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: D₁ – 1200 x 2100 glazed metal door;
D₂ – 900 x 2100 panel wooden door with 100 x 75 hardwood timber frame.
D₃ – 750 x 2100 flush wooden door with 100 x 75 hardwood timber frame.

WINDOWS: All windows are glazed aluminium sliding type:
W₁ – 1800 x 1200;
W₂ – 1200 x 1200;
W₃ – 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.
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.