**Code No: CE1512**                                                    **GEC-R14**

**II B. Tech II Semester Supplementary Examinations, January 2017**
# STRUCTURAL ANALYSIS–I
### (Civil Engineering)
**Time: 3 Hours**                                                    **Max. Marks: 60**

**Note:** All Questions from **PART-A** are to be answered at one place.

Answer any **FOUR** questions from **PART-B.** All Questions carry equal Marks.

## PART-A
**6 × 2 = 12M**

1. What is the advantage of fixed beam?
2. Write the expression for theorem of three moments for general loading with settlement of supports assuming uniform flexural rigidity.
3. Why the slope-deflection method is so called?
4. State Castigliano's first theorem.
5. Define Influence Line Diagram.
6. Determine the kinematic Indeterminacy of a fixed beam.Explain.

## PART-B
**4 × 12 = 48M**

1. a)  A horizontal cantilever of 5m. span carries a point load of 12KN at 2m from fixed end.  If the beam is propped at the free end to the level of fixed end, determine the prop reaction.                                                    (4M)

   b) A fixed beam of span 6m is subjected to udl of intensity 10kN/m throughout the span. Determine the fixed end moments and support reactions. Plot the BMD and also sketch the elastic curve.                (8M)

2. Analyze the continuous beam shown using three moment equation. Sketch the BM diagram.. All the supports are at the same level.                (12M)
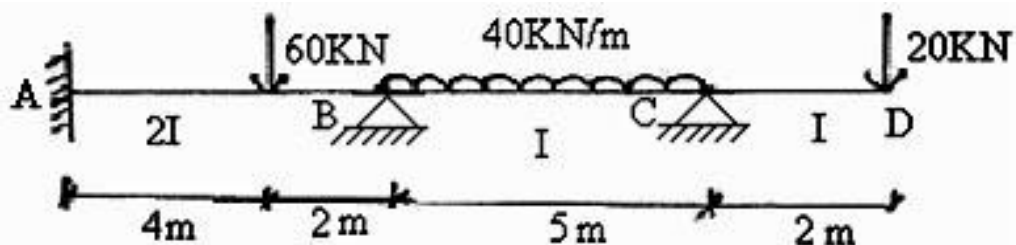


3. A continuous beam ABCD 20 m long is continuous over 3 spans. AB = 8 m, BC = 4 m, CD = 8 m. Moment of Inertia of AB is 2I , that of BC is I and that of CD is 2I. There is a u.d.l. of 1500 N/m over spans AB & BC. On the span CD, there is a point load of 4000 N acting at 3 m from right end. The ends are fixed and during loading, the support B sinks by 1 cm. Find the fixed end moments using Slope Deflection method. Sketch B.M.D. Take I = 1600 cm4; E = $2x10^5$N/mm$^2$.                                                    (12M)

4. a) Derive the expression strain energy for a beam subjected to pure bending.

   (4M)

   b) Using Castiglino's theorem, obtain the deflection under a single concentrated load of 50kN acting at a distance of 4m form left support for a simply supported beam of span 6m. Take EI = 2000 kN-m$^2$.   (8M)

5. A UDL of length 5m and intensity 25kN/m moves across a simple beam of span 30m. Determine the maximum negative and positive S.F and maximum B.M at sections 3m and 12m form the left support and also the absolute maximum shear force and bending moment. Draw the maximum SFD and BMD.   (12M)

6. a) Differentiate between internal and external indeterminacy with respect to analysis of Trusses.   (4M)

   b) Describe the procedure for analysis of Pin-jointed frame with one internal indeterminacy and one external indeterminacy with example.   (8M)

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