

**W1-2-60-1-6**

**JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS 2018/2019**

**SECOND YEAR FIRST SEMESTER SPECIAL/SUPPLEMENTARY EXAMINATION FOR THE DEGREE OF BACHELOR OF ARCHITECTURAL STUDIES**

**ABA 2202 : STRUCTURES FOR ARCHITECTS II**

**DATE: JULY 2019 TIME: 2 HOURS**

**INSTRUCTIONS**

1. Answer Question **ONE (COMPULSORY)** and any **other TWO** questions.

2. All workings must be clearly shown.

3. Use neat sketches.

**QUESTION ONE (COMPULSORY)**

a) Define the following terms

(i) Cantilever (2 marks)

(ii) Slenderness Ratio (2 marks)

b) Using neat sketches, describe the following types of tensile structures.

(i) Air supported membranes (2 marks)

(ii) Cable nets (2 marks)

(iii) Shell structures (2 marks)

(iv) Monocoque structures (2 marks)

c) Using neat sketches, describe the 3 main types of cantilever structures (6 marks)

d) A timber beam has a uniformed lead of 4KN/M with a required span of 4.5m.

Given Fb = 4KN/M2, find the section modulus for the beam (4 marks)

e) A column is 0.6m in diameter and carries a load of 600KN. It is offset from the

centroid by 0.1m. Calculate the extremes of the stresses (4 marks)

f) Derive the equation showing the relationship between strain, the radius of

curvature and modulus of elasticity using figure 02 (4 marks)

**QUESTION TWO**

a) What is Structural Analysis (2 marks)

b) Discuss the importance of Structural Analysis (4 marks)

c) Apart from enclosing a space, a wall also acts as a structural element. Discuss

the 3 classifications of walls. (6 marks)

d) Discuss the 3 common types of 3-Dimenstional Domes (6 marks)

e) State and briefly explain 2 failure modes in columns (2 marks)

**QUESTION THREE**

a) Discuss, giving examples,what vaults are in a structural system (5 marks)

b) Define the following terms

(i) Foundation (2 marks)

(ii) Load bearing soil (2 marks)

c) Differentiate between braced and unraced columns (4 marks)

d) Using neat sketches, explain the following as used in trusses

(i) Praff truss (2 marks)

(ii) Town’s lattice truss (2 marks)

(iii) North light truss (2 marks)

(iv) Warren truss (2 marks)

**QUESTION FOUR**

a) Define the following terms as applied in Foundations

(i) Settlement (2 marks)

(ii) Differential settlement (2 marks)

b) Using clear sketches, explain the 5 different types of Arches and their use (10 marks)

c) Differentiate between the following

(i) Pad Foundation (2 marks)

(ii) Strip Foundation (2 marks)

(iii) Raft Foundation (2 marks)