NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF THE BUILT ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

BUILDING CONSTRUCTION III

AAR 3108

Examination Paper

December 2015

This examination paper consists of 5 pages

Time Allowed: 4 hours

Total Marks: 100

Special Requirements: A1 DRAWING BOARDS, A1 PLAIN SHEETS, MASKING TAPE.

Examiner's Name: I. Mhandu

INSTRUCTIONS

1. Answer ALL questions
2. Answer question 1 on an A1 sheet/s of paper

MARK ALLOCATION

QUESTION	MARKS
1.	**40**
2.	**20**
3.	**20**
4.	**20**
TOTAL	**100**

Question 1

A triple-glazed window projects 1.5 metres from the external wall of a dwelling house, as shown in Figure 1.

The external wall is a 350 mm brick wall with an insulated cavity. The lean-to roof is an insulated tiled roof and has a pitch of 30°. Insulated plasterboard is fixed to the underside of the rafters to form a sloped ceiling.

Figure 1: External wall of a house showing a 1.5 m projected triple glazed window.

(a)(i) Draw a vertical section using a scale of 1:5 through the window, roof and front wall of the house showing the typical construction details from 400 mm below the concrete lintels of the window, through the fixed frame of the window, wall plate and rafter to a level 400 mm above the abutment of the lean-to roof and the front wall of the house. (20)

(ii) Indicate on your drawing the design detailing that ensures moisture does not penetrate at the abutment of the roof and the wall of the house. (5)

(b) A concrete block chimney stack with a sand/cement render passes through a cut roof of the house above which is slated and is pitched at 45°.

(i) To a scale of 1:5, draw a vertical section through the chimney stack and roof, showing the typical details of the chimney stack, flue, chimney capping and portion of the roof structure. The design details should prevent the penetration of water between the chimney stack and the adjoining roof surface. (10)

(ii) On your drawing, show **two** design details that will help prevent the occurrence of a downdraught in a chimney. Include dimensions as appropriate. (5)

(40)

Question Two

a) Explain the difference between demolition and deconstruction *(4)*

Figure 2:Demolition of The Pruit- Igoe complex (Charles, 2005)

Figure 2 above shows a method of pulling down a building.

b) Identify the method and explain the conditions that favour its use.

(5)

c) What are the environmental effects to be considered when planning to pull down a building using the method in Figure 2?

(5)

d) Use sketches to explain temporary support with maintenance jacking

(6)

(20 marks)

Question 3

a) What is a deep foundation system and give an example? *(4)*

b) Explain situations that require the use of deep foundations systems *(8)*

c) Using sketches explain the difference between displacement and replacement piles.

(8)

(20 marks)

Question 4

a) Identify the main five types of formwork systems in current use?

(5)

b) Explain the type of formwork most suitable for construction of multi-storey vertical concrete elements in high-rise structures, such as shear walls, lift shafts and core walls.

(4)

c) (i) Provide reasons for the common use of EPS (expanded polystyrene) in construction to substitute more traditional fill materials. (2)

(ii) Identify three applications of expanded polystyrene in light of the statement in (c)(i) and use sketches to explain its use. (9)

(20 marks)