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 $I=12x10^6 mm^4$.   **(6mks)**

c) Draw the shear force and bending moment diagrams for the beam shown below using the three moment theorem.
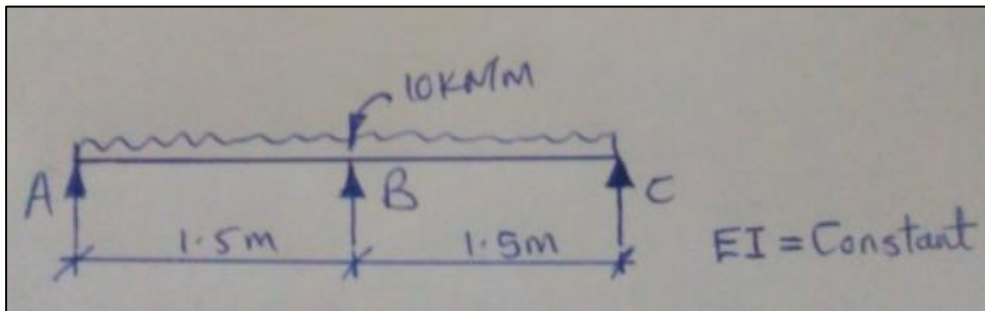
(10mks)

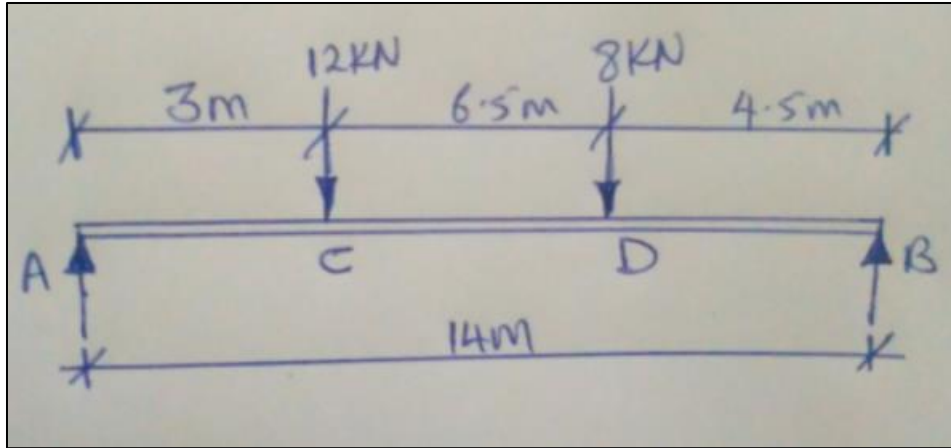## QUESTION TWO

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 $EI=2.5x10^{12} mm^2$
    (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=160x10^6mm^4 **(17mks)**
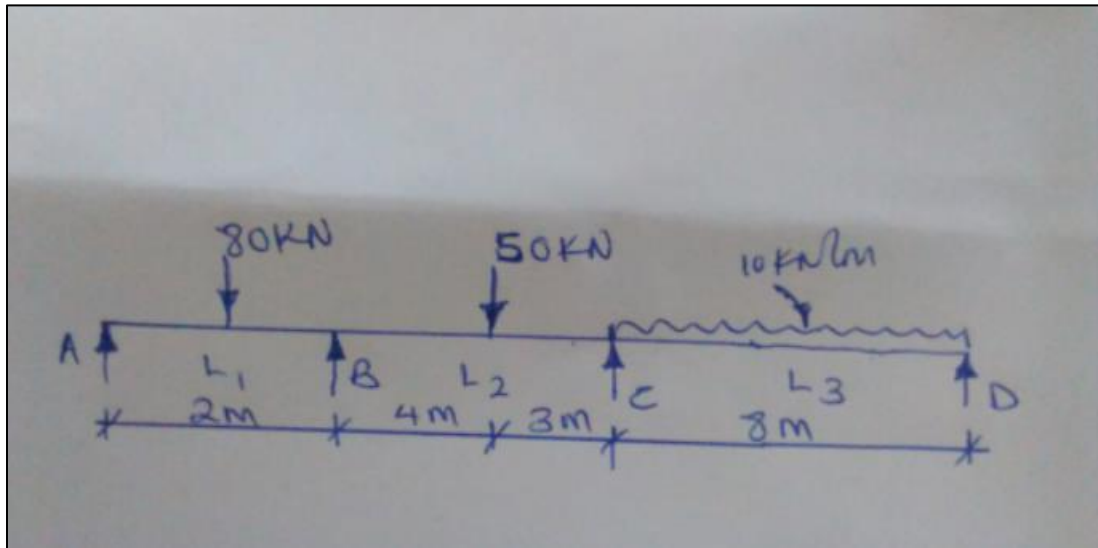
QUESTION FOUR

Using the moment distribution method draw the shear force and bending moment diagrams indicating critical values for the beam shown below:
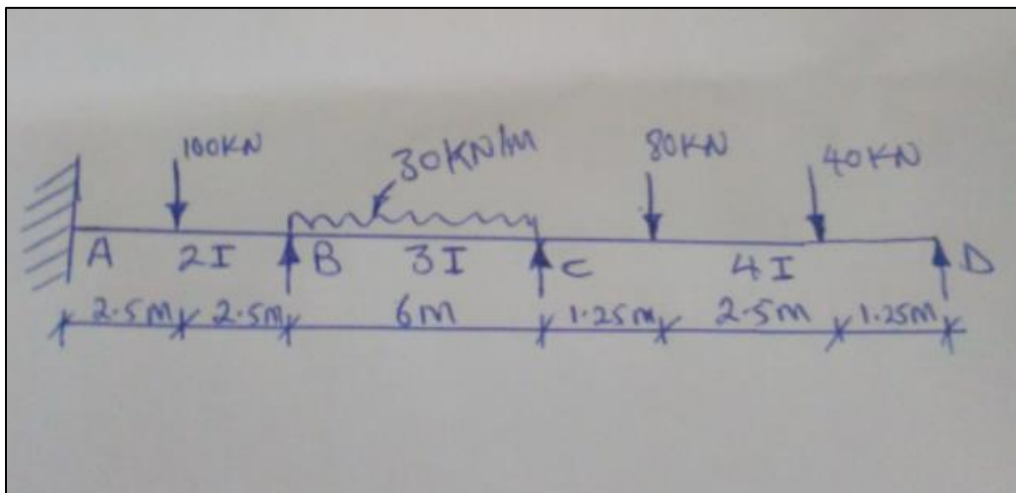
(20mks)

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)