

FORM TP 2014050



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**CARIBBEAN EXAMINATIONS COUNCIL**

**CARIBBEAN SECONDARY EDUCATION CERTIFICATE®  
EXAMINATION**

**BUILDING TECHNOLOGY**

**OPTION II – CONSTRUCTION**

**Paper 02 – Technical Proficiency**

*2 hours 40 minutes*

**26 MAY 2014 (p.m.)**

**READ THE FOLLOWING INSTRUCTIONS CAREFULLY.**

1. This paper consists of THREE sections. You MUST answer FIVE questions.

Section A: You must answer the only COMPULSORY question in this section.

Section B: You must answer THREE questions from this section.

Section C: You must answer ONE question from this section.

2. Use sketches where necessary to support your answers.
3. Only sketches for Question ONE should be done on the drawing sheets provided. ALL other sketches should be done in the answer booklet.
4. Silent, non-programmable calculators may be used.
5. You are advised to take some time to read through the paper and plan your answers.

**DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.**

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01308020/F 2014

## BUILDING TECHNOLOGY CONSTRUCTION

### LIST OF FORMULAE

Candidates should refer to the following list of formulae for assistance in answering questions.

#### TRUE LENGTH OF COMMON RAFTER WITH OVERHANG

- Overhang =  $\text{Rise/Run} = X/\text{overhang}$   
Value of X =  $(\text{Rise} \times \text{Overhang})/\text{Run}$   
Value of X + Original Rise = Total Rise  
Run + Given Overhang = Total Run

Using Pythagoras' Theorem

- True Length of Rafter =  $\sqrt{\text{Total Rise}^2 + \text{Total Run}^2}$

Formula for calculating tread and riser dimensions

- $2R + T$  OR  $2R + G = 550 \text{ mm to } 700 \text{ mm}$

Where R = rise G = going and T = tread

$$\frac{\text{Rise}}{\text{Span}} = \text{Pitch}$$

- $\frac{\text{Area of wall}}{\text{Area of block}} = \text{No. of blocks}$
- $\% \text{ Moisture Content} = \frac{\text{Wet Weight} - \text{Dry Weight}}{\text{Dry Weight}} \times 100$
- $\frac{\text{Span in mm}}{24} + 50 \text{ mm} = \text{Depth in mm}$

GO ON TO THE NEXT PAGE

This paper is divided into THREE sections — A, B and C. You MUST answer the only question from Section A, THREE questions from Section B and ONE question from Section C.

This paper contains metric dimensions only. You should work your answers in the metric system.

### SECTION A

You are allowed to use freehand sketches or rule-assisted sketches to answer this question, which is based on MODULES D5 TO D9 of the syllabus — Walls, Floors, Roofs, Windows, Doors and Stairs. ALL sketches should be done to proportion. This question is worth 40 marks.

You are advised not to spend more than 50 minutes on this question.

1. Figure 1 shows the floor plan of a dwelling house which measures 12.9 m long and 8.7 m wide. The external walls are built of 150 mm hollow concrete blocks (plastered on both sides.) The partition walls and floor are constructed of timber. The floor joists are 250 mm × 50 mm and floor boards are 150 mm × 25 mm tongued and grooved. The window at B – B on the plan view is constructed of wood and is of the type shown in Figure 2. The external doors are of the four flat panel type with flush planted moulds and the internal doors are of the flush type. The building is covered with a gable roof; the position of the roof is outlined on the plan by the broken lines. The overhang is 300 mm all around.

