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B.E.DEGREE EXAMINATIONS: NOV/DEC 2010

Fifth Semester

CIVIL ENGINEERING

U07CE503: Structural Analysis - I

Time: Three Hours **Maximum Marks: 100**

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. Value of Statically Indeterminate 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. $\frac{\delta' xD}{\delta DD}$ b) $\frac{\varphi' Dx}{\varphi DD}$ 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 is influence line?

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., 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. Write the distribution theorem?

PART C (5 x 14 = 70 Marks)

21. a) Using the method of virtual work, find the deflection component of point E of the truss shown in fig.1. Cross sectional areas of members are: AE and FD = 250mm^2 EF and EC = 1875mm$^{2;}$ AB, BC, CD, EB and FC = 1250mm^2; E = 200kN/mm^2.

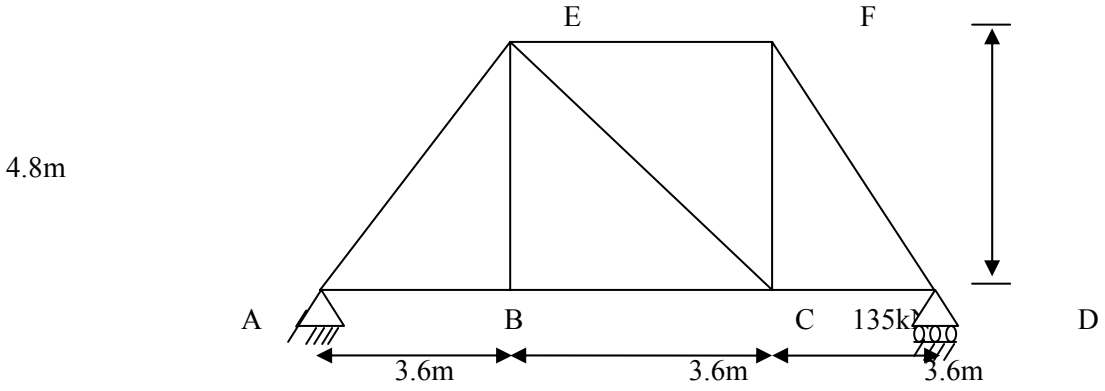

Fig.1

(OR)

b) Using the method of virtual work, determine the vertical deflection under the load point for the beam shown in fig.2. EI constant.

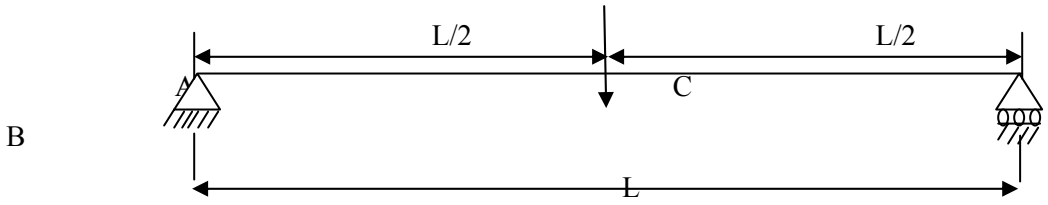

Fig.2

22. a) Using Muller Breslau principle, draw the influence line for bending moment at the midpoint D of the span AB of the continuous beam ABC shown in fig. 3. Determine the influence line ordinate at suitable interval and plot them.

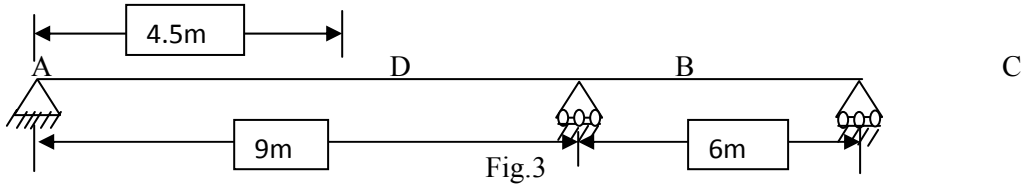

Fig.3

(OR)

b) Two point loads of 100kN and 200kN spaced 3m apart cross a girder of span 15m from left to right with the 100kN load loading. Draw the influence line for the shear force and bending moment and the final values of maximum shear force and bending moment at a section D, 6m from the left hand support. Also find the absolute maximum bending moment due to the given load system.

23. a) A two hinged parabolic arch has a varying moment of inertia given by $I=I_0 \sec\theta$. It has a span of 40m and a central rise of 8m. Calculate the maximum positive and negative bending moment at a section D 12m from the left support due to a moving point load of 6KN.

