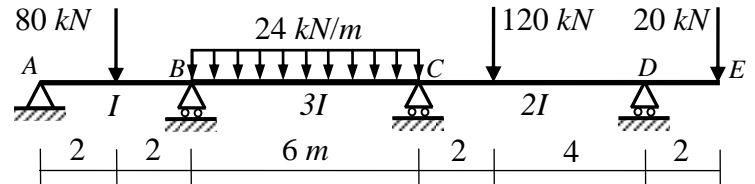


Second Semester Final Examination

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

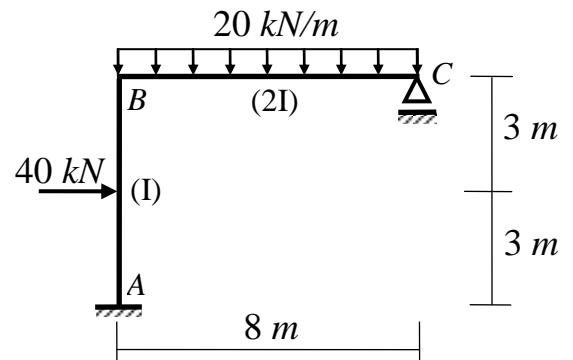
Question (1): (15 Marks)

Using the three-moments equation, draw the shear force and bending moment diagrams for the shown continuous beam of variable moment of inertia.



Question (2): (15 Marks)

For the shown frame with variable moment of inertia, **using the virtual work method**, find the reactions at the supports A and C . The relative moments of inertia are given between brackets and E is constant.



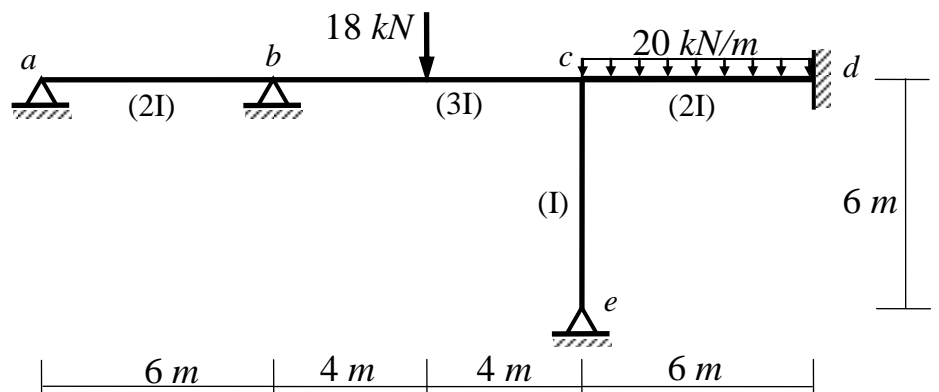
Question (3): (15 Marks)

For the frame of Question (2), **using the slope deflection method**,

- (a) Find the rotation at B (θ_B) and the sway of the frame Δ .
- (b) Draw the bending moment diagram.

Question (4): (15 Marks)

For the shown frame with variable moment of inertia, **using the moment distribution method**, draw the bending moment diagram. E is constant. The relative moments of inertia are given between brackets.



With my best wishes

Dr. M. Abdel-Kader