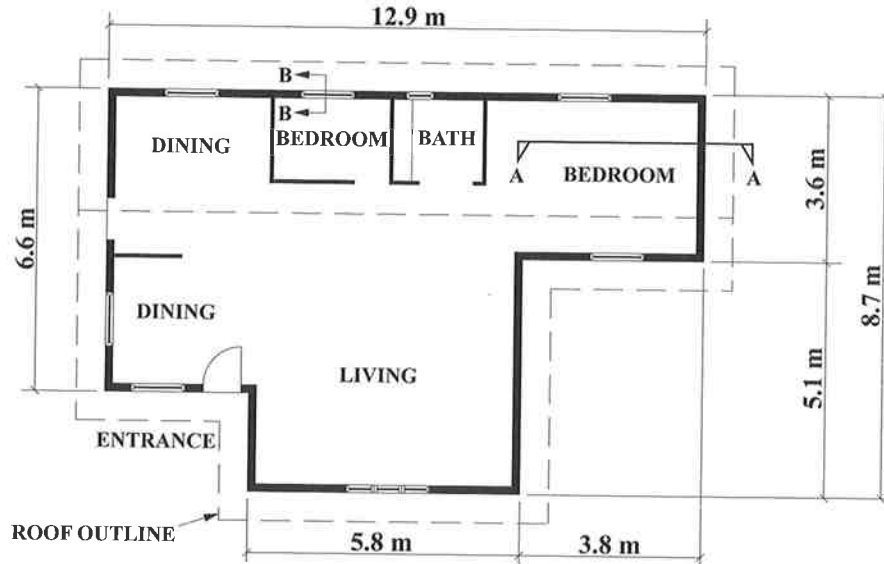


Figure 1. Floor plan

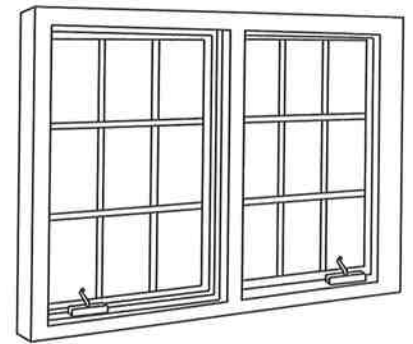


Figure 2. Window

- (a) (i) Produce a neat sketch of the vertical section of the wall and THREE joists at A – A on the floor plan in Figure 1 to show the arrangement of the members of the timber floor. **(5 marks)**

**Note: Details of the foundation, window and roof are not required in your response.**

- (ii) Label correctly any THREE parts of the timber floor section produced in (a) (i) above. **(3 marks)**

- (b) (i) Sketch a neat vertical section at B – B as indicated on the floor plan in Figure 1 to show details of the window and frame in the concrete wall opening. **(7 marks)**

**Note: Details of the foundation and roof are not required.**

- (ii) Label correctly any FOUR parts of the detailed sketch produced in (b) (i) above. **(4 marks)**

- (c) (i) Use a single line sketch to reproduce the shape of the external walls of the building and produce a complete roof framing plan view of the gable roof as outlined in Figure 1. **(8 marks)**

- (ii) Label correctly any FIVE parts of the roof framing plan produced at (c) (i) above. **(5 marks)**

- (d) (i) State THREE functions of the external door as indicated on Figure 1. **(3 marks)**

- (ii) Name TWO types of ironmongery designed for use on external doors. **(2 marks)**

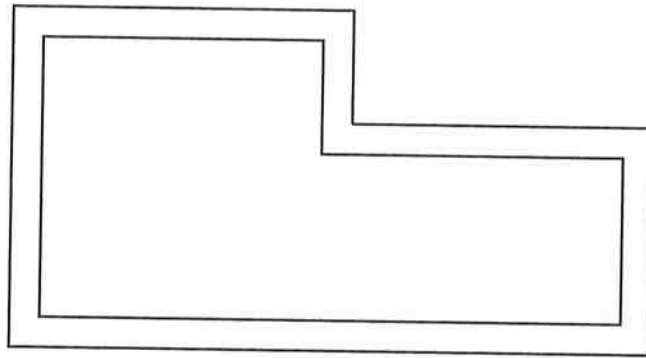
- (iii) Name THREE types of ironmongery designed for use on the window in Figure 2. **(3 marks)**

**Total 40 marks**

**SECTION B**

**You are required to answer THREE questions from this section. EACH question is worth 20 marks.**

2. (a) List THREE reasons for stripping a building site. **(3 marks)**
- (b) (i) List FOUR temporary services that a well-managed building site should provide. **(4 marks)**
- (ii) List THREE reasons for hoarding a building site. **(3 marks)**
- (c) With the aid of labelled sketches and brief notes, explain:
- (i) How corner profiles are positioned when setting out a small, L-shaped building as shown in Figure 3. **(6 marks)**



