Reg. No. : | | | | | | | | | | | | |

R 3169

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Fifth Semester

(Regulation 2004)

Civil Engineering

CE 1302 — STRUCTURAL ANALYSIS – CLASSICAL METHODS

(Common to B.E. (Part-Time) Fourth Semester Regulation 2005)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What is willot diagram?

2. What is meant by perfect frame?

3. Explain the term influence lines?

4. State Muller Breslau's principle.

5. Define statically determinate structures?

6. What is the difference between two hinged and three hinged arches?

7. State Eddy's theorem.

8. What are the causes of sway frames?

9. What do you understand by the term distribution factor?

10. Find out the static indeterminacy of the following structures

PART B — (5 × 16 = 80 marks)

11. (a) A pin jointed frame shown in fig. 11 (a) is carrying a load of 6 tonnes at C

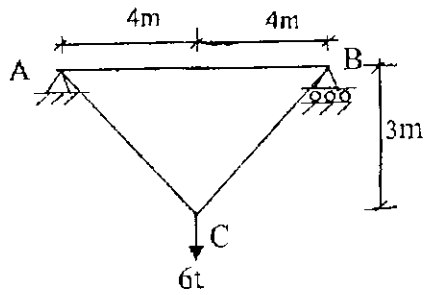

Fig. 11 (a)

Find the vertical as well as horizontal deflection of C. Take area of member AB as 10 cm^2 and those of members AC & BC as 15 cm^2. E = 2.0 × 10^3 t/cm^2.

Or

(b) The truss shown in fig.11 (b) find the vertical deflection components of L1. The cross sectional areas of the members in cm^2 are shown in brackets. E = 2.0 × 10^6 Kg/cm^2.

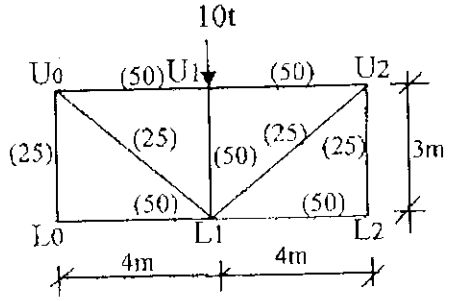

Fig. 11 (b)

12. (a) For the span shown in the Fig. 12 (a), obtain the bending moment at a section P, 20 m from A, due to given loads in the position indicated.

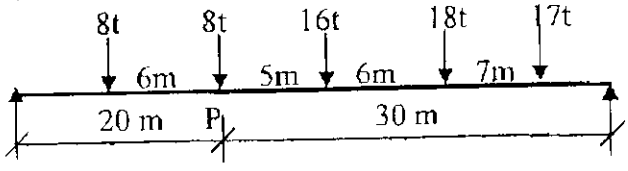

Fig. 12 (a)

Determine the maximum bending moment at a section 5 m from the left support. Also find the magnitude of the absolute maximum bending moment any where in the girder.

Or

(b) A uniformly distributed load of 5 t/m [fig. 12 (b)] longer than span, rolls over a beam of 25 m span. Using influence lines determine the maximum SF and BM at a section 10 m from the left end support.

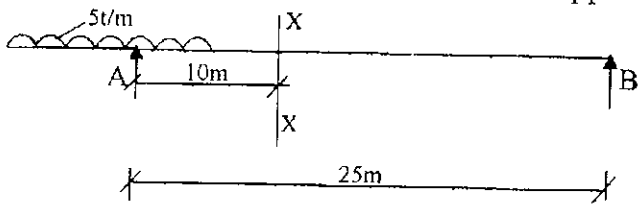

Fig. 12 (b)

13. (a) A three hinged parabolic arch of span 20 m and rise 8 m carries a UDL of 40 kN/m over the left half span.

(i) Analyse the arch and draw the BMD.

(ii) Also evaluate the thrust and shear force at a section 8 m from left hinge.

Or

(b) Evaluate the horizontal thrust in a two hinged parabolic arch of span 10 m and rise 25 m carrying an UDL of 24 kN/m over the left half span, assuming secant variation of its sectional moment of area. Also calculate the Bending Moment at the crown and draw the BMD.

14. (a) Analyse the continuous beam shown in fig. 14 (a) by slope deflection method. Support B settles by 8 mm and C settles by 12 mm. $I = 60000\ cm^4 = 6 \times 10^{-4}\ m^4$, $E = 210 \times 10^6\ kN/m^2$. Draw the SFD and BMD.

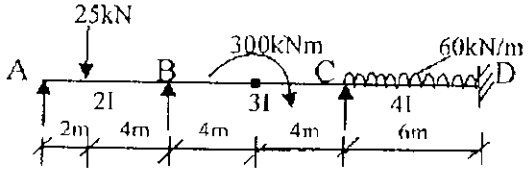

Fig. 14 (a)

Or

(b) A beam ABC supported on a column BD is loaded as shown in Fig.14 (b). Analyse the frame by slope deflection method and draw the BMD.

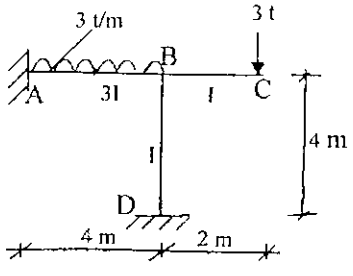

Fig. 14 (b)

15. (a) Analyse the continuous beam shown in Fig. 15 (a) by moment distribution method and draw the BMD.

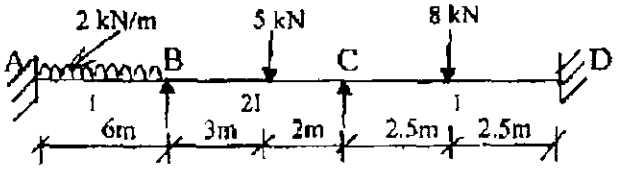

Fig. 15 (a)

Or

(b) Analyse the frame shown in Fig. 15 (b) by moment distribution method and draw BMD.

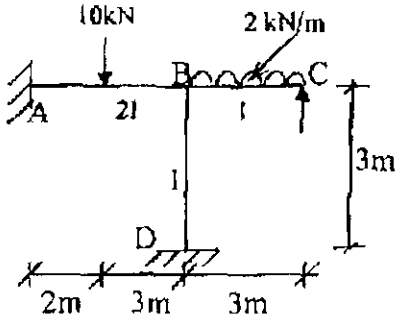

Fig. 15 (b)