

BUILDING CONSTRUCTION

EXAMINATION SCHEME

There will be three papers, Papers 1, 2 and 3 all of which must be taken. Papers 1 and 2 shall be a composite paper to be taken at one sitting.

- PAPER 1: will consist of forty multiple-choice objective questions all of which are to be answered in 45 minutes for 40 marks.
- PAPER 2: will consist of five short-structured essay questions. Candidates will be required to answer any four in 1 hour for 60 marks.
- PAPER 3: will be a practical test. It will consist of two sections, Sections A and B. The paper will take 2½ hours and will carry 100 marks.
- Section A: will be for candidates in Nigeria, Sierra Leone and The Gambia only. It will be on BUILDING DRAWING and shall consist of **four** questions including a compulsory one. Candidates will be required to answer the compulsory question and any two of the other questions.
- Section B: will be for candidates in Ghana only. It will consist of **six** essay questions including a compulsory one. Candidates will be required to answer the compulsory question and any three of the other questions.

SAMPLE QUESTIONS

PAPER 1 **(OBJECTIVE)**

1. A school building is a place **mainly** used for
 - A. public worship.
 - B. public gathering.
 - C. developing knowledge.
 - D. conferences.
2. Which of the following personnel certifies the result of a drain test?
 - A. Building foreman
 - B. Building inspector
 - C. Clerk of works
 - D. Site engineer

3. Building contract documents include the following **except**
- A. purchase order.
 - B. drawings and specifications.
 - C. bill of quantities.
 - D. agreement.
4. The material specification in a contract document indicates the
- A. schedule of materials to be used.
 - B. cost of materials for the work.
 - C. quantity of materials for the work.
 - D. quality of materials to be used.
5. The following are involved in a setting out operation:
- I. placing the profile pegs in position;
 - II. fixing the profile boards;
 - III. marking out the features on the profile boards;
 - IV. digging the foundation trenches.

Which of the combinations listed below are **correct**?

- A. I and II only
 - B. I and III only
 - C. I, II and III only
 - D. I, III and IV only
6. A **suitable** foundation for water-logged soil is the
- A. wide strip.
 - B. pile.
 - C. pad.
 - D. deep strip.
7. Which of the following is a structural floor?
- A. Reinforced concrete floor
 - B. Earth block floor
 - C. Chipboard flooring
 - D. Monolithic flooring

8. The laying of roof tiles is commenced at the
- A. hip.
 - B. verge.
 - C. ridge.
 - D. eaves.
9. Which of the following describes headroom in a stair construction?
- A. Clearance above the stairs to allow easy passage
 - B. Opening into which the stairs is located
 - C. First room at the top of the stairs for access
 - D. Clearance below the stairs to allow easy passage
10. The **most** suitable types of pipe used for water supply are
- A. copper and brass pipes.
 - B. aluminium and bronze pipes.
 - C. clay and rubber pipes.
 - D. p.v.c. and galvanized steel pipes.

PAPER 2
(SHORT STRUCTURED QUESTIONS)

1. (a) Explain the following terms as used in concreting:
- (i) batching;
 - (ii) water-cement ratio;
 - (iii) curing.
- (b) With the aid of annotated sketches, illustrate the following methods of checking the accuracy of setting out a rectangular building:
- (i) diagonal method;
 - (ii) builders' square method;
 - (iii) 3 : 4 : 5 method.
- (c) State **three** methods of transporting concrete mix on site.
2. (a) State the purpose of foundation in a building.
- (b) Sketch a section through an external wall with a wide-strip foundation and label the following parts:
- (i) blinding;
 - (ii) main bars;
 - (iii) distribution bars;
 - (iv) ground floor slab.

