at the practicalities of using renewable energies where possible.

The contractor will have a telescopic handler on site.

Specification

Cavity wall construction

Outer leaf: 100 mm concrete block, 40 mm cavity, 60 mm “Jablite” EPS insulation held in position using stainless steel insulation retaining wall ties to BS1243.

Inner leaf: 100 mm concrete block work. Provide sand/cement plaster and carlite finish to inner face. Wall ties to be spaced at 900 mm horizontally and 450 mm vertically, and un-bonded jambs ties to be spaced 300 mm vertically.

25 mm “Jablite” insulation to all jambs between lintels and behind sills. DPC in front of “Jablite” in each case.

External walls finished in dry dash render.

Reinforced concrete heads over windows.

Solid floor construction

Seal all floors with two coats of penetrating liquid dust proofer, 75 mm fine aggregate screed, 40 mm of Jablite S.D. grade insulation, Visqueen 1200 grade DPM 100 mm concrete sub-floor. 150 mm consolidated hard-core.

Doors and windows

Brown plastic PVC windows and doors.

First floor construction

25 mm T & G Boarding, 225 mm × 38 mm. Joists at 400 mm centres. All joists built into inside skin of cavity walls to be beam filled and completely sealed between floor void and cavity. Provide one row herringbone bridging to each room, 12.5 mm plaster board and skim to ceilings. Provide 30 mm × 5 mm restraint straps to all timbers parallel to walls.

Damp proof courses

Vertical DPCs to all window and external door jambs, horizontal DPCs behind and under sills and stepped between lintels. Wall DPCs to external skin, laid at 150 mm minimum above finished ground levels.

DPCs to internal walls to overlap and be bonded to the floor DPM by a minimum of 215 mm.

Foundations

600 mm × 300 mm foundations to 300 mm walls.

450 mm × 300 mm foundations to 100 mm walls.

The above to be concrete strip foundations. The size and depth of foundations shown are the minimum required. Final sizes and bearing depths to be determined and agreed with building control when sub/soil bearing pressures are known.

Cavity fill to external walls to stop a minimum of 150 mm below the lowest DPC.

Roof construction

37 degree pitched roof construction

Bangor blue natural slate

150 × 38 softwood rafters

200 × 38 softwood ceiling joist

White PVC gutter and down pipe

NOTE Students will require the use of a scale ruler during the examination.

