ELIZADE UNIVERSITY, ILARA-MOKIN
FACULTY OF ENGINEERING
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING
FIRST SEMESTER 2019/2020 EXAMINATIONS

Course Title: STRUCTURAL ANALYSIS I **Course Code:** CVE 405
Instruction: Attempt **ANY FOUR** questions **Time allowed:** 3 hours. **Units:** 3

Question 1 (15 marks)

a) Determine the reactions and the span moment of the fixed beam in Figure Q1 by the method of least work. Take EI=constant **(8 marks)**

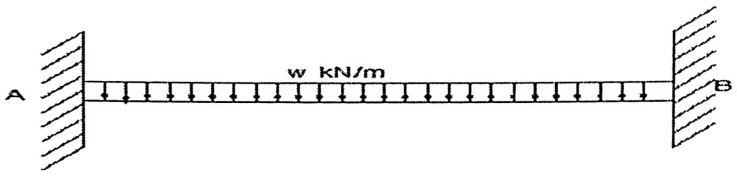


Figure Q1: A fixed beam with UDL

b) Show that the equation of slope and deflection using double integration method is given by $EI\frac{d^2y}{dx^2} = M$ **(7 marks)**

Question 2 (15 marks)

a) Determine the reactions and the span moment of the propped cantilever beam in Figure Q2a using double integration method. Take EI=constant **(8 marks)**

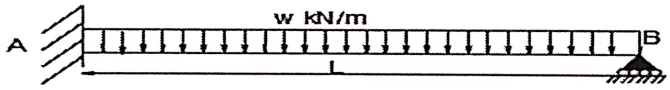


Figure Q2a: Propped Cantilever Beam with UDL

b) Analyse the beam in Figure Q2b. **(7 marks)**

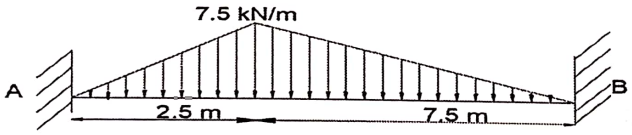
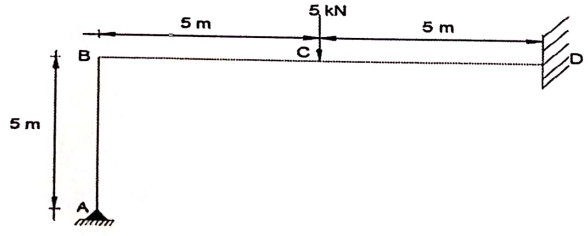


Figure Q2b: Fixed Beam with Varying Load

Question 3 (15 marks)

a) Determine the reactions and draw the bending moment and shearing force diagram for the beam in FigureQ3a by the method of least work. *EI* is constant. **(9 marks)**



FigureQ3a: Frame Structure

b) Analyse the beam in Figure Q3b. **(6 marks)**

Figure Q3b: Fixed Beam

Question 4 (15 marks)

a) Show that the strain energy 'U' due to bending is $\frac{M^2L}{2EI}$ **(7 marks)**

b) Determine the strain energy and the deflection under the load for the beam in FigureQ3b. The flexural stifness is 25 MNm^2. **(8 marks)**

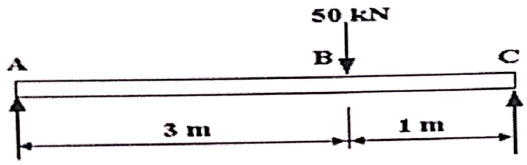


Figure Q3b: Simply Supported beam

Question 5 (15 marks)

Determine the reactions for the truss Figure Q5 by the method of least work. Number in brackets ( ) are areas x 10^{-3} Take E = 200MNm^2

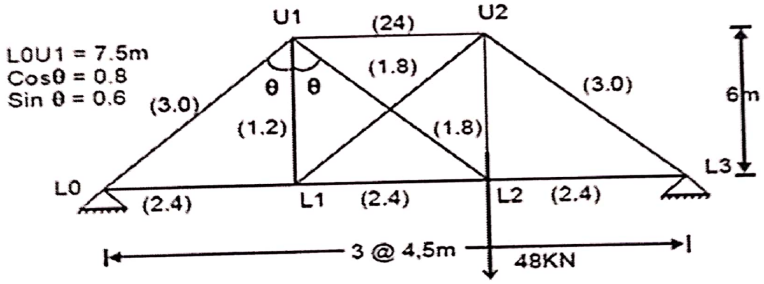


Figure Q5: A truss

Question 6 (15 marks)

Use the moment distribution method to determine the reactions for the beam in Figure Q6 and also draw the shear force and bending moment diagram. E is constant.

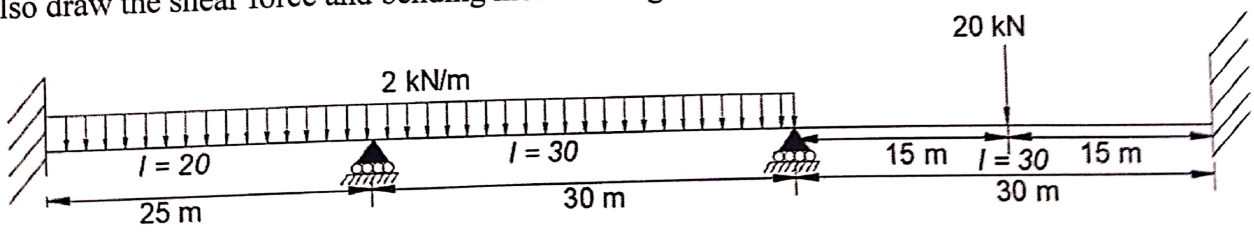


Figure Q6: A continuous Fixed Beam