D 12062 (Pages : 4) Name.....

Reg. No.....

FIFTH SEMESTER B.TECH. (ENGINEERING) [14 SCHEME] DEGREE EXAMINATION, NOVEMBER 2016

CE 14 504—STRUCTURAL ANALYSIS II

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*
Each question carries 5 *marks.*

1. Derive from fundamentals the basic slope deflection equations.
2. What are the causes of side-sway in portal frames.
3. Explain the moment distribution method for portal frames with side-sway.
4. State and explain Clapeyron's theorem of three moments .
5. Briefly explain Kani's method of structural analysis.
6. What are the assumptions made in the analysis of frames subjected to lateral loads ? What are the two methods of analysis based on these assumptions ?
7. A quadrant of a circle of radius R having uniform cross section is horizontal in plan. It carries a vertical concentrated load, W at the free end. Determine the vertical deflection of point A.
8. Define the mechanism in plastic theory.
9. Define :
   (i) Plastic hinge.
   (ii) Shape factor.
10. Determine the length of plastic zone of a simply supported beam of rectangular section supporting a point load at the centre.

(8 × 5 = 40 marks)

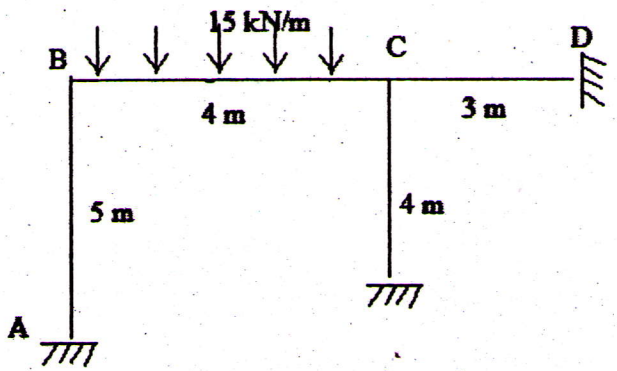
Turn over

Part B

All question carries 15 *marks.*

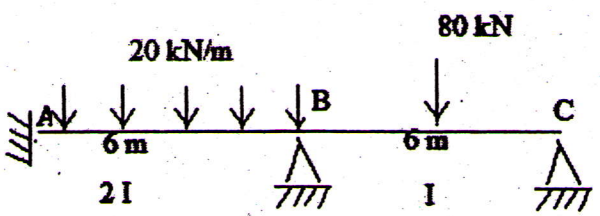
MODULE I

11. Analyse the frame loaded as shown below by slope deflection method and draw BMD Take EI constant throughout.



Or

12. Analyze the continuous beam by moment distribution method and draw BMD.

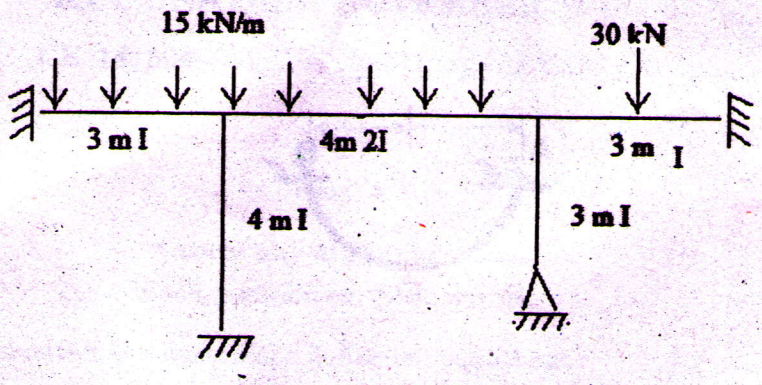


MODULE II

13. A continuous beam ABCD 28 m long is continuous over 3 spans of 10 m, and 8 m. There is UDL of 3 tonnes/m over each of 10 m span and a load of 6 tonnes/m over 8 m span. The ends are freely supported and during load support B sinks by 1 cm. Find the fixed end moments and draw BM and SF for the beam using theorem of three moments. $E = 2 \times 10^4$ kN/cm^2 $I = 30{,}000$ cm^4.

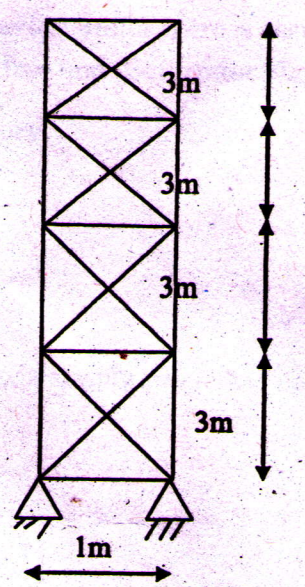
Or

14. Analyze the frame shown by Kani's method and draw BMD.



MODULE III

15. Determine the maximum load in the members due to wind across the face of a 12 m × 0,75 m × 0.75 m watch tower shown in figure, if the basic wind speed is 47 m/sec and the wind speed factors are $k_1 = 0.9$ $k_2 = 1.0$ $k_3 = 1.0$. Take overall force coefficient 2.8 corresponding to solidarity ratio 0.3.Assume that :

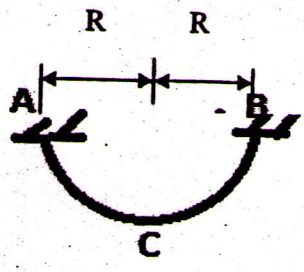


(i) Bracings are effective in tension only.

(ii) Bracings are effective in tension and compression both.

Or

16. A uniform cross section semi-circular beam is fixed at A and B. It is subjected to a vertical load W at C. The cross section of the beam is circular. Show that the sagging moment at C of the beam is WR/π. Also find the expression for the deflection of C.



MODULE IV

17. A portal frame ABCD is fixed at A and D is loaded with a point load of 20 kN at the middle point of BC and a horizontal point load of 10 kN at the joint B towards right. The lengths of AB = 5 m, BC = 4 m and CD = 2 m. If the plastic moment of AB, BC and CD are respectively 2 Mp, Mp and Mp, determine the values of plastic moment.

Or

18. A beam fixed at both ends is subjected to a uniformly distributed load w on the $3/4^{th}$ length from the right support. Determine the value of collapse load W_C. The beam is of uniform plastic moment.

(4 × 15 = 60 marks)