**Figure 3. L-shaped building**

- (ii) TWO methods of ensuring that the corners of the building are square. **(4 marks)**

**Note: Write the name of the method directly under each sketch.**

**Total 20 marks**

3. (a) List THREE characteristics of aggregates used in concrete. (3 marks)
- (b) Define the term 'proportioning' in relation to a concrete mix. (2 marks)
- (c) Briefly explain EACH of the following terms in relation to timber:
- (i) Moisture content
  - (ii) Conversion
  - (iii) Seasoning
  - (iv) Dry rot
  - (v) Natural defects (10 marks)
- (d) List FIVE uses of plastics in the building construction industry. (5 marks)

**Total 20 marks**

4. (a) State the main purpose of a slump test. (2 marks)
- (b) (i) List THREE different types of brick bonds. (3 marks)
- (ii) Sketch TWO of the brick bonds stated in (b) (i) above. (4 marks)
- (c) State TWO functional requirements for foundations. (2 marks)
- (d) List THREE different types of foundations. (3 marks)
- (e) Sketch the THREE different types of foundations stated in (d) above. (6 marks)

**Total 20 marks**

5. (a) State the MAIN function of stairs. **(2 marks)**
- (b) Define the following terms used in the construction of stairs:
- (i) Riser
  - (ii) Tread
  - (iii) Handrail
  - (iv) Baluster
  - (v) Newel post **(5 marks)**
- (c) A new staircase is at the design stage, and the measurements taken on the site show that the total rise is 2.16 m. If the height of each riser is taken as 180 mm, calculate
- (i) the total number of risers required for the staircase
  - (ii) the total going of the staircase if the width of a tread is 240 mm wide. **(3 marks)**
- (d) Produce a labelled vertical sectional sketch, through a timber staircase with a housed string, to show details of how a riser and tread are connected to the string and to each other. **(7 marks)**
- (e) A lacquer finish is to be applied to the staircase. List, in sequence, THREE steps required to prepare the surfaces of the staircase before the finish is applied. **(3 marks)**

**Total 20 marks**

6. (a) Make neat line drawings to illustrate EACH of the following types of roofs. Insert the CORRECT name next to each drawing.
- (i) Lean-to roof
  - (ii) Gable roof
  - (iii) Hip roof
  - (iv) Hip and valley roof **(10 marks)**
- (b) List THREE advantages of using truss roof construction over traditional roof construction. **(3 marks)**
- (c) State TWO different types of ceilings. **(2 marks)**
- (d) List FIVE types of roof covering materials. **(5 marks)**
- Total 20 marks**

### SECTION C

**You are required to answer ONE question from this section. EACH question is worth 20 marks.**

7. (a) Use neat, labelled sketches to illustrate the following systems of sewerage disposal:
- (i) Septic tank
  - (ii) Soakaway **(10 marks)**
- (b) Briefly describe the operation of EACH of the following drainage systems in terms of function, cost, advantage, disadvantage and effectiveness.
- (i) Combined system of drainage
  - (ii) Separate drainage system **(10 marks)**
- Total 20 marks**



8. (a) (i) Name FIVE members of a building team. (10 marks)
- (ii) Outline ONE responsibility of EACH member named in (a) (i) above. (10 marks)
- (b) State TWO jobs carried out on a building site by EACH of the following members of the building trades:
- (i) Carpenter
  - (ii) Electrician
  - (iii) Mason
  - (iv) Painter
  - (v) Plumber (10 marks)

**Total 20 marks**

9. (a) (i) List FOUR factors that influence the design of a building. (4 marks)
- (ii) State how any THREE of the factors named in (a) (i) above EACH influence building practices. (6 marks)
- (iii) Explain how steep roof pitches usually found in American houses have influenced roof pitches in Caribbean houses. (2 marks)

- (b) Table 1 on the enclosed sheet, shows building components used in building construction in the first column. The table also shows headings for English and Caribbean building practices.

Select any TWO of the building components listed and for EACH compare the design and materials for English and Caribbean building practices. (8 marks)

**NOTE: An example for windows under the building component column is given as a guide.**

**Total 20 marks**

**END OF TEST**

**IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.**