MACHAKOS UNIVERSITY

University Examination 2019/2020

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECV 204: THEORY OF STRUCTURES I

DATE:16/12/2019 **TIME: 8.30-10.30 AM**

INSTRUCTIONS

Answer Question One and Any Other Two Questions

QUESTION ONE (30 MARKS)

a) State three types of loading in a beam (3 marks)

b) Name and graphically show four types of beam supports (4 marks)

c) Calculate the reactions at A, B. Draw shear force and bending moment diagrams. Find location of zero shear force. Find the maximum moment for beam shown in fig 1 (12 marks)

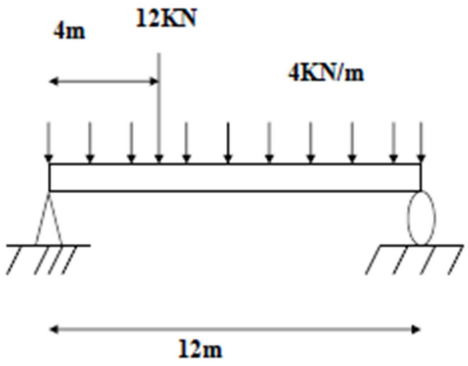

Fig :1

d) Determine the statical inderminancy of the following structural members (fig 2,3,4)

(6 marks)

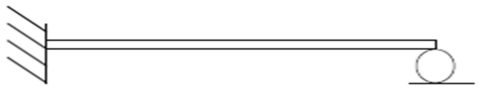

Fig :2

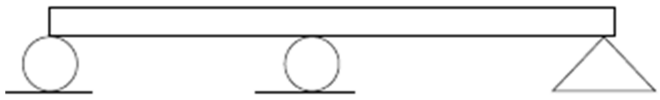

Fig: 3

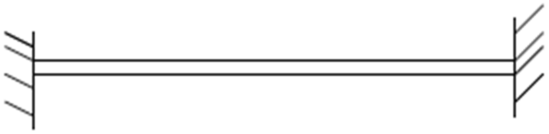

Fig: 4

e) Draw shear force and bending moment diagrams for the simply supported beam in fig 5

(5 marks)

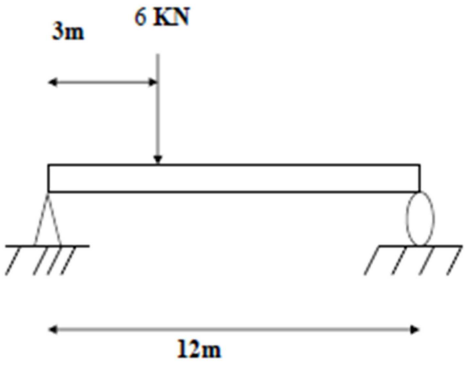

Fig 5

QUESTION TWO (20 MARKS)

Draw shear force, bending moment and axial force diagrams and the qualitative deflected shape for the frame shown in fig 6

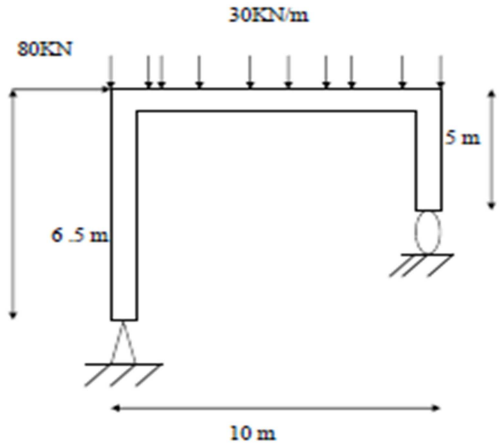

Fig :6

QUESTION THREE (20 MARKS)

a) A simply supported beam of length 6m carries point load of 3KN and 6KN at distances of 2m and 4m from the left end respectively. Draw shear force and bending moment diagrams for the beam. (10 marks)

b) Draw shear force and bending moment diagrams for the beam shown in figure 7 (10 marks)

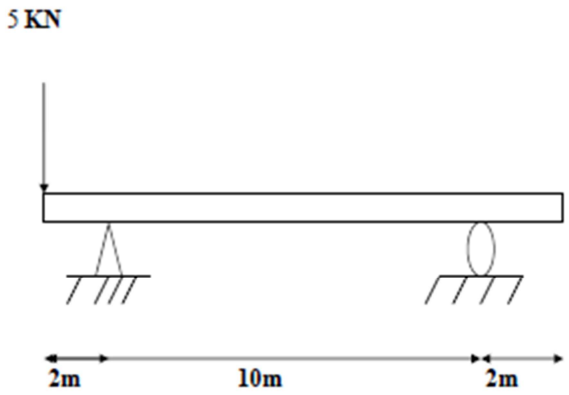

Fig: 7

QUESTION FOUR (20 MARKS)

For the simply supported pin-jointed frame shown in fig 8 calculate the following ;

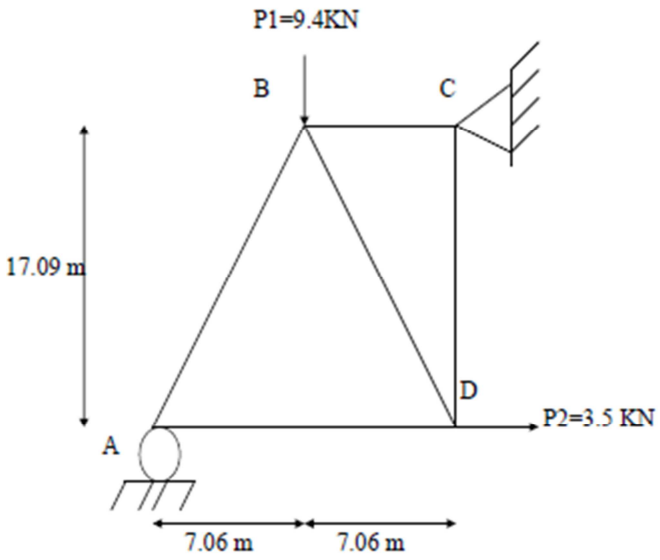

Fig:8

i. The horizontal and vertical reac

ii. tions at supports A and C

iii. The magnitude of the internal forces for all the structural members

QUESTION FIVE (20 MARKS)

A 10m long simply supported beam carries two point loads of 10KN and 6 KN at 2m and 9m respectively from the left end. It also has a uniformly distributed load of KN/m run for the length between 4m and 7m from the left end. Draw shear force and bending moment diagrams