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Question Paper Code : 51254

B.E/B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Fifth Semester

Civil Engineering

CE 2302/CE 51/10111 CE 502 – STRUCTURAL ANALYSIS – I

(Regulations 2008/2010)

(Common to PTCE 2302 – Structural Analysis – I for B.E. (Part-Time) Third Semester – Civil Engineering – Regulations 2009)

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

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. Draw the Influence Line Diagram (ILD) for reaction at left support of a simply supported beam.
2. What is the condition at which maximum absolute bending moment occurs in the simply supported beam when an udl of length more than span of the beam move on it ?
3. State Muller Breslau's principle.
4. What are the uses of Influence lines ?
5. Define horizontal thrust.
6. Express the slope deflection equation.
7. Mention any four causes for sway in portal frames.
8. Write the general slope deflection equation for a single span beam.
9. What are fixed end moments ?
10. Define distribution factor.

PART – B (5 × 16 = 80 Marks)

11. (a) A simply supported beam of 15 m span is subjected to an u.d.l of 5 kN/m (self weight) and an u.d.l. of 12 kN/m (live load) acting for 6 m length travelling from right to left. Draw the ILD for shear force and bending moment at a section 10 m from the right end. Use these diagrams to determine the maximum shear force and bending moment at this section.

OR

(b) The Warren girder of 25 m span is made of 5 panels of 5 m each. The diagonals are inclined at 60° to the horizontal. Draw the influence line diagram for force in upper cord member in the second panel from left. Hence evaluate the forces in it when there is a load of 60 kN at each lower joint.

12. (a) Using Muller Breslau's Principle, develop the I.L. for B.M. at section D of the continuous beam shown in Fig. Q-12 a. Compute and plot the ordinates at every 1 m interval.

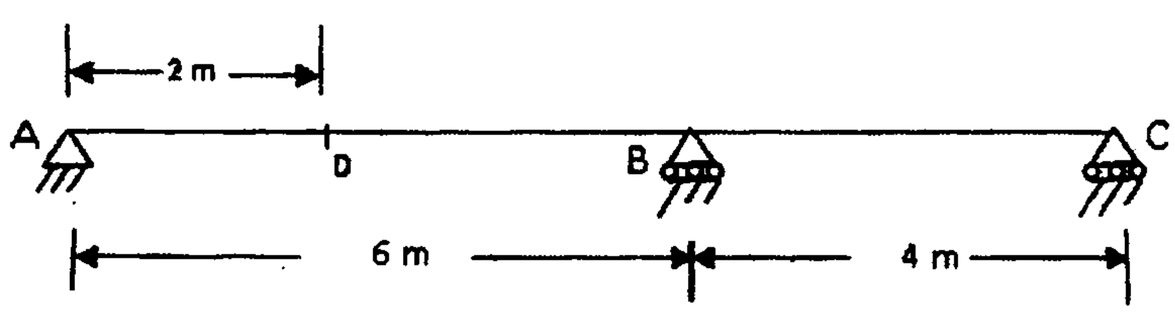

Fig. Q. 12 (a)

OR

(b) Draw the influence line diagrams for shear force and bending moment for a section at 5 m from the left support of a simply supported beam, 20 m long. Hence determine the maximum Shear force and bending moment at the section due to an uniformly distributed load of length 8 m and intensity 10 kN/m.

13. (a) A two hinged parabolic arch has a span of 32 m and a central rise of 7 m. Calculate the maximum positive and negative bending moment at a Section distance 10 m from the left support, due to a single point load of 10 kN rolling from left to right.

OR

(b) A three hinged parabolic arch of span 33 m and rise 7 m carries a UDL of 45 kN per meter on the whole span and a point load of 250 kN at a distance of 7 meters from the right end. Find the horizontal thrust, bending moment, normal thrust and radial shear at a section 5 meters from the left end.

14. (a) ABC is a continuous beam with constant EI throughout its length as shown in Fig. 14 (a). The end supports A and C are fixed and the beam is continuous over middle support B. Span BC is uniformly loaded with 15 kN/m length while a concentrated vertical downward load of 125 kN acts at the mid span of AB. Calculate the moments by slope deflection method.

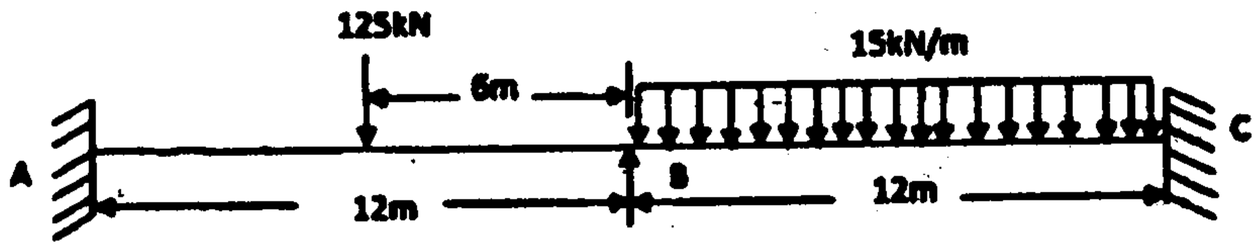

Fig Q. 14 (a)

OR

(b) Analyse the portal frame shown in Fig. 14 (b). Take I1 : I2 : I3 = 3 : 2 : 1. Use slope deflection method.