(OR)

b) A three hinged symmetrical circular arch is loaded as shown in fig.4. Determine the bending moment, normal thrust and radial shear at 9m from the left support.

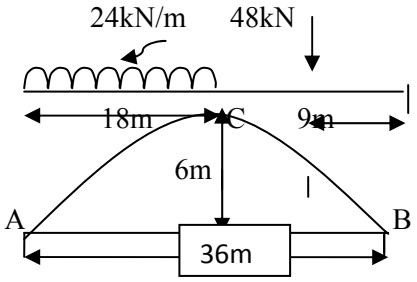

Fig.4

24. a) ABC is a continuous beam with constant EI throughout its length (fig.5). The end support A and C are fixed and the beam is continuous over the middle support B. Span BC is uniformly loaded with 10kN per metre length while a concentrated vertical downward load of 100kN acts at the midspan of AB. Calculate the moments by slope deflection method.

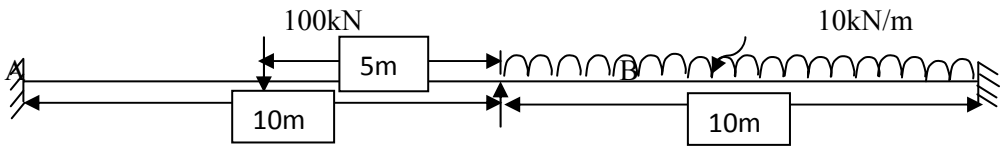

Fig.5

(OR)

b) Analyse the portal frame shown in fig.6. E is constant, and I1: I2: I3 = 3:2:1

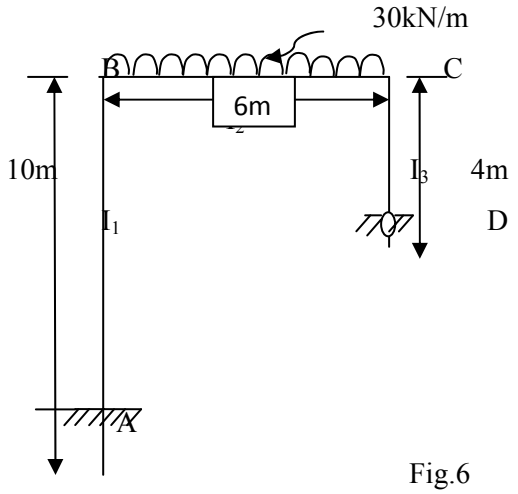

Fig.6

25. a) Analysis the continuous beam shown in fig.7 by the method of moment distribution method.

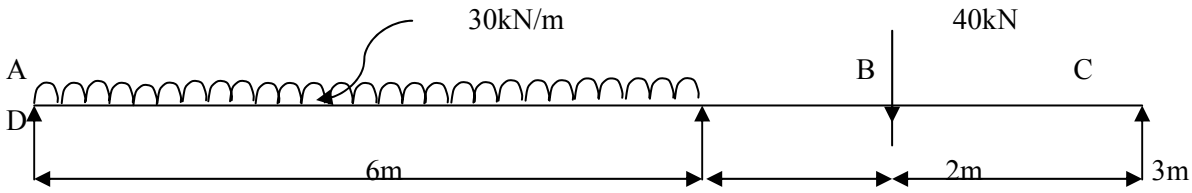

Fig.7

(OR)

b) Analysis the portal frames loaded as shown in fig.8 by the method of moment distribution method and sketch the BMD and SFD

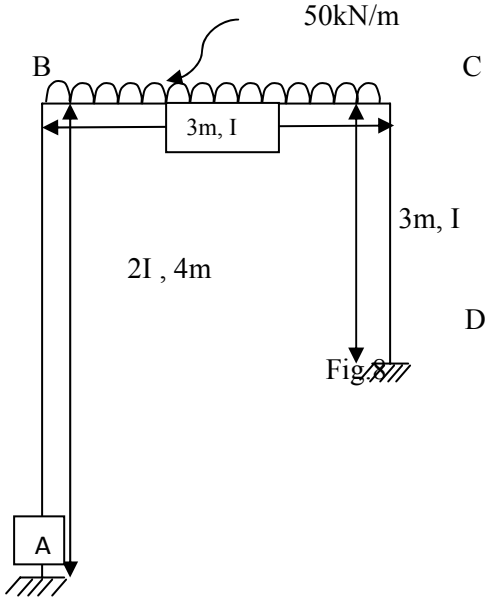

Fig.8

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