

Question Paper Code : 91235

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Fifth Semester

Civil Engineering

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

(Regulation 2008/2010)

(Common to PTCE 2302/10111 CE 502 — Structural Analysis — I for
B.E. (Part-Time) Third Semester — Civil Engineering — Regulation 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State principle of virtual work.
2. What is a Williot diagram?
3. What is an influence diagram?
4. What is the operating principle of Begg's deformer?
5. What is the main advantage of Arches?
6. How do you account the temperature effect in the analysis of arches?
7. State the generalised slope deflection equation.
8. State any four reasons for the sway of portal frames.
9. What are fixed end moments?
10. Define distribution factor.

PART B — (5 × 16 = 80 marks)

11. (a) Determine the vertical displacement of joint A of the truss given in Fig. Q 11 (a). The member BD is subjected to an increase in temperature of 80°C . Take the coefficient of thermal expansion as $0.00012/^{\circ}\text{C}$ and $E = 2 \times 10^5 \text{ N/mm}^2$. The cross sectional area of each member is 1700 mm^2 .

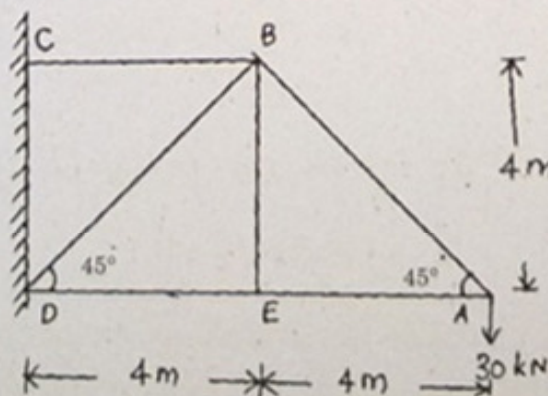


Fig. Q 11 (a)

support D
 $I = 400 \times 10^{-6} \text{ m}^4$.

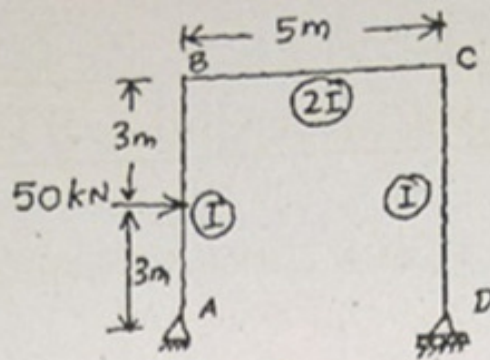


Fig. Q. 11 (b)

12. (a) The following system of wheel loads crosses a span 30 m.
 Wheel load : 16 16 20 30 30 kN
 Distance between centres : 3 3 5 5m
 Find the maximum value of BM and shear force in the span.

Or

- (b) Determine the influence line for R_A , for the continuous beam shown in Fig. Q 12 (b). Compute the ordinates at every 1 m interval.

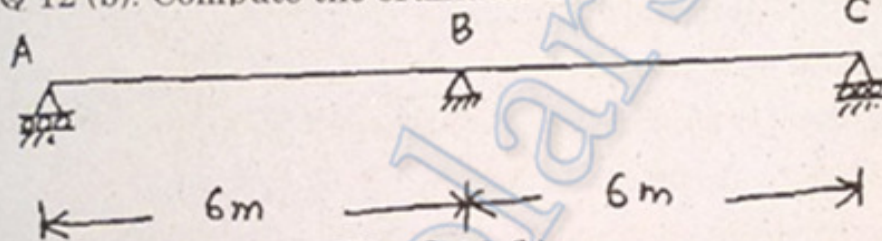


Fig. Q 12 (b)

13. (a) A two hinged parabolic arch has a span of 40 m and a centre rise of 8 m. Calculate the maximum positive and negative bending moment at a section 12 m from the left support due to a single point load of 15 kN rolling from left to right.

Or

- (b) A three pinned arch is shown in Fig. Q. 13 (b). Find

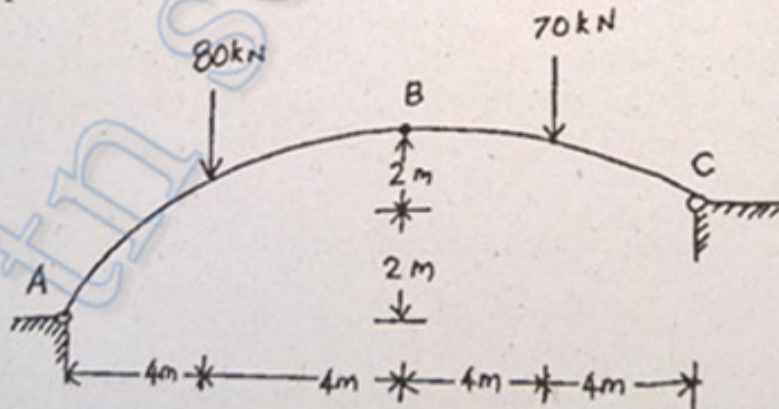


Fig. Q. 13 (b)

