T63/A01042/EE/20160711

**Time : 3 Hours**   **Marks : 80**

Instruction :

1. All Questions are Compulsory.
2. Each Sub-question carry 5 marks.
3. Each Sub-question should be answered between 75 to 100 words. Write every questions answer on separate page.
4. Question paper of 80 Marks, it will be converted in to your programme structure marks.

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1. Solve any **four** sub-questions.
    a) State the limitations in Euler's theory of long columns.   5
    b) Analyse the continuous beam as shown in figure by using theorem of three moment.
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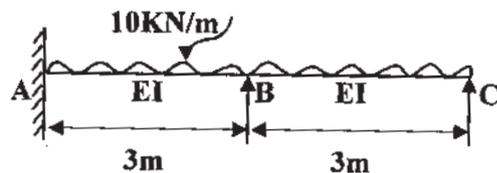
    c) Write short note on effective length of column.   5
    d) Calculate the distribution factors for the following continuous beam.   5
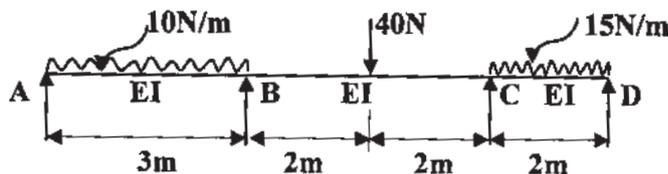
    e) Analyse the continuous beam for the figure in Q. 1 (d) and use distribution factors from the same.   5

2. Solve any **four** sub-questions.
    a) What are the conditions when doubly reinforced beams are used?   5
    b) Design a rectangular beam at mid-span having an effective span of 3m. The superimposed load is 3 kN/m and size of the beam is limited to 230mm × 400mm overall. Use M25 concrete and Fe415 steel.   5
    c) Differentiate between working stress method and limit state method.   5
    d) Design one way slab for room having size 2.5m × 6.5m resting simply supported on 230mm thick brick wall on all four sides, live load is 2.0 kN/m^2, floor finish is 0.75kN/m^2. Use M20 concrete and Fe415 steel. Show reinforcement details.   5
    e) Define and explain slenderness limit for column.   5

3. Solve any **four** sub-questions.

   a) List different types of loading coming on the structure and explain them with neat sketches. 5

   b) Design a short R.C. column to carry an ultimate load of 1700kN, both ends of the column are hinged having length 3.2m. Use M20 concrete and Fe415 steel. 5

   c) Write short note on Development length. 5

   d) Design a cantilever beam for a span of 3m carrying uniformly distributed load of 10kN/m over entire span. Use M20 concrete and Fe415 steel. 5

   e) Explain carry over factor and distribution factor. 5

4. Solve any **four** sub-questions.

   a) What do you understand by sway and non sway of beams. 5

   b) Find Euler's crippling load for a cylindrical column whose diameter is 250mm, if the length of the column is 3.2m and fixed at both the ends. Take $E = 2 \times 10^5$ N/mm^2. 5

   c) Differentiate limit state method and working stress method. 5

   d) State the advantages and disadvantages of fixed beam. 5

   e) Write short note on functions of distribution steel in slab. 5

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