

II B. Tech II Semester Regular/Supplementary Examinations, November - 2020
STRUCTURAL ANALYSIS-I
 (Civil Engineering)

Time: 3 hours

Max. Marks: 70

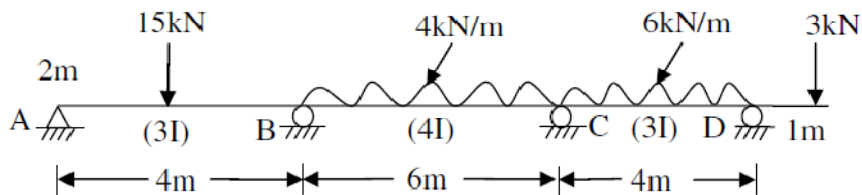
- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **FOUR** Questions from **Part-B**

PART -A

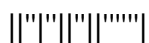
1. a) A propped cantilever of length 'L' carries a concentrated load 'W' at its mid-span. Find the reaction at the prop.
- b) Write down the compatibility conditions for a fixed beam.
- c) Write the Effects of sinking of supports.
- d) What are the sign conventions used in slope deflection equations and write the equations.
- e) State the Castigliano's first theorem.
- f) What is the condition for absolute maximum bending moment due to moving UDL longer than the span?

PART -B

2. a) A cantilever of length 8m carries a uniformly distributed load of 4kN/m length over the whole length. The free end of the cantilever is supported on a prop. If $E = 2 \times 10^5 \text{ N/mm}^2$ and $I = 10^8 \text{ mm}^4$, then
 (i) find the prop reaction (ii) Magnitude and position of maximum deflection.
- b) Write the difference between statically determinate and indeterminate structure?
3. Determine fixed end moments of a fixed beam of span 4 m. If support at right end sinks by 1 cm due to UDL of 1500 N/m. $I = 40000 \text{ cm}^4$, $E = 2 \times 10^6 \text{ N/mm}^2$.
4. Derive the equation for a fixed beam with ends at different levels.
5. Analyze the continuous beam shown in figure, using three-moment equation. Draw S.F and B. M diagrams



6. Define Strain energy. Derive an expression for strain energy due to bending moment.



7. Draw the influence line for BM and SF for a section 8 m from the left hand support A shown in figure below. Determine the maximum BM and SF values for simply supported span 28 m. The section carries a uniformly rolling load 5 kN/m over a span of 9 m. ‘