- (c) State **one** duty of **each** of the following personnel:
- (i) Architect;
 - (ii) Quantity surveyor;
 - (iii) Inspector of factories.
3. (a) State **two** advantages in the use of precast lintel over cast in-situ lintel.
- (b) Sketch to illustrate **two** methods of fixing risers to treads in a timber stair construction.
- (c) Sketch a door frame and label the following parts:
- (i) jamb;
 - (ii) head;
 - (iii) horn;
 - (iv) rebate.
4. (a) Describe in sequence, **six** stages involved in hanging a timber door when the frame is in position.
- (b) Sketch a close couple roof and label the following parts:
- (i) ridge board;
 - (ii) rafter;
 - (iii) wall plate;
 - (iv) supporting walls.
5. (a) Sketch the conventional symbol for **each** of the following:
- (i) fluorescent tube;
 - (ii) one-way switch.
- (b) State **three** locations on a drainline where an inspection chamber is required.
- (c) List **four** materials used for the manufacture of drain pipes.
- (d) Sketch a section through a water-closet with a P-trap and indicate the following parts:
- (i) water seal;
 - (ii) flushing rim.

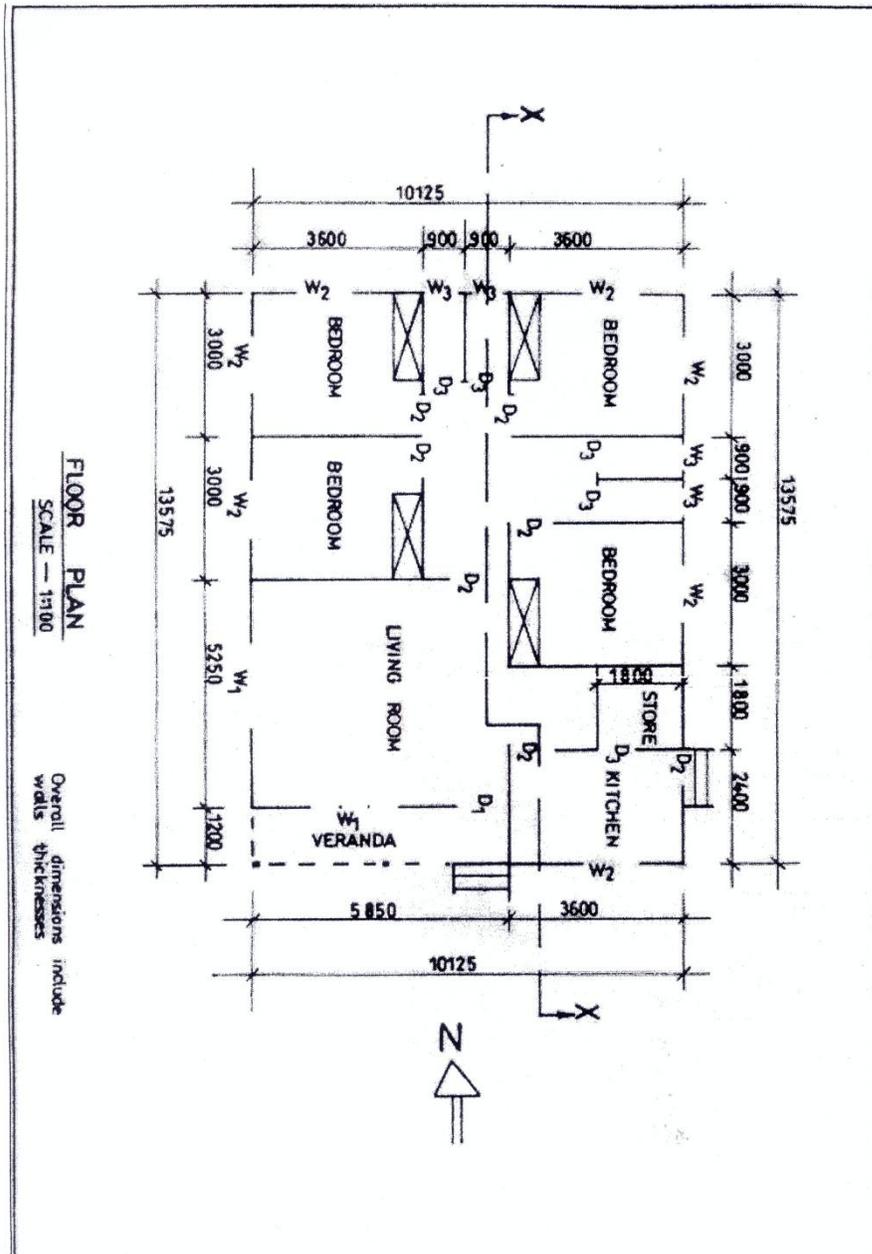
PAPER 3
SECTION A
(BUILDING DRAWING)

