Menoufia University **Faculty of Engineering** **Civil Eng. Department** **Academic Year:** 2012-2013 **Date:** 18/6/2013	Minufiya University	**Subject:** Theory of Structures (3) **Course Code:** CVE301 **Year:** 3rd Civil **Time Allowed:** 3 hours **Final Exam**

Allowed Tables and Charts: *(None)*

Read carefully the given data and solve all questions. (Total Marks: 120)

Question (1) **[30 marks]**

For the structure shown in **Figure (1)**, use **Consistent Deformation** method to calculate unknown reactions and draw the final BMD for the given loads and temperature changes. Take $\alpha=10^{-5}/°C$, $E=2x10^{6}t/m^{2}$. **(Please define the terms δ)**

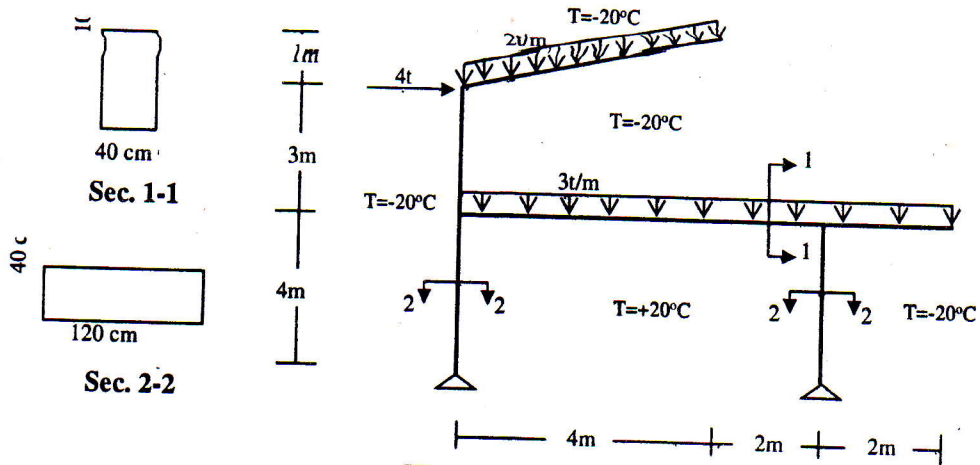


Figure (1)

Question (2) **[30 marks]**

a) Explain the difference between static and kinematic degree of indeterminacy. (Illustrate with an example).

b) Use **Slope Deflection** method to solve the structure shown in **Figure (2)**, and then draw the BMD. (EI = Const.)

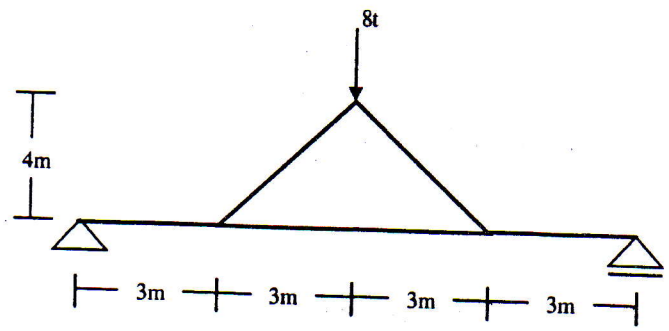


Figure (2)

Question (3) **[30 marks]**

Analyze the frame shown in **Figure (3)** by **Moment Distribution** method, Draw the BMD and find the free body diagram.

