8/5/13 Regn.No. | | | | | | | | | |

B.E. DEGREE PROGRAMME , MARCH/APRIL 2013
CIVIL ENGINEERING
V SEMESTER (REGULATIONS 2008)

CE 9301 STRUCTURAL ANALYSIS-I

Time : Three Hours Max Marks : 100

ANSWER ALL QUESTIONS

Part A
(10 x 2 = 20)

1. State: Principle of virtual work
2. What is the use of Williot Mohr diagram?
3. What is called a primary structure?
4. Differentiate: Determinate and Indeterminate Structures
5. Write down the equilibrium equations used in slope deflection methods.
6. What are the limitations of slope deflection method?
7. What is relative stiffness?
8. Define: distribution factor.
9. Give the stiffness matrix for a truss element.
10. What is compatibility Matrix?

Part B
(5 x 16 = 80)

11. Analyze the portal frame loaded as shown in Fig. 11 by the slope deflection method and sketch the bending moment and shear force diagrams.

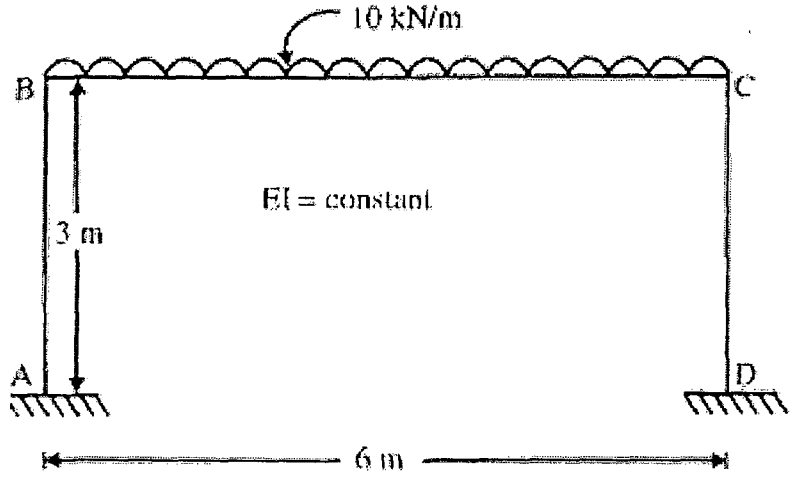

Fig. 11

12. (a) Using the method of virtual work, determine the horizontal displacement of a point C of the frame shown in Fig. 12 (a). Take $E = 2 \times 10^5$ N/mm^2, $I = 4 \times 10^6$ mm^4.

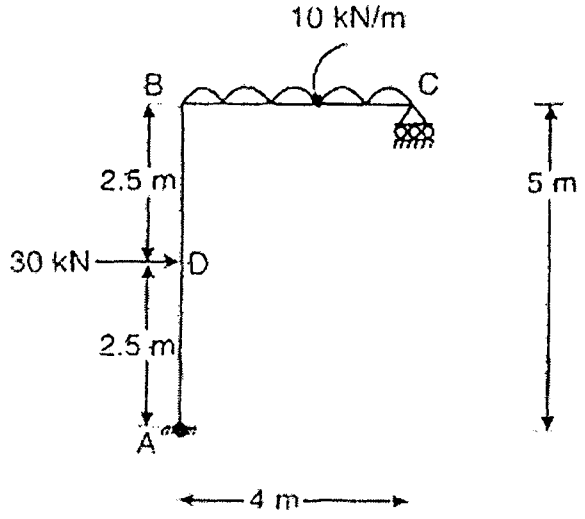

Fig. 12 (a)

(OR)

12. (b) Using the principle of virtual work, determine the vertical and horizontal deflection components of joint C of the truss in Fig. 12 (b). $E = 200 \times 10^6$ kN/m^2 and sectional area of each bar $A = 100 \times 10^{-6}$ m^2.

