TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

DEPARTMENT BUILDING AND CIVIL ENGINEERING

UNIVERSITY EXAMINATIONS FOR DEGREE IN

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECE 2307: THEORY OF STRUCTURES III

END OF SEMESTER EXAMINATIONS
SERIES: APRIL 2014
TIME: 2 HOURS

INSTRUCTIONS:

- You should have the following for this examination:
  - Scientific calculator
  - Answer booklet
- Answer question **ONE (Compulsory)** and any other **TWO.**

This paper consists of Three printed pages

QUESTION 1 (Compulsory)

A continuous beam ABCD, 20 m long is simply supported at its ends and is propped at the same level at points B and C as shown in Fig. Q.1 under the loading arrangement shown the support B sinks by 10mm Take

$E = 2.1x10^{8}\ KN/m^{2}$

$I = 85x10^{-7}\ m^{4}$

a) Analyse the beam. **(22 marks)**

b) Sketch the bending moment diagram. **(8 marks)**

QUESTION 2

Refer to the two dimensional framed structure shown in Fig. Q2 which is fixed at all ends A, C, D and determine using the moment distribution method:

a) The fixed end moments. **(5 marks)**
b) The distribution factors **(3 ½ marks)**
c) The moment distribution table **(6 ½ marks)**
d) The bending moment diagram **(5 marks)**

QUESTION 3

A continuous beam ABC is fixed at end A and simply supported at the other end C. The beam has a total length of 14.0m and is loaded as shown in Fig. Q.3
Apply the theorem of three moments to determine the following:

a) Moments along the beam. **(9 marks)**
b) Support reactions. **(4 marks)**
c) Bending moment diagram. **(4 marks)**
d) Shear force diagram. **(3 marks)**

QUESTION 4

a) Analyse the continuous beam loaded as shown in Fig. Q4 by the slope deflection method. **(10 marks)**

b) Using the values obtained from above question sketch:
   i) The bending moment diagram. **(4 marks)**
   ii) The shear force diagram. **(5 marks)**

QUESTION 5

A continuous beam ABCD is supported and loaded as shown in Fig. 5 using method of consistent deformations and determine the reactions. Assuming EI is the same for e ach span. Determine the flexibility coefficients required for analyzing the beam.