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B.E., DEGREE EXAMINATIONS: NOV/DEC 2012

Fifth Semester

CIVIL ENGINEERING

CEE113: Structural Analysis I

Time: Three hours **Maximum Marks: 100**

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. Value of static Indeterminancy for propped cantilever beam is

   a) 0 b) 1 c) 2 d) 4

2. Williot diagram is used to find out one of the following

   a) Deflection b) Slope c) Support reaction d) None

3. Begg's deformator is used for in which equipment

   a) Designing b) analyzing c) Drafting d) all

4. Equation of 1 < D of Moment at any interminate point 'D' of continuous beam

   a) $\frac{\delta' x D}{\delta D D}$ b) $\frac{\varphi' D x}{\varphi D D}$ c) both d) None

5. An Example for theoretical Arch

   a) 3 Hinged Segmental arch with point load b) 3 Hinged Semicircular arch with UDL

   c) 3 Hinged Parabolic arch with UDL d) 3 Hinged Parabolic arch with point load

6. Which arch has only the following internal forces Vp, H, N & F

   a) 2 Hinged Parabolic arch with UDL b) 3 Hinged Segmental arch with UDL

   c) 3 Hinged Parabolic arch with point load d) 3 Hinged Parabolic arch with UDL

7. The reason for sway in Portal frame is

   a) Eccentric loading b) Unsymmetrical Outline

   c) different end load d) all the above

8. Which one of the following is algebraic method

   a) Matrix stiffness method b) slope deflection method

   c) moment distribution method d) all the above

9. The force required to produce a unit displacement is called

   a) Carry over b) Distribution c) Stiffness d) proof resilience

10. The main causes of sinking of support is

a) Soil settlement b) end moments c) loads d) carry over

PART B (10 x 2 = 20 Marks)

11. What is meant by modulus of resilience?
12. Write the formulae to calculate the strain energy stored due to shear force.
13. What are uses of uses of Begg's De formator?
14. What is equivalent uniformly distribution load and focal length of beam?
15. Is the BM=0 for three hinges arch, when it is subjected to UDL throughout its span. If its zero, then how the structure acts?
16. What is Ribshorting effect in two hinged arch?
17. What are the slopes induced at the both end of the simply supported beam, when it is subjected to clockwise moment 'M' at one end?
18. What is the condition of equilibrium equation used at the intermediate support to solve the slope deflection equations?
19. Define the distribution factor?
20. What is meant by modified stiffness?

PART C (5 x 14 = 70 Marks)

21. a) In the truss shown in fig.1 no load acts. The member AB gets 4 mm too short. The cross - sectional area of each member is A = 300 mm^2 and E = 200 Gpa. Determine the virtual displacement of joint C.

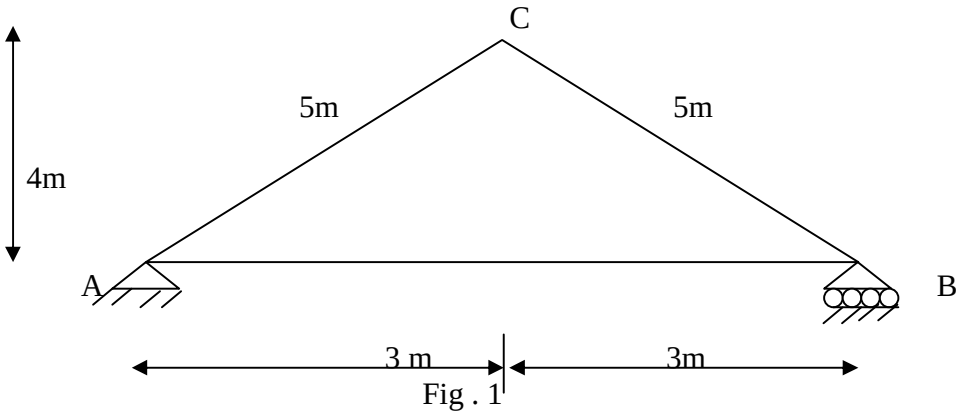


Fig . 1

(OR)

b) Using the principle of virtual work, determine the deflection at the centre of the beam and slope at end A of the beam Shown in Fig.2. Take E = 200 x 10^6 kN/m^2 and I = 13 x 10^{-6} m^4.

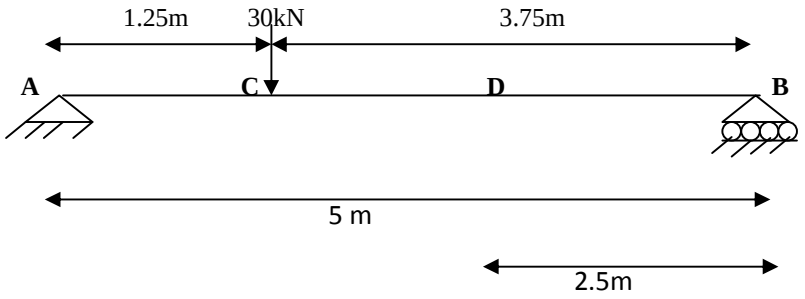


Fig .2

22. a) The system of concentrated loads shown in Fig.3 rolls from left to right across a beam simply supported over a span of 40 m, the 4 kN load leading. For a section 15m from the left hand support determine a) the maximum bending moment b) The maximum shear force.

