TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

DIPLOMA IN BUILDING AND CIVIL ENGINEERING

EBC 2302: THEORY OF STRUCTURES III

END OF SEMESTER EXAMINATION

SERIES: APRIL 2016

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination

- Answer booklet

This paper consists of **FIVE** questions

Answer question one (**compulsory)** and any other two questions

Maximum marks for each part of a question are as shown

This paper consists of **FOUR** printed papers.

QUESTION ONE (COMPULSORY)

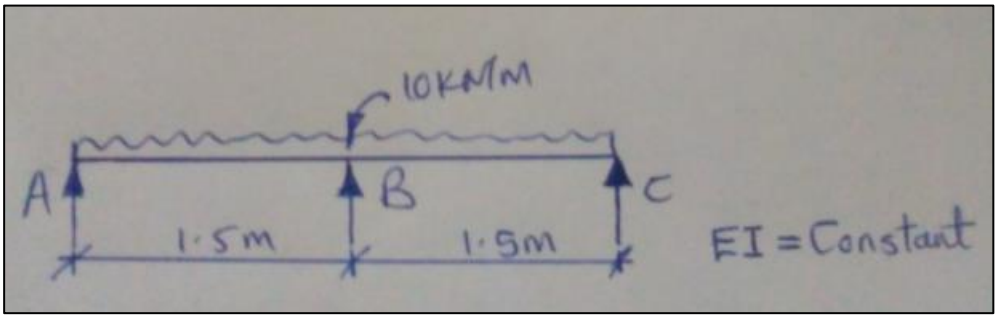
a)

i. Define an influence line.

ii. A U.D.L. of 50KN/M longer than the span rolls over a beam of 20m span. Using influence lines, determine the maximum shear force and bending moment at a section 10m from the left end support. **(12mks)**

b) A simply supported beam of span 3m is subjected to a central point load of 10KN. Find the maximum slope and deflection of the beam. Take I=12x$10^6 \mathrm{mm}^4$. **(6mks)**

c) Draw the shear force and bending moment diagrams for the beam shown below using the three moment theorem.



(10mks)

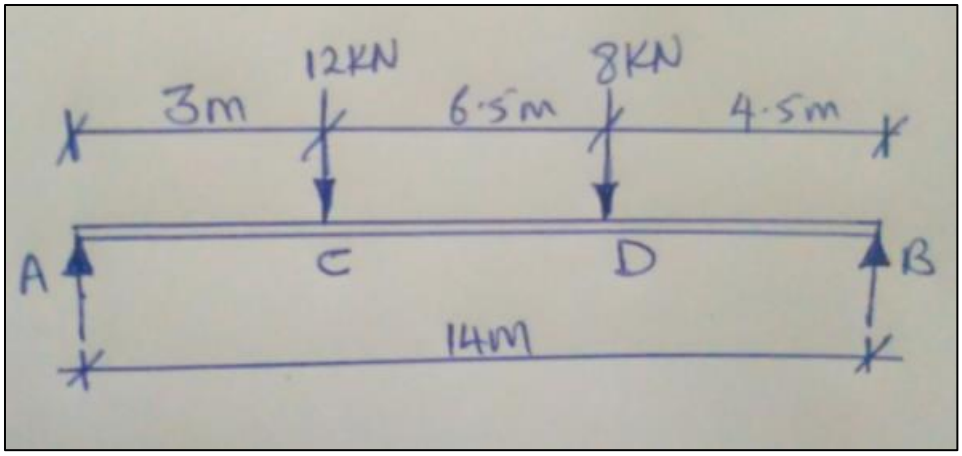
QUESTION TWO

Using the area moment principle derive the three moment equation. **(20mks)**

QUESTION THREE

(a) A cantilever beam 2m long is subjected to a U.D.L. of 5KN/M over its entire length. Find the slope and deflection of the cantilever beam at its free end. Take EI=2.5x$10^{12} \boldsymbol{mm}^2$ **(3mks)**