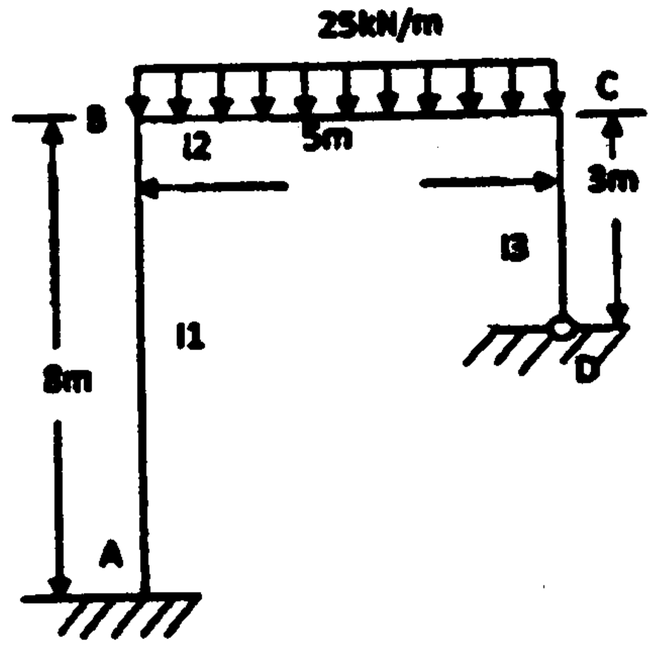

Fig Q. 14 (b)

15. (a) Analyse the continuous beam given in Fig. Q. 15 (a) by moment distribution method.

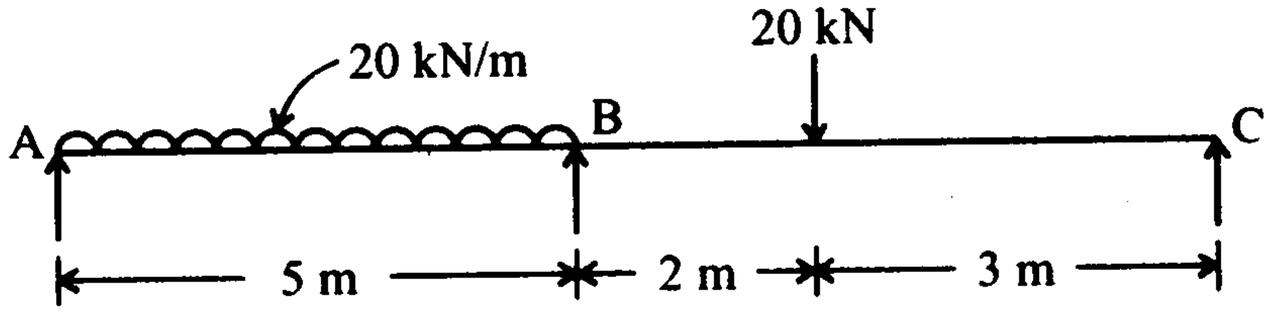

Fig Q. 15 (a)

OR

(b) Analyse the portal frame shown in Fig. Q. 15 (b) by moment distribution method and sketch the bending moment and shear force diagram.

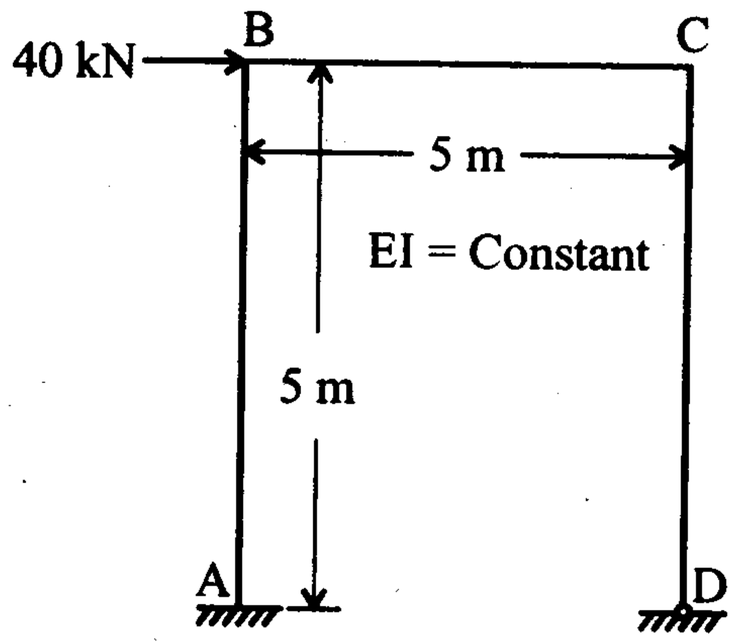

Fig Q. 15 (b)