FOR CANDIDATES IN THE GAMBIA, NIGERIA AND SIERRA LEONE ONLY

*Answer **three** questions only in this section, Question 1 and any other **two** questions.*

SPECIFICATIONS

FOUNDATION:	675 x 225 concrete strip laid at a depth of 900 below ground level.
FLOORS:	Earth filling; Hardcore – 300; Concrete slab – 150; Mortar screed – 25.
WALLS:	All walls are 225 sandcrete hollow blocks with 12 mortar rendering on both sides.
DOORS:	D ₁ – 1200 x 2100 glazed metal door; D ₂ – 900 x 2100 panel wooden door with 100 x 75 hardwood timber frame. D ₃ – 750 x 2100 flush wooden door with 100 x 75 hardwood timber frame.
WINDOWS:	All windows are glazed aluminium sliding type: W ₁ – 1800 x 1200; W ₂ – 1200 x 1200; W ₃ – 600 x 600.
BEAMS/LINTELS AND COLUMNS:	225 x 225 reinforced concrete.
WARDROBES:	Partitioned into cloth and box compartments.
THRESHOLD STEPS:	Width – 1200; Tread – 300; Rise – 150.
VERANDAH:	Metal balustrade (MB)900 high measured from floor level.
ROOF:	Double pitched timber roof with corrugated galvanized iron roofing sheets; Eaves projection – 750; Pitch – 15°; Height from floor to ceiling – 3000.



1. (a) To a scale of 1:50, draw a detailed section X – X of the building from the foundation to roof.
 - (b) (i) List **four** sources of capital for any construction work.
 - (ii) Explain the term entrepreneurship.
2. Draw to a scale of 1:100, the detailed floor plan of the building
3. Draw to a scale of 1:100, the following views:
 - (a) front elevation;
 - (b) right side elevation.
4. To a scale of 1:20, draw the doors' and windows' schedules for the building.

SECTION B (FOR CANDIDATES IN GHANA ONLY)

Answer **four** questions only: Question 1 and any other **three** questions.

Credit will be given for clarity of expression and orderly presentation of material.

