NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF THE BUILT ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

BUILDING CONSTRUCTION V

AAR 5102

Examination Paper

May 2016

This examination paper consists of 4 pages

Time Allowed: **4 hours**

Total Marks: **100**

Special Requirements: Computer installed with ArchiCAD SOFTWARE

Examiner's Name: T. NYAMANDE and I. MHANDU

INSTRUCTIONS

1. Answer ALL questions
2. Answer question 1 using CAD (Computer software)

MARK ALLOCATION

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

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QUESTION 1

Figure 1 below shows schematic sketches of a development of a simple paraboloid tensile membrane structure.

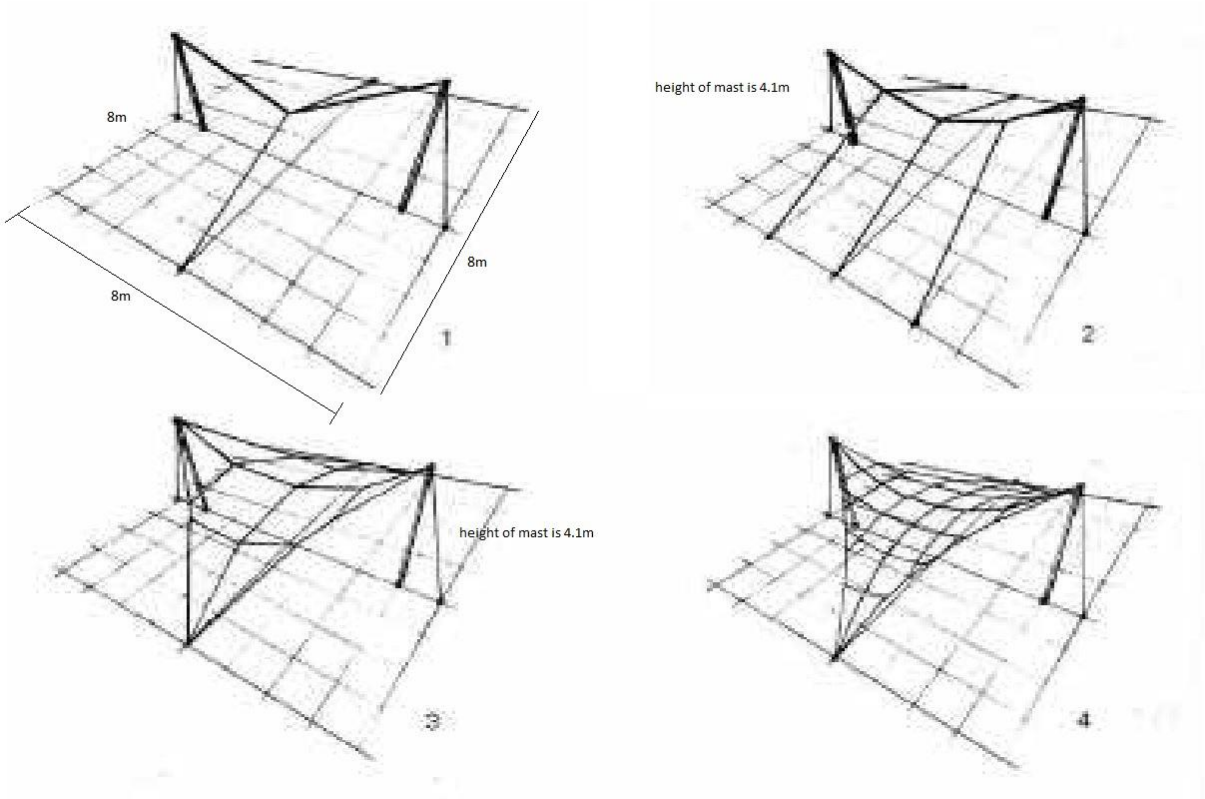

Figure 1: Schematic sketches of a simple paraboloid tensile membrane structure

You are required to design the structure which is to be used as a relaxation space at one of the local hotels in Bulawayo. The space to be covered by the structure measures 8m x 8m. It consists of steel mast with a height of 4.1m which is supported by tie back cables. The membrane is of a high density Teflon fabric of a high strength.

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Drawings of the following should be drawn at a scale of 1:1 using ArchiCAD and then placed on an A1 layout with a proper title block which should be printed to pdf in black and white or grayscale.

a. A structural plan using scale 1:25 [10]
b. 2 different elevations at a scale of 1:25 [10]
c. 5 relevant details of the joints using appropriate scales clearly stating the materials and their specifications. [20]

QUESTION 2

a. i. What is Fibre Reinforced Concrete (FRC)? (3)
   ii.State the five types of FRC (5)
b. Identify and explain the four (4) factors that determine the properties of FRC. (8)
c. Describe the 2 ways of making pre-stressed concrete (4)

QUESTION 3

a. i. Define pre-fabricated modular structures (3)
   ii. Identify five design considerations for the prefabricated modular structures. (5)
b. Use sketches to show the following precast concrete elements details.
   i. Column to column connection.
   ii. Beam to column connection.
   iii. Beam to slab joint. (9)
c. What are the three limitations of using pre-fabricated modular structures (3)

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QUESTION 4

a. Explain why water tightness is difficult in claddings of very tall buildings. *(2)*

b. Illustrate a detail of cladding for sound, heat and moisture protection. (6)

c. Identify the two most common finishes for aluminium cladding components and explain their properties (6)

d. Sketch and explain the difference between Structural glass cladding and Curtain Walling (6)

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