

Roll No.

24195

**B. Tech. 4th Semester (Civil
Engineering) Examination – May, 2013**

STRUCTURAL ANALYSIS-II

Paper : CE-202-F

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 : Attempt *five* questions in all, selecting at least *one* question from each Section. Question No. 1 is *compulsory*. All questions carry equal marks.

1. Answer the following questions :

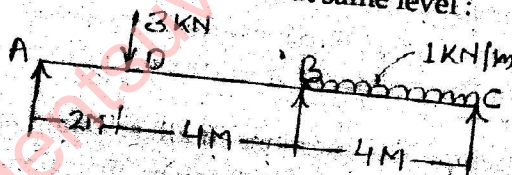
5 × 4 = 20

- (a) Distinguish between statically determinate structure and statically indeterminate structure.
- (b) Explain column analogy method. Why is column analogy method better than slope deflection or moment distribution method ?
- (c) Write short note on parabolic arch and circular arch.

- (d) Define perfect frame and deficient truss.
- (e) Where are anchor cables used and how ?

SECTION - A

2. (a) State and explain the theorem of Castigliano. Show how this theorem is helpful in the analysis of redundant frames ? 10
- (b) Explain basic steps involved for analysis of a structure by slope deflection method. 10
3. Analyze the continuous beam by moment distribution method. The supports are at same level : 20



SECTION - B.

4. (a) Explain column analogy method. Why is this method better than other methods ? 6
- (b) Analyze propped cantilever by column analogy method.
5. (a) Differentiate between two hinged and three hinged arches. Why are hinges provided in any structure ? 10

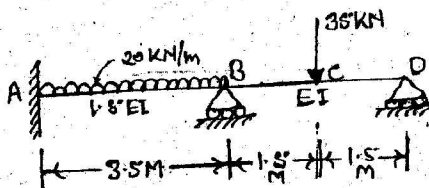
- (b) A two hinged parabolic arch of span 30 m and central rise 6 m is carrying a uniformly distributed load of 20 kN/m for a length of 12 m from the left support towards the centre. Find the horizontal thrust and the reaction at the hinges. 10

SECTION - C

6. (a) Write a short note on unsymmetrical bending. 5
- (b) Taking $S = ax + by$ as the general equation for bending stresses induced due to unsymmetrical bending deduce the values of constant 'a' & 'b'. 15
7. A cable is used to support six equal and equidistant loads over a span of 14 metres. The central dip of the cable is 1.6 m and the loads are 20 kN each. Find the length of the cable required and its sectional area, if the safe tensile stress is $15 \times 10^4 \text{ kN/m}^2$. The distance between the loads is 2 meters. 20

SECTION - D

8. Analyze the beam by slope deflection method as shown in figure : 20



9. Determine the forces in the truss shown below which carries a horizontal load of 12 kN and a vertical load of 18 kN at C & D respectively : 20

