80

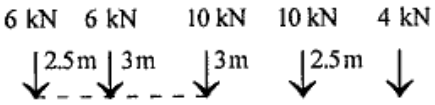
A parabolic two hinged arch has a span 40m and rise 6m. A concentrated load of 20kN acts at 15m from the left hinge. If $I = I_0 \sec\theta$. Calculate the horizontal thrust and the reactions at the hinges. Also calculate the maximum B.M anywhere on the arch.

a) Explain maximum shear force diagrams.

b) State the condition for maximum BM under any given wheel load.

c) Define E.U.D.L and find E.U.D.L. for B.M for single point load.

d) The system of concentrated loads shown below rolls from left to right across a beam simply supported over a span of 45m, the 4kN load leading for a section 15m from the left hand support determine the maximum B.M.



OR

For above beam. Determine the maximum shear force at a section 20m from left hand support.

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Roll No .....

CE-505

B.E. V Semester

Examination, June 2016

Theory of Structure - I

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

1. a) Define plane frame and space frame with examples.

b) What do you understand by complementary energy?

c) Derive the expression for the strain energy stored in axially loaded member.

d) Analyse the frame as shown in figure 1 by strain energy method and draw BMD.

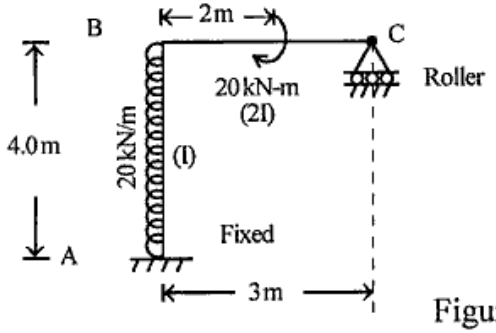

Figure 1

OR

Find the forces in all the members of the truss shown in figure 2. Tabulate the results.
AE= same for all members
A and D are hinged.

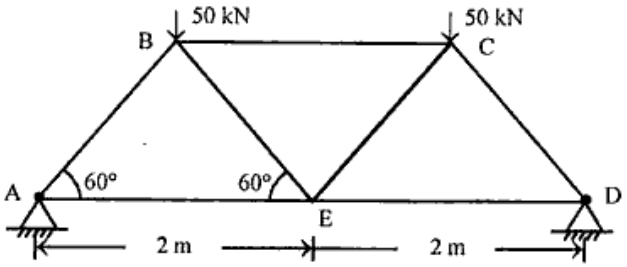

Figure 2

2. a) Define kinematics indeterminacy. Find the degree kinematics indeterminacy of propped cantilever beam.

b) Define the carry over factor and distribution factor for prismatic beam.

c) Derive the expression for moment induced due to rotation of support of fixed beam.

d) Draw the BMD and SFD using theorem of three moments for the beam as shown in figure 3.

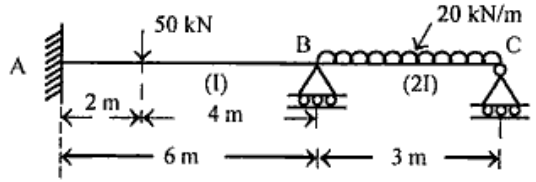

Figure 3

OR

Draw BMD for frame shown in figure 4 using moment distribution method.

A and D are hinged

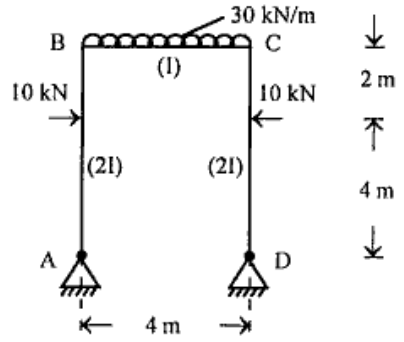

Figure 4

Contd...

3. a) Explain joint equilibrium equation.

b) Write down the generalised column flexure formula.

c) Explain the slope deflection method for analysis of sway frames.

d) A beam AB of span L is fixed at both the ends and carries a point load W at its centre. The moment of inertia of first half portion of the beam is 2I and that of the next half is I. Compute the fixed end moments.

OR

Analyse the frame shown in figure 5 by slope deflection method.

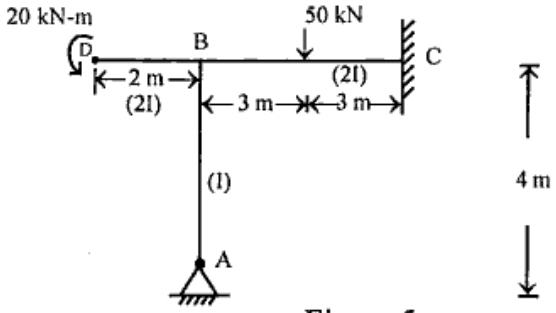

Figure 5

4. a) Explain Eddy's theorem for arches.

b) Explain the functions of stiffening girders.

c) Discuss the temperature stress in suspension cable.

d) A cable is used to support five equal and equidistant loads over a span of 40m. Find the length of the cable required and its sectional area if the safe tensile stress is 150N/mm^2. The central dip of the cable is 30m and loads are 8kN each.

OR

PTO