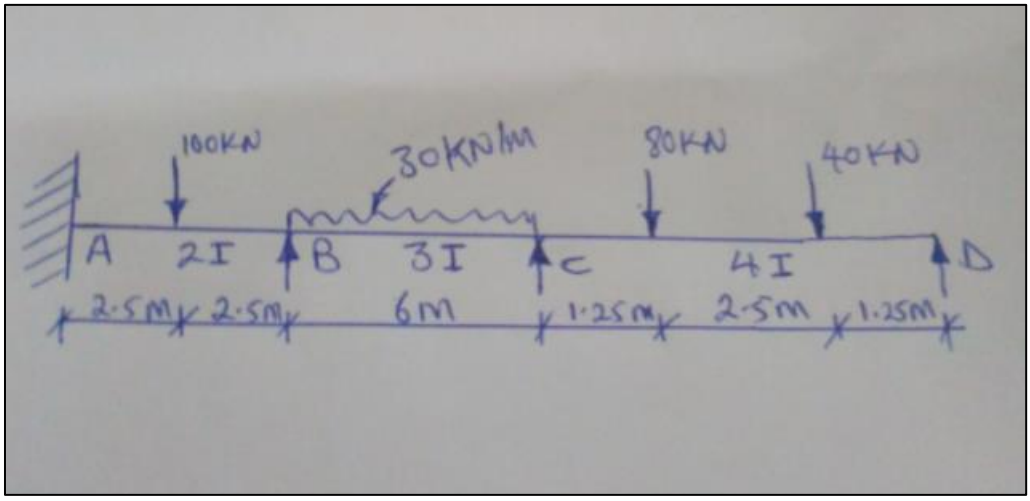
(b) A horizontal steel girder having a uniform cross-section is 14m long and is supported at its ends. It carries two concentrated loads as shown:



Calculate the deflection of the beam under the load C and D. Take E=200GPa, I=160x$10^6 mm^4$ **(17mks)**

QUESTION FOUR

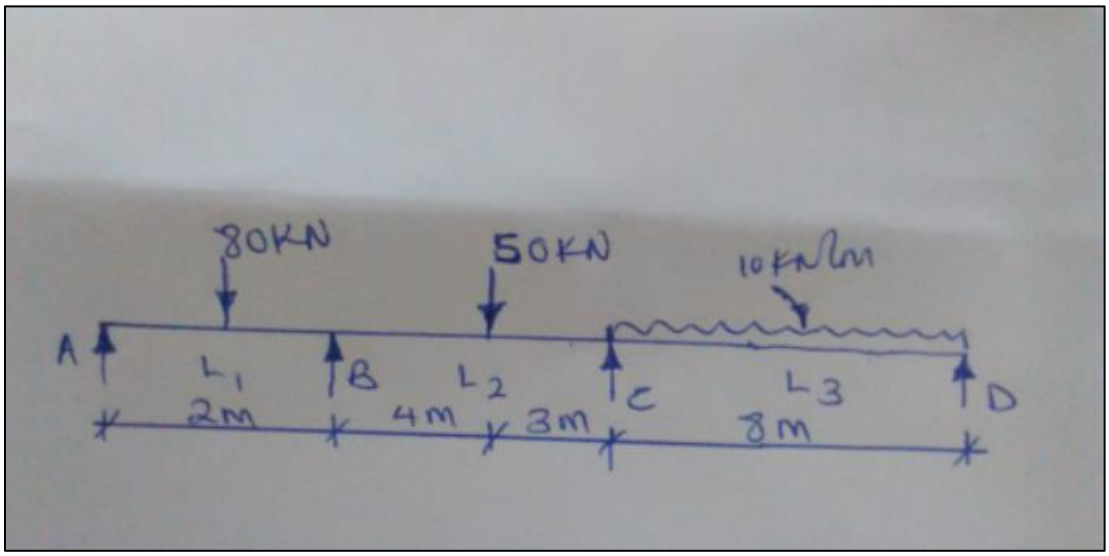
Using the moment distribution method draw the shear force and bending moment diagrams indicating critical values for the beam shown below:



(20mks)

QUESTION FIVE

The figure below shows a loaded continuous beam of constant cross-section. Using the three moment theorem, analyse the beam and sketch the shear force and bending moment diagrams indicating the critical values.



(20mks)