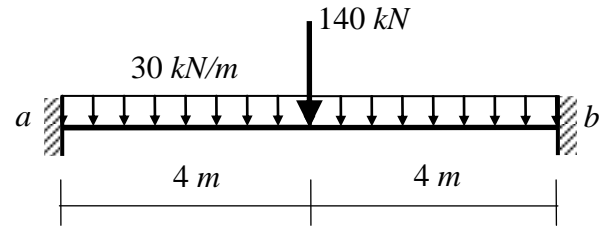


Second Semester Final Examination

- Attempt all questions.
- The Exam consists of **4** questions in **1** page.
- Maximum grade is **60 Marks**.

Question (1): (15 Marks)

Using the **three-moments equation**, draw the **shear force and bending moment diagrams** for the shown loaded beam.

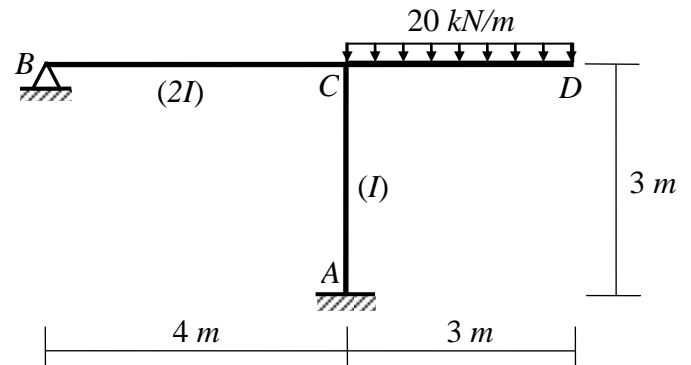


Question (2): (15 Marks)

For the shown loaded frame with variable moment of inertia, using the **virtual work method**,

- (a) find the reactions at the supports *A* and *B*.
- (b) draw the bending moment diagram.

The relative moments of inertia are given between brackets and *E* is constant.

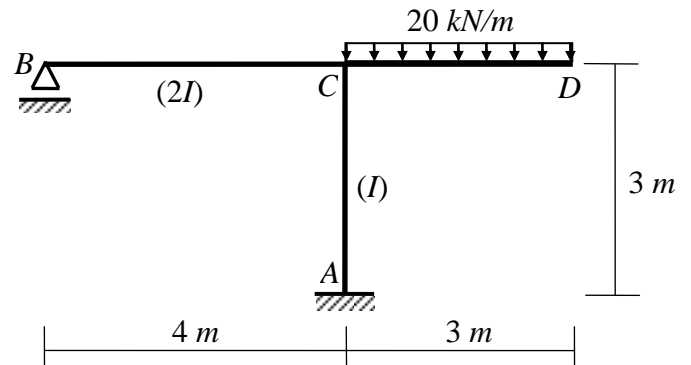


Question (3): (15 Marks)

For the shown loaded frame with variable moment of inertia, using the **slope deflection method**,

- (a) find the rotation at *C* (θ_C) and the sway of the frame Δ .
- (b) draw the bending moment diagram.

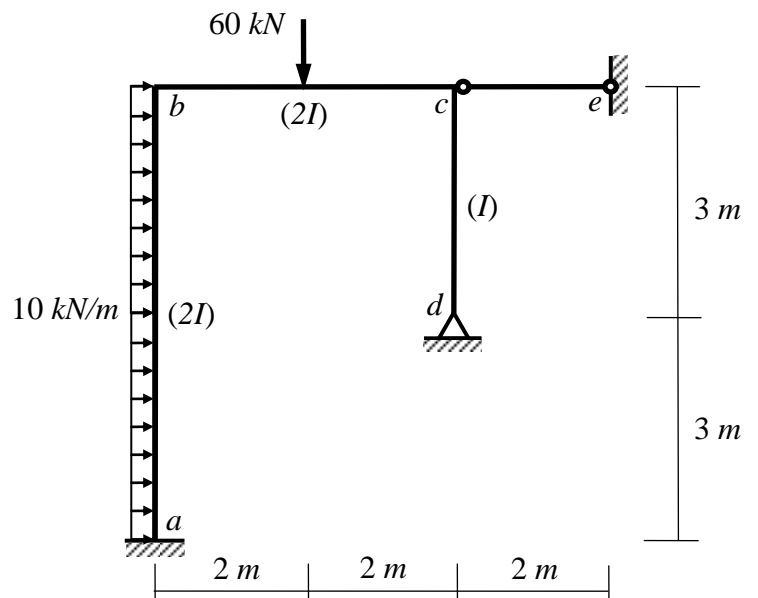
The relative moments of inertia are given between brackets and *E* is constant.



Question (4): (15 Marks)

Using the **moment distribution method**, draw the bending moment diagram for the shown loaded frame with variable moment of inertia.

E is constant. The relative moments of inertia are given between brackets.



With my best wishes

Dr. M. Abdel-Kader