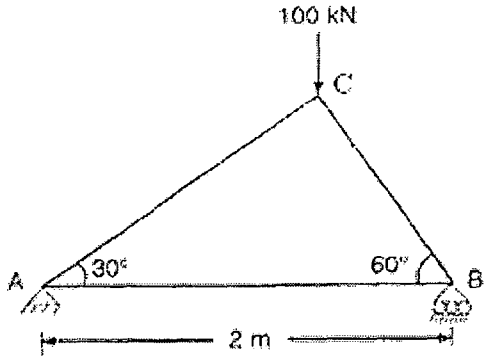

Fig. 12 (b)

13. (a) Analyze the continuous beam in Fig. 13 (a) by flexibility method.

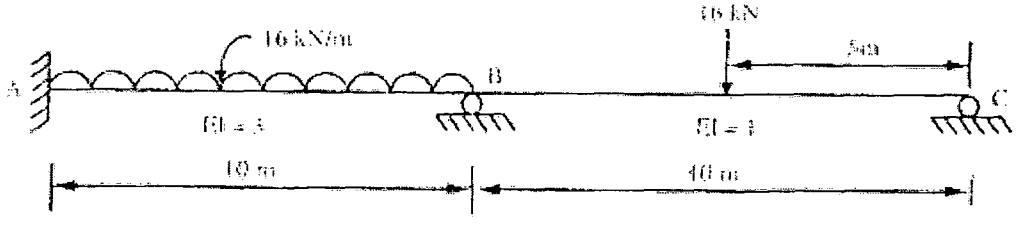

Fig. 13 (a)

15. (a) Find the bars forces in the truss shown in Fig. 15 (a) by matrix stiffness method. AE and L for all members are tabulated below.

Member	AE (MN)	L (cm)
AD,CD	300	300
BD	259.8	259.8

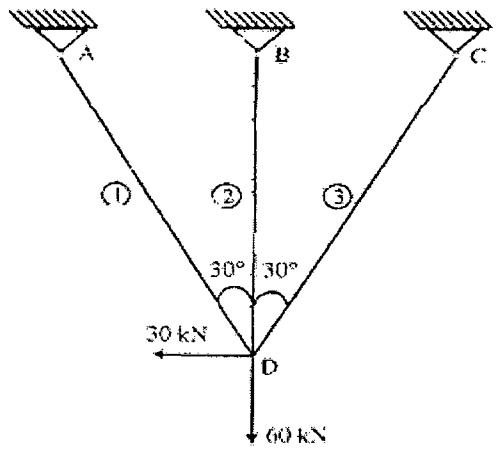

Fig. 15 (a)

(OR)

15. (b) A continuous beam ABC shown in Fig. 15 (b) has two equal spans of 10 m each with the support at A as fixed and support at C as hinged. Spans AB and BC carry concentrated loads of 240 kN and 200 kN respectively. Supports B and C settle by 2000/EI and 1000/EI respectively. Calculate the slopes at B and C in terms of EI and hence the end moment at B using matrix stiffness method of analysis.

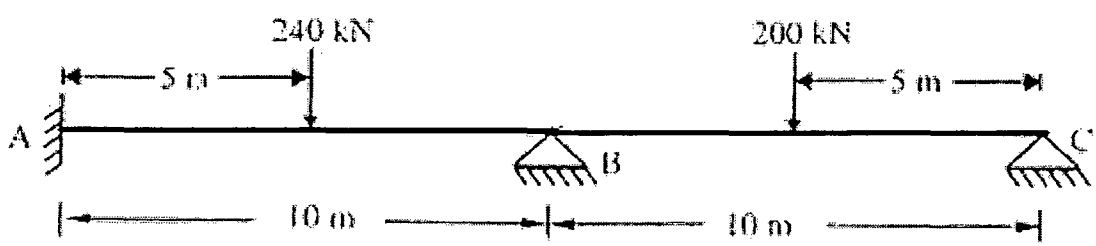

Fig. 15 (b)