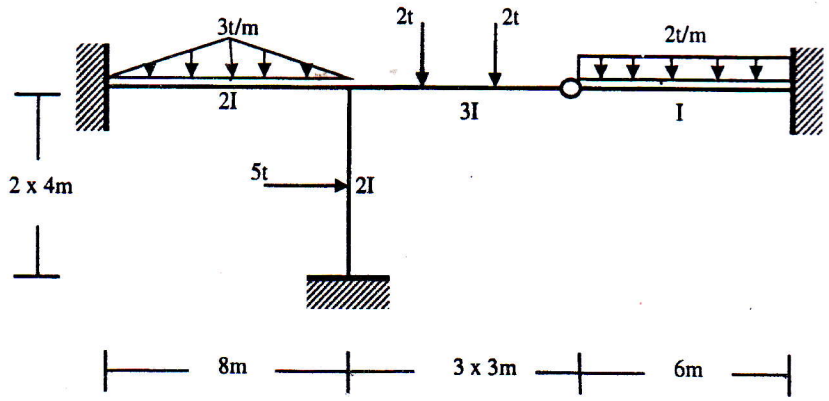


Figure (3)

Question (4) **[30 marks]**

a) From its local stiffness matrix, drive the global stiffness matrix for the bar element. What are the three characteristics of stiffness matrix?

b) For the truss shown in **Figure (4)**, Use **Direct Stiffness** method to determine all joint displacements, reactions and bar forces. Assume axial rigidity EA to be constant for all members.