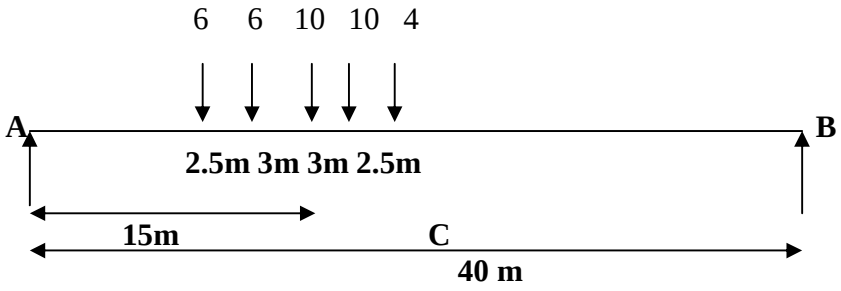


Fig. 3

(OR)

b) Four wheel loads of 6,4,8 and 5 kN cross a girder of 20 m span, from left to right followed by U.D.L of 4 kN/m and 4 m long with the 6 kN load leading. The spacing between the loads in the same order is 3m, 2m and 2m. The head of the U.D.L. is at 2m from the last 5 kN load. Using influence lines, calculate the S.F. and B.M. at a section 8m from the left support when the 4 kN load is at centre of the span.

23. a) A three hinged parabolic arch of 20 metre span and 4m central rise carries a point load of 4 kN at 4m horizontally from the left hand hinge. Calculate the normal thrust and shear force at the section under the load. Also, calculate the maximum B.M. positive and negative. The supports of the arch are at the same level.

(OR)

b) Write Short notes the following
(i) Types of arches

(ii) Linear arch

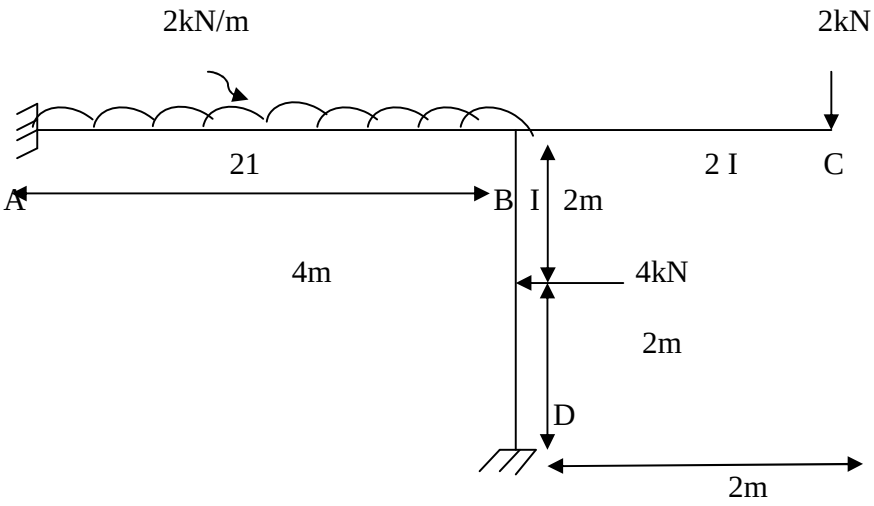
(iii) Rise and horizontal thrust of the arch

(iv) The Eddy's Theorem

24. a) A beam ABCD 16m long is continuous over three spans : AB= 6m, BC = 5m and CD = 5m, the supports being at the same level. There is a uniformly distributed load of 20 kN/m over BC on AB there is a point load of 80 kN at 2 m from A on CD, there is a point load of 60kN at 3m from D. Calculate the moments and reactions at the supports.

(OR)

b) Analyse the rigid frame shown in Fig. 4 using Slope deflection method.



25. a) A continuous beam ABC is supported on an elastic column BD, and is loaded as shown in Fig.5. Treating joint B as rigid, analyse the frame and plot the B.M.D. and sketch the deflected shape of the structure.

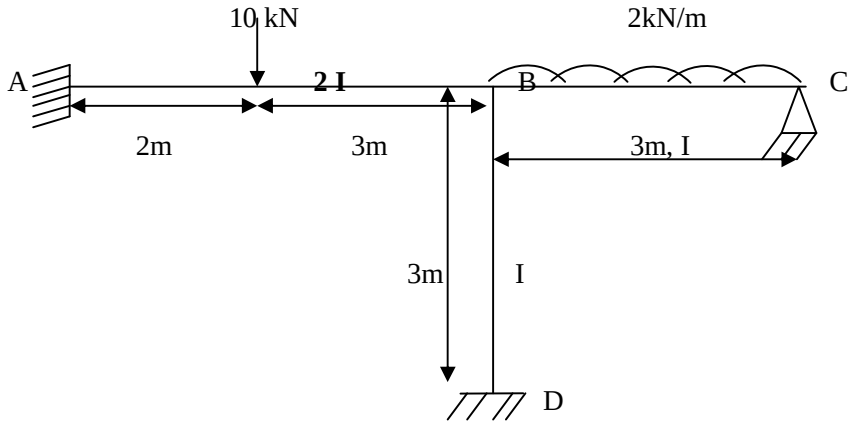


Fig.5

(OR)

b) A continuous beam ABCD consists of three span and is loaded as shown in Fig.6 Ends A and D are simply supported, Determine the bending moments at supports and plot the bending moment diagram.

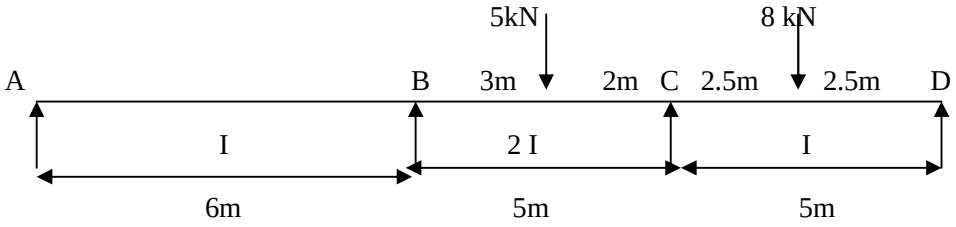


Fig.6

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