

CIVIL ENGINEERING

Paper—V

(SECTION—II)

(Subjective)

Time Allowed : 2 Hours]

[Maximum Marks : 100

- Note :**
- (1) Attempt any five questions.
 - (2) All questions carry equal marks.
 - (3) Assume suitable data, wherever essential and clearly mention the same.

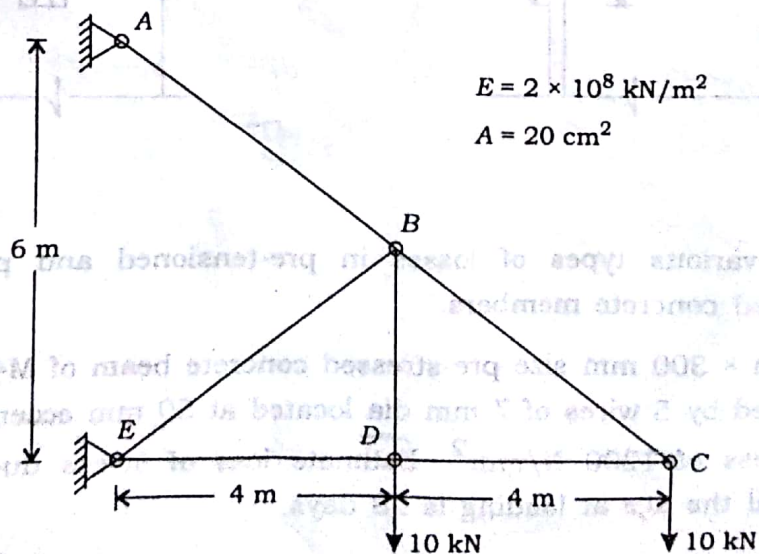
SECTION—A

(Structural Analysis)

1. Analyse the given beam and draw BM, SF and deflected shape :



2. In the given plane truss, find deflections under the loaded joints :



(Structural Design)

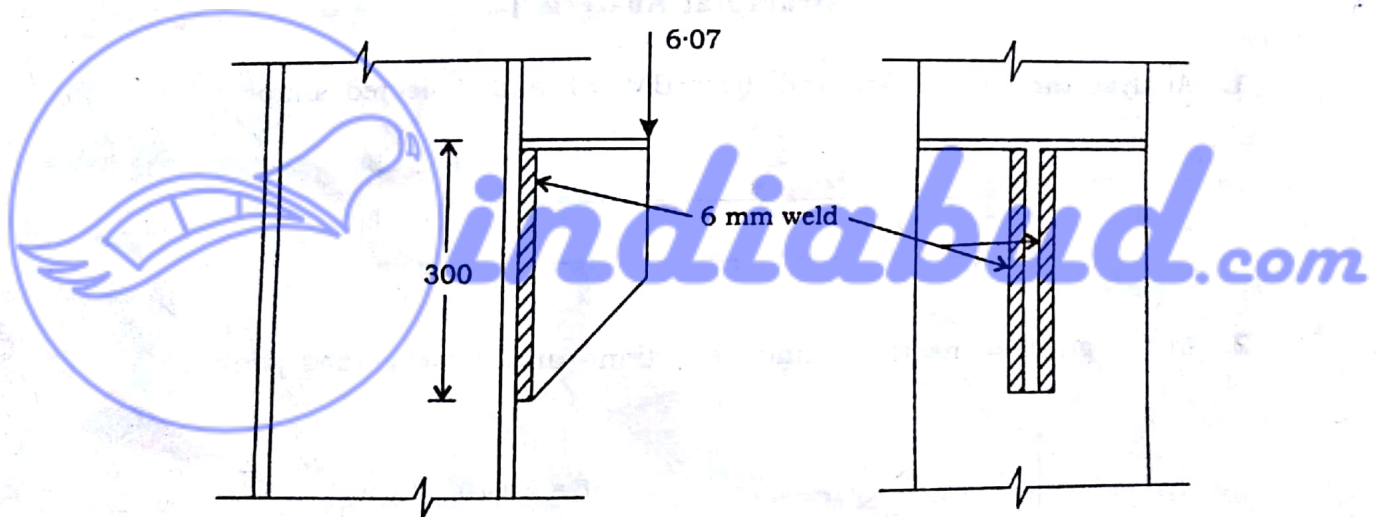
3. Using limit state method, design a simply supported beam of 10 m span carrying a load of 30 kN/m in addition to its self-weight.

Draw reinforcement details.

4. Clearly stating assumptions, derive the expression for critical buckling load for a hinged column.

Modify the expression for different end conditions presenting the results in a clear tabular form.

5. Determine actual stress in the 6 mm size weld for the bracket shown in the figure below and check for its safety :



6. Compare various types of losses in pre-tensioned and post-tensioned pre-stressed concrete members.

A 100 mm × 300 mm size pre-stressed concrete beam of M40 concrete is pre-stressed by 5 wires of 7 mm dia located at 50 mm eccentricity having initial stress of 1200 N/mm². Estimate loss of stress due to creep of concrete, if the age at loading is 28 days.

SECTION—C

(Soil Mechanics and Foundations)

7. Design square footing for a column carrying 450 kN load for the following two types of soils and draw the details :

(a) Alluvial soil

(b) Soft rock

8. Draw plan and elevation for a well foundation, clearly showing its components.

Describe well sinking process.

Explain lateral stability check for wells using elastic theory.



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