- (i) The horizontal and vertical reaction at the abutments A and C.
 (ii) The bending moment at the point of application of the 80 kN load.

method. Support B sinks by 12 mm. Take $E = 2 \times 10^5 \text{ N/mm}^2$.
 $I = 16 \times 10^7 \text{ mm}^4$. Sketch the bending moment and shear force diagrams.

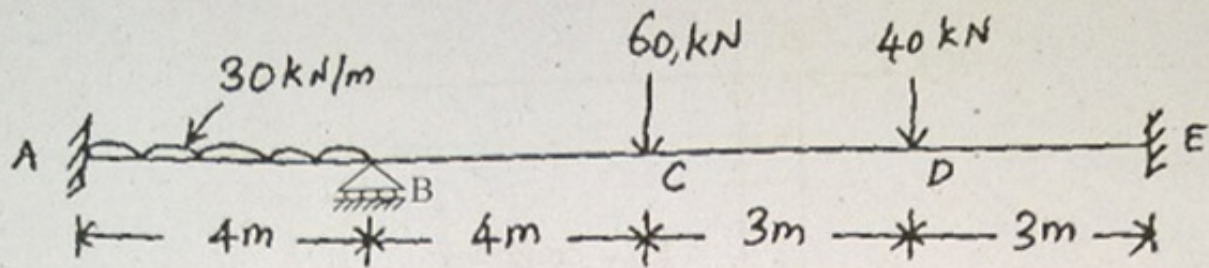


Fig. Q. 14 (a)

Or

- (b) Analyse the portal frame shown in Fig. Q. 14 (b) by slope deflection method and sketch the bending moment and shear force diagram.

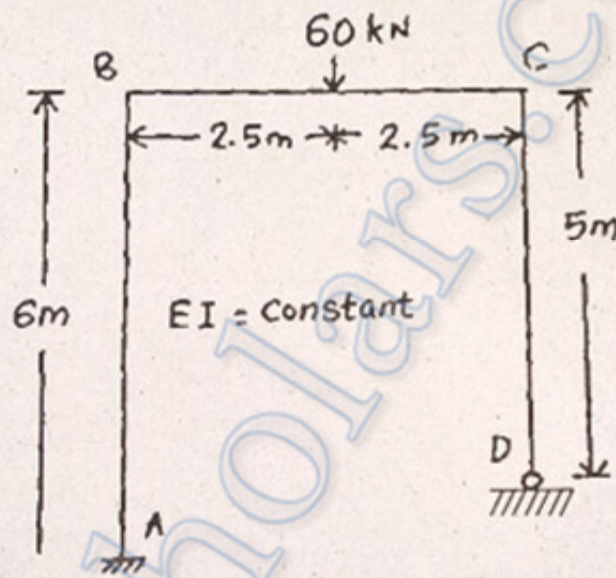


Fig. Q. 14 (b)

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

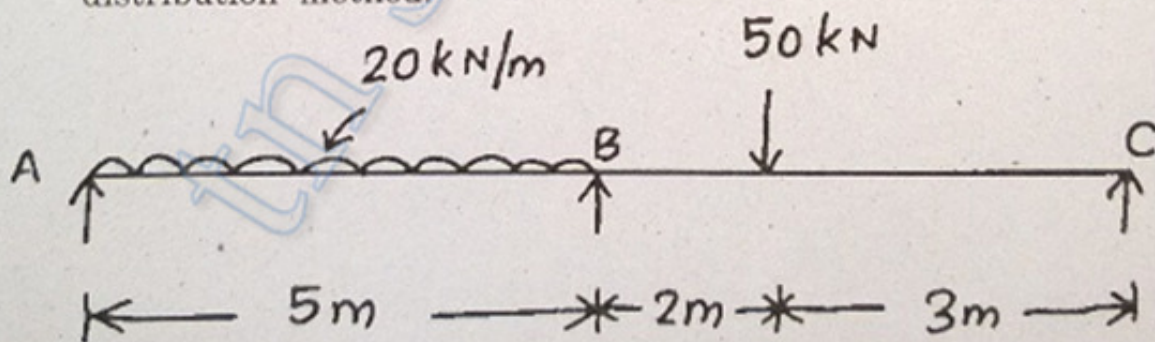


Fig. Q. 15 (a)

Or