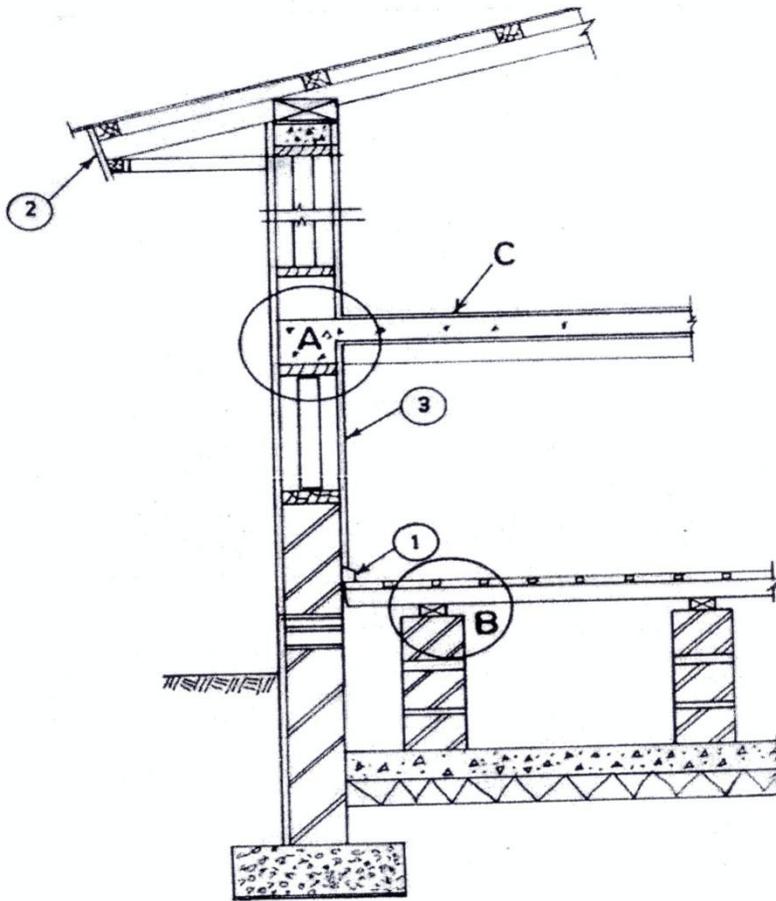


Fig - 1

Fig 1 shows a cross-section through a domestic building in a neighbourhood. Use it to answer the following questions:

1. (a) (i) Identify the elements labelled **1** and **2**
(ii) State **one** function of **each** of the elements identified in (a)(i) above.

- (b) State **four** reasons for choosing ready-mixed concrete for the construction of the works.
 - (c) (i) Sketch the detail at **A** to illustrate the formwork for the construction of reinforced concrete floor and the beam.
(ii) Label any **four** parts of the sketch in (c)(i) above.
 - (d) Explain **three** ways by which moisture rising from the ground may affect the elements in the area labelled **B**.
 - (e) The reinforced concrete floor labeled **C** is to be finished with tongued and grooved hardwood flooring fixed to 50 x 50 hardwood bearers. Sketch a pictorial view to illustrate the construction of the tongued and grooved flooring and label the following on the sketch:
 - (i) tongued and grooved flooring;
 - (ii) hardwood bearers;
 - (iii) concrete slab;
 - (iv) mortar bed.
 - (f) State **two** defects that may cause roof leakage if corrugated aluminium roofing sheet is used as the covering material.
- 2.
- (a) State **three** reasons for a poor flow of effluent in a drainage system.
 - (b) With the aid of an annotated sketch, explain how a ball valve in a water reservoir operates.
 - (c) State **three** reasons why an access road to a building site must be free from obstruction.
 - (d) State **three** protective clothing that must be worn when working with bagged Portland cement.
- 3.
- (a) Explain the cause of **each** of the following timber defects:
 - (i) cup shake;
 - (ii) star shake;
 - (iii) heart shake.
 - (b) Sketch a pictorial view of **each** of the following defects in timber:
 - (i) bowing;

- (ii) cupping;
 - (iii) warping.
 - (c) State **two** advantages of using reinforced concrete over the use of timber in suspended floor construction.
- 4.
- (a)
 - (i) State **three** precautions to be observed when excavating foundation trenches in loose soil for a proposed school building.
 - (ii) State **three** reasons for timbering the sides of the trenches in (a)(i) above.
 - (b) Sketch a precast concrete pile and label the following:
 - (i) metal shoe;
 - (ii) main reinforcement;
 - (iii) pile cap;
 - (iv) shoe strap.
 - (c) State **two** disadvantages in the construction of a deep strip foundation over that of a pad foundation.
- 5.
- (a) State **six** stages involved in casting a ready-mix concrete for a ground floor slab when the hardcore filling is in place.
 - (b) Sketch to illustrate the plan of each of the following types of staircase:
 - (i) dogleg;
 - (ii) quarter landing.
- 6.
- (a) State **four** causes of failure of a floor screed.
 - (b) State the **main** reason for using **each** of the following ironmongery for hanging doors:
 - (i) Rising butt hinge;
 - (ii) Parliament hinge.
 - (c) Sketch to illustrate **each** of the following cold water supply systems:
 - (i) direct system;
 - (ii) indirect system.