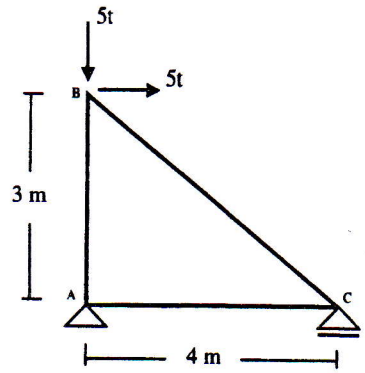
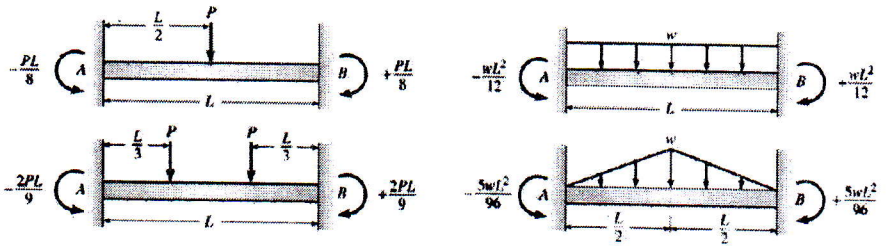
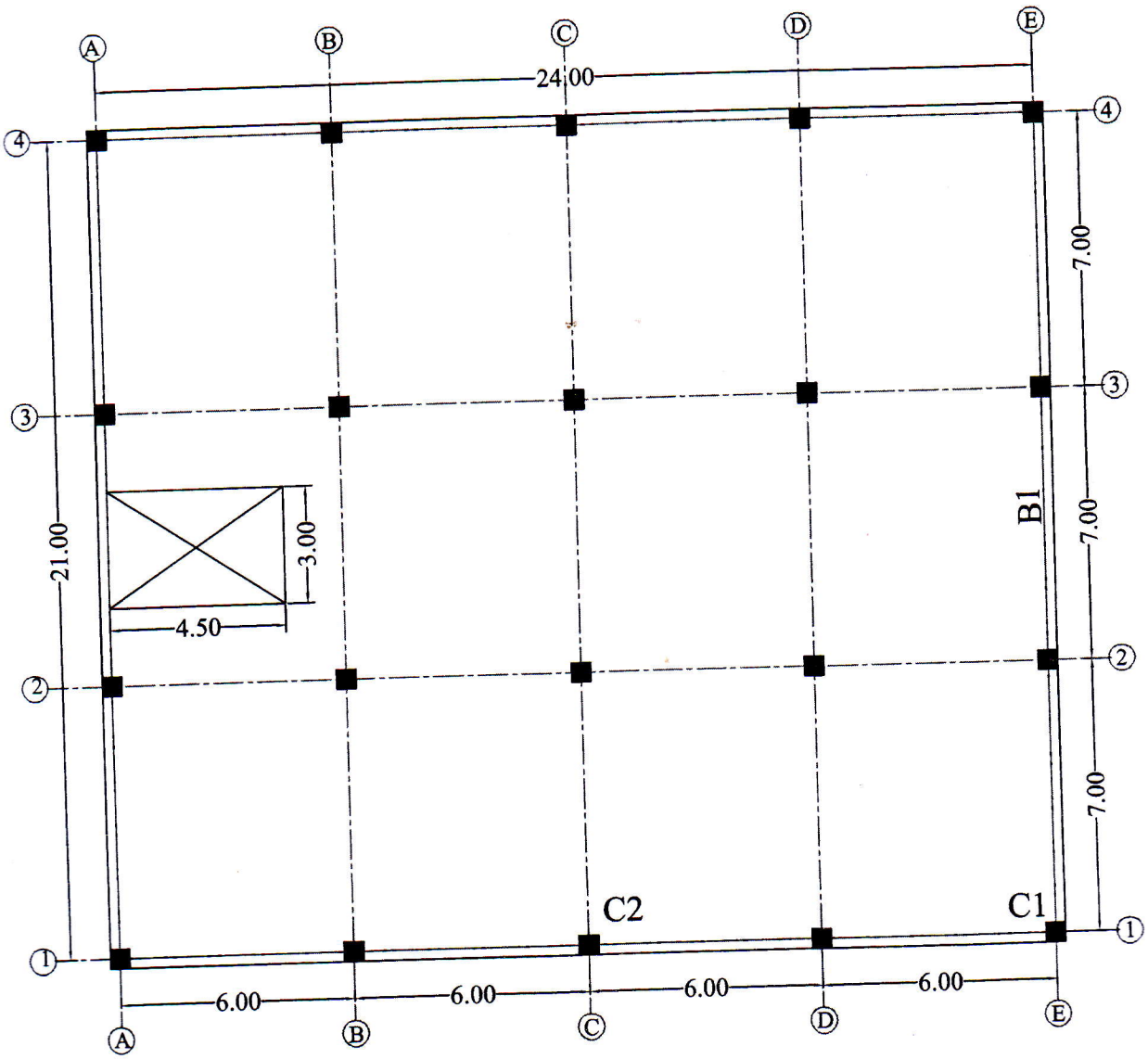
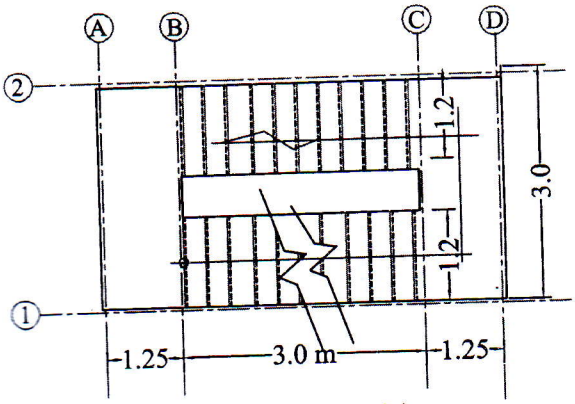


Figure (4)

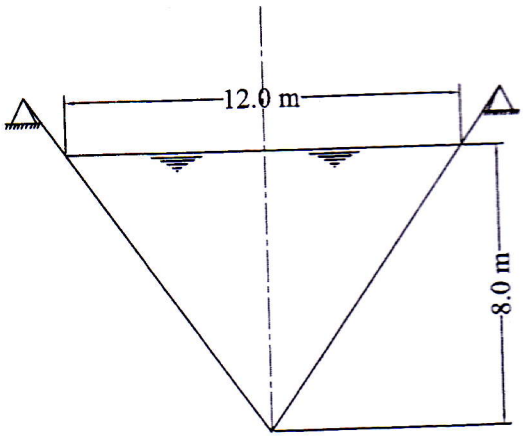




Problem (2)

