Roll No. ....

2040

B. E. 3rd Semester (Civil Engg.)
Examination – December, 2012

STRUCTURAL ANALYSIS - 1

Paper : CE-201-E

Time : Three hours]   *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note :   (i)   Attempt any *five* questions.

       (ii)   All questions carry equal marks.

       (iii) If any data/value is missing, assume the same.

1. Explain in brief with neat sketches :

   (a)   Principle of virtual work,

   (b)   Limitations of Euler's theory,

   (c)   Principle stress and strain,

2040-250 -(P-4)(Q-8)(12)   **P. T. O.**

(d) Elastic constants and their relationship,

(e) Hooke's Law. $5 \times 4 = 20$

2. A steel tube of 100 mm internal dia. and 125 mm external dia. is surrounded by a brass-tube of the same length m such a way that the axes of the two tubes coincide. If the outer brass tube has an inner dia. of 126 mm and outer dia. of 150 mm with axial load (compressive) of 5 KN, find the load taken by each tube and stresses and strains developed in each tube. $E_s = 2 \times 10^5$ MPa and $E_b = 1 \times 10^5$ MPa. **20**
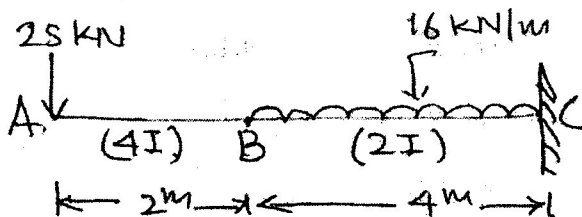
3. Draw the Bending Moment Diagram for a u.d.l. of w/m over the entire span for a three-henged parabolic symmetrical arch. Also calculate normal thrust and redial shear at left-quarter span. **20**
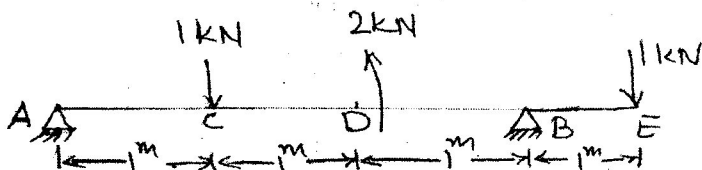
4. Calculate Δ_A and Δ_B by conjugate Beam Method.

20

2040- 250 -(P-4)(Q-8)(12)　　(2)

5. Draw SFD and BMD for given beam. Hence calculate the maximum SF and BM.

20

6. (a) Define the elastic constants and derive the relationship between them. **10**

   (b) Explain the theory of simple bending with assumptions. **10**

7. (a) Define slenderness ration, bukling and crippling in columns. **9**

   (b) A hollow column carries a load of 360 KN at an eccentricity of 20 mm from the axis of the column. It has a length of 5^m, with external dia. 300 mm and internal dia. 250 mm; fixed at both ends. Find the $\max^m$, stresses developed. **11**

   Take $E = 1 \times 10^5 \, \text{N/mm}^2$.

8. Explain in detail :

(i) Mohr's circle of stress and strain,

(ii) Different failures in column,

(iii) Perfect, imperfect and Redundant frame,

(iv) Moment Area Method,

(v) Analysis of plane tresses by method of joints.

$$5 \times 4 = 20$$

———————