



MACHAKOS UNIVERSITY

University Examination 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

SECOND YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (CIVIL ENGINEERING)

ECV 204: THEORY OF STRUCTURES I

DATE: 26/7/2019

TIME: 8.30-10.30 AM

INSTRUCTIONS: Answer questions **ONE** and any other **TWO** questions.

QUESTION 1 (COMPULSORY) (30 MARKS)

- (a) What is the role of a Structural Engineer in the design and construction of structures such as buildings, bridges, communication masts etc. (2 marks)
- (b) Describe what is meant by the terms structural elements in reference to high rise building structures naming at least three such elements and their functions. (3 marks)
- (c) Name at least three types of loading systems which must be considered in the process of structural analysis. (10 marks)
- (d) Describe with the aid of sketches the above named systems as in (c) above stating typical example of each system named. (15 marks)

QUESTION 2 (20 MARKS)

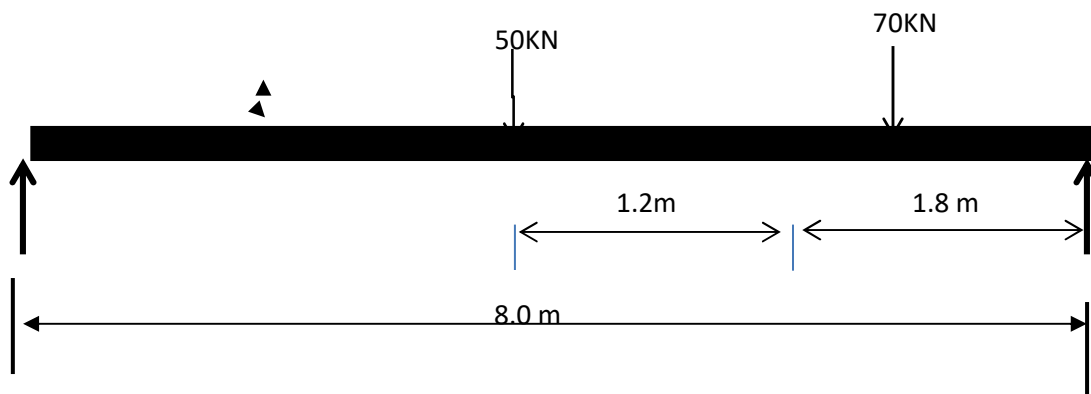
- (a) Briefly define the term Moment of forces stating the formula on how to calculate the moments. (4 marks)
- (b) State three common Laws of Static Equilibrium. (6 marks)
- (c) State the effects loads will have on the listed members below stating the expected deformation mode and common orientation of each; (i) Stanchions (ii) slabs (iii) Beams (iv) Tendon/rod

QUESTION NO.3 (20 MARKS)

- (a) Briefly describe why it is necessary to classify buildings into different classes such as domestic, commercial, restaurant, hospital etc during the design stage. (6 marks)
- (b) Briefly describe with the aid of sketches what you understand by the following listed terms; (i) Foundations (ii) Retaining walls and (iii) Load bearing walls.

QUESTION NO.4 (20 MARKS)

- (a) Describe with the aid of sketches the following terms which you frequently come across during the analysis of structures (i) Uniformly distributed loads (UDL) and (ii) Point loads (5 marks)
- (b) Calculate the magnitude of the Reaction, Shear Force and Bending moments in the loaded beam shown in the figure below. (15 marks)



QUESTION NO.5 (20 MARKS)

- (a) Differentiate the terms statically determinate and statically indeterminate frameworks. (5 marks)
- (b) Determine the magnitude and type of force acting in each of the members of the framework sketch shown below using method of joint resolution of forces. (15 marks)