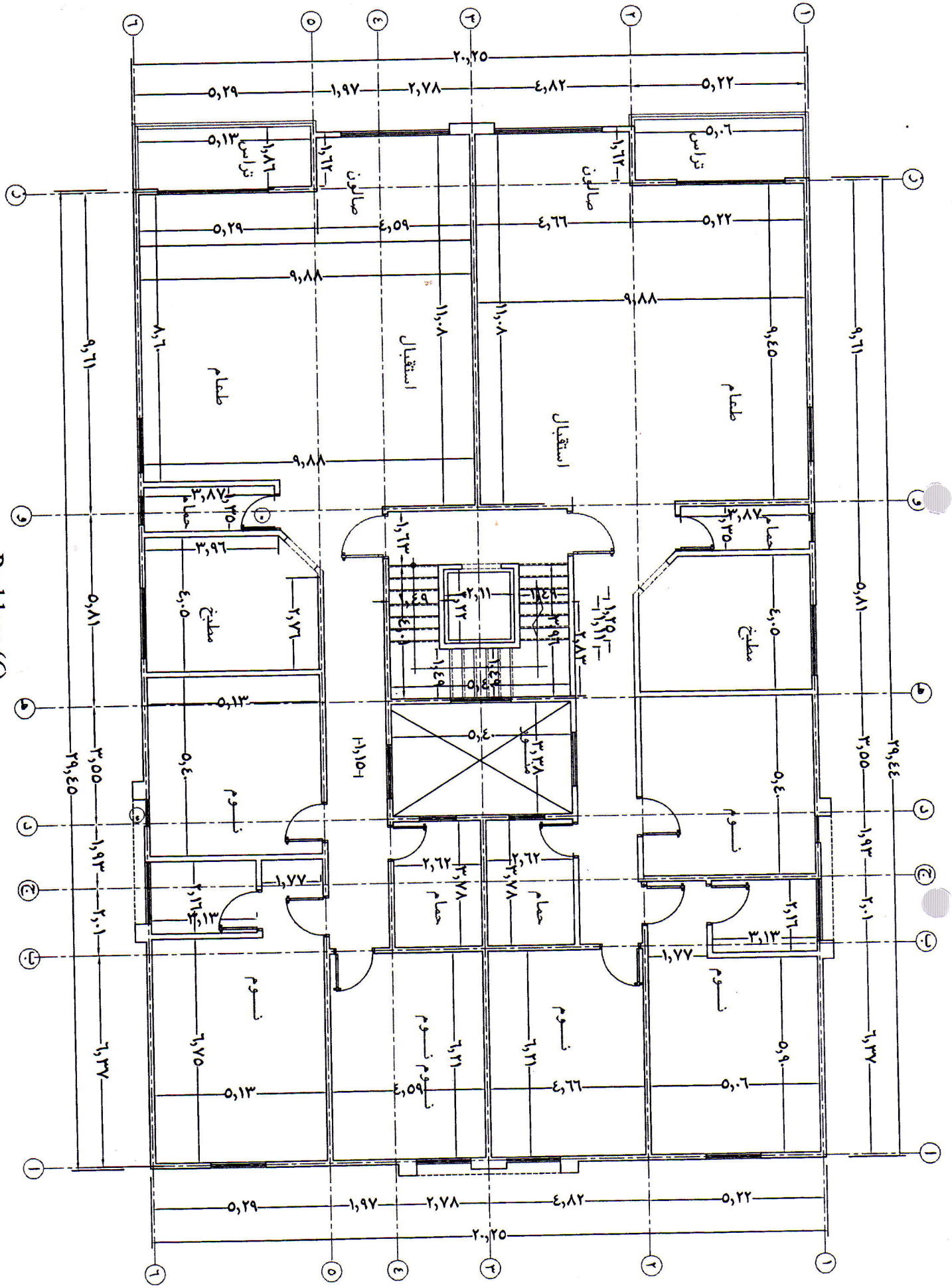


Problem (3)



Problem (4)

Problem (6)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