MACHAKOS UNIVERSITY

University Examinations for 2020/2021Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

SECOND YEAR SPECIAL/ SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECV 204: THEORY OF STRUCTURES I

DATE: 23/3/2021 **TIME: 2.00-4.00 PM**

INSTRUCTIONS

Answer question one and any other two questions

QUESTION ONE (COMPULSORY) (30 MARKS)

a) Briefly state the role of a **Civil Engineer** within the Built Environment setting design of structures such as roads, bridges, water damps e.tc. (2 marks)

b) What you understand by the term **Structural Engineering** explaining the role a Structural Engineer plays in design/supervision of structures. (3 marks)

c) Briefly explain how basic loads to be carried on a structure are determined. (10 marks)

d) In the case of Architectural structures, describe **two principal** and most important types of loads to be considered in the analysis of an Architectural structure. (15 marks)

QUESTION TWO (20 MARKS)

a) Define the terms Theory of Structures and Strength of materials. (4 marks)

b) Name three conditions and equations of equilibrium of any system of forces.

(6 marks)

c) Explain with the aid of a clearly annotated sketch of a cantilever beam what is meant by a moment of force? (10 marks)

QUESTION THREE (20 MARKS)

a) Explain why it is necessary to classify buildings into different types of classes during the design stage and give at least **two** types of classes. (6 marks)

b) Briefly describe what you understand by the terms listed below. (14 marks)

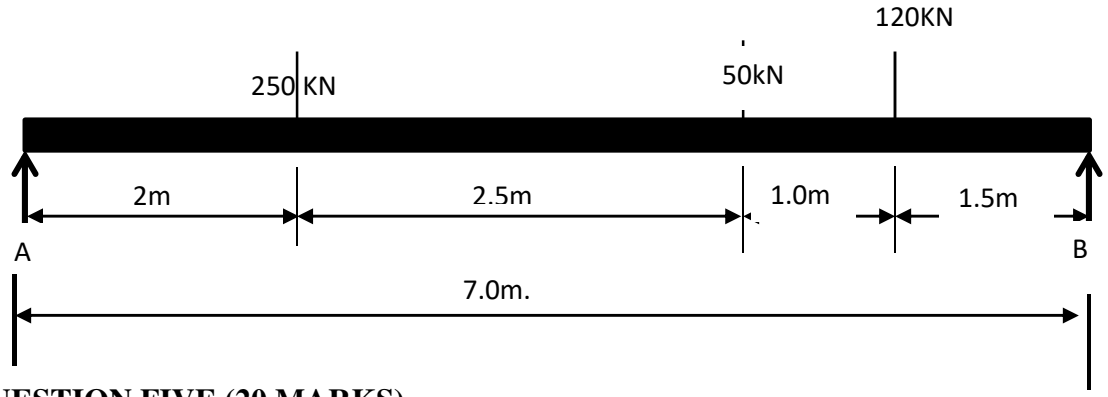
i. Structural elements.

ii. Foundations.

QUESTION FOUR (20 MARKS)

a) Explain what a force is and state the effect it has when applied to a stationery body. Briefly show how the force will be worked out making use of applied force formula.. (7 marks)

b) Calculate the magnitude and direction of the reaction in the loaded beam shown in the figure below. (13 marks)



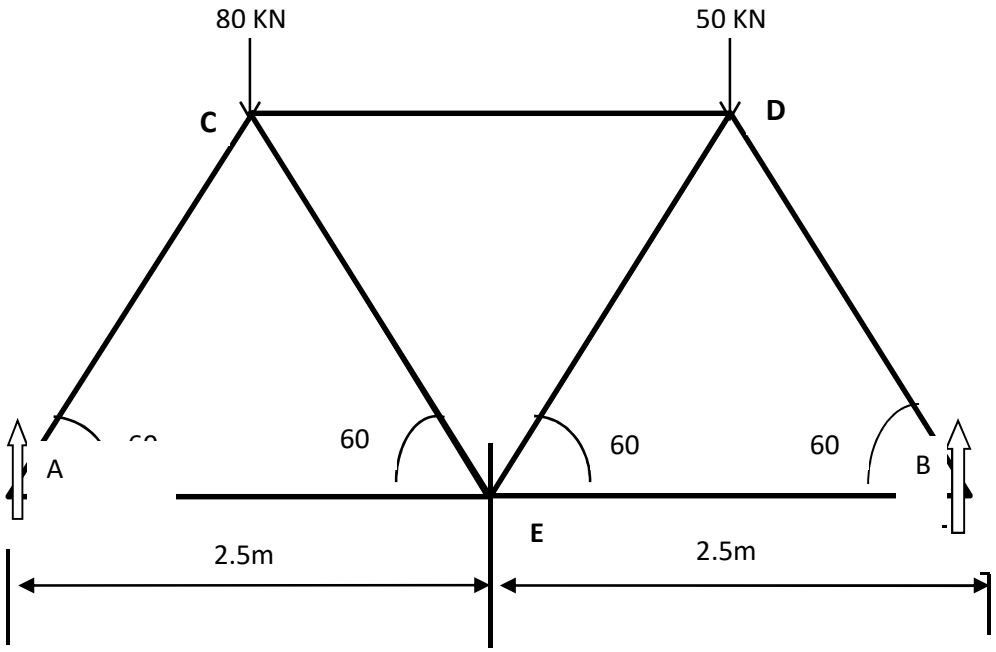
QUESTION FIVE (20 MARKS)

a) Define the following terms :

i. Statically determinate framework.

ii. Statically Indeterminate Framework (6 marks)

b) Determine the magnitude and type of force acting in each of the members of the framework sketch below using method of joint resolution of forces. (14 marks)


80 KN
50 KN
C
D
60
60
60
A
B
E
2.5m
2.5m