NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF THE BUILT ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

BUILDING CONSTRUCTION IV

AAR 3208

Main Examination Paper

May 2016

This examination paper consists of 4 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

Figure 1 below shows a schematic section of a mansard straight back carport.

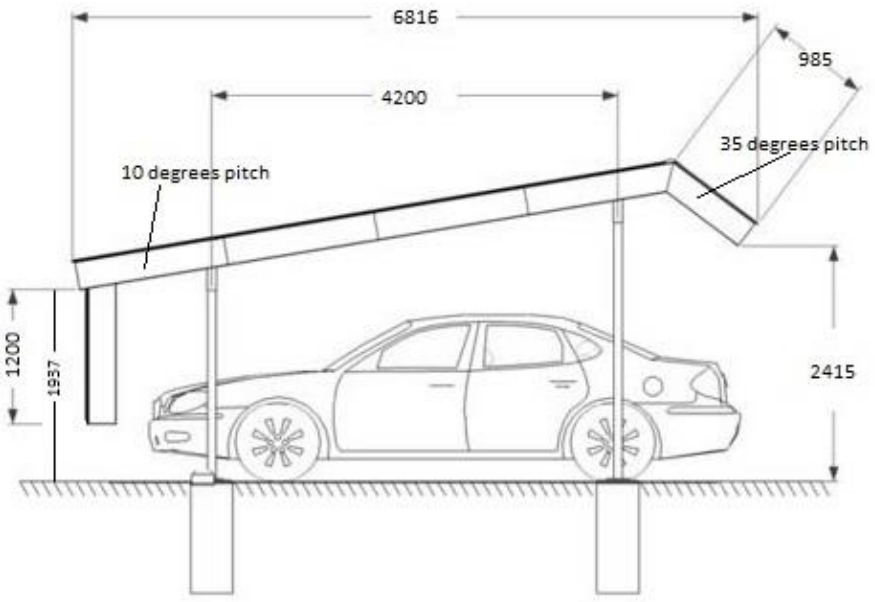

Figure 1: Schematic section of a mansard straight back carport.

You are required to design and draw a carport basing on the schematic drawing given in figure 1 which accommodates 4 cars. The basic envelope size to be provided by the carport measures 12 000mm x 6 816mm. Three rows of steel columns support the structure providing accommodation divided into 2 halves with each half consisting of 2 parking bays. The structure uses galvanized steel with the roof and back wall cladding done in chromadek.

Drawings should show

(i) A structural plan using scale 1:25

(ii) A section at a scale of 1:25

(iii) 5 relevant details of the joints using appropriate scales **[40]**

QUESTION 2

Use annotated sketches for the following

a. Identify any three drainage layout systems? (3)

b. Explain the following classifications of sub-surface drains.

i. Aggregate Drains

ii. Pipe Drains (8)

c. Using clearly annotated sketches explain the following:

i. A typical section of a geo-textile (geo- fabric) drain behind a retaining wall. (5)

ii. A typical section of insitu concrete box drainage channel with metal grill. (4)

[20]

QUESTION 3

a. Explain the following:

i. The difference between Recycled aggregates (RA) and Recycled Concrete aggregates (RCA) in the manufacturing of concrete. (2)

ii. Post tensioned slabs. (2)

iii. Voided slabs (2)

b. Explain four factors to take into account when using voided or post tensioned slabs for waste minimization. (5)

c. In modern day construction, there is no proper replacement for the traditional aggregates for concrete. Any replacement by other materials changes the properties of concrete. Explain how the uses of the following materials change the characteristics of concrete.

i. Expanded polystyrene

ii. Plastic (High-density polyethylene)

iii. Glass (9)

[20]

QUESTION 4

a. Define a pavement and what are the three main purposes it serves? (5)

b. Use well labelled sketches to explain the two types of pavements (8)

c. Explain using sketches the purpose of the following in pavement construction.

i. Longitudinal joint

ii. Expansion Joint (4)

d. Explain the causes of pavement deterioration (3)

[20]

