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CBCS SCHEME

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18ENG25

Second Semester B.Arch. Degree Examination, June / July 2026
Building Structures – II

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice

Module-1

1 a. Define :
i) Stress and strain ii) Hooke's law iii) Tensile stress and compressive stress
iv) Poisson's ratio v) Factor of safety. **(10 Marks)**

b. A stepped bar circular cross section 2m length is subjected to an axial load of 50kN. Find the stress in each section, strain and deformation in each section and total deformation. Take E = 206GPa.

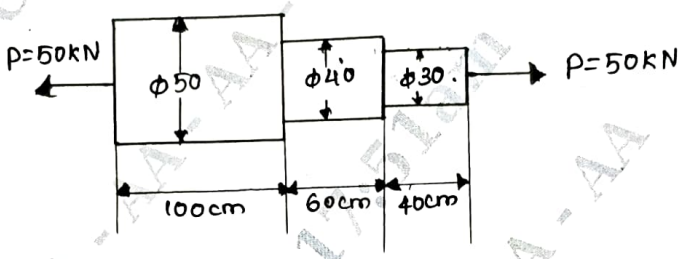

Fig Q1(b) **(10 Marks)**

OR

2 a. Draw and explain stress – strain diagram of a mild steel specimen subjected to tension test. **(06 Marks)**

b. A rod, which tapers uniformly form 40mm dia to 20mm dia in a length of 40cm is subjected to an axial load of 5000N. if $E = 2.1 \times 10^5$ N/mm^2. Find the extension of the rod. **(04 Marks)**

c. A bar of 20mm diameter is subjected to a pull of 50kN. The measured extension o gauge length of 250mm is 0.12mm and change in diameter is 0.00375mm. determine :
i) longitudinal strain and lateral strain ii) Youngs modulus iii) Poisson's ratio
iv) Bulk modulus v) Modulus of rigidity. **(10 Marks)**

Module-2

3 a. Define : i) Shear force ii) Bending moment iii) Shear Force diagram
iv) Bending movement diagram. **(04 Marks)**

b. Draw the BMD and SFD for a cantilever beam shown in the Fig Q3(b) **(06 Marks)**

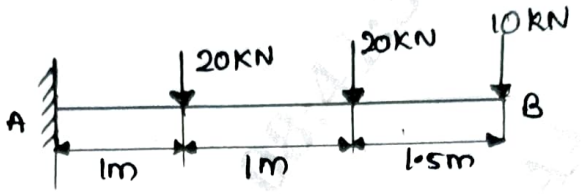

Fig Q3(b)

c. The simply supported beam shown in Fig Q3(c) carries 2 concentrated loads and uniform distributed load. Draw the SFD and the BMD. **(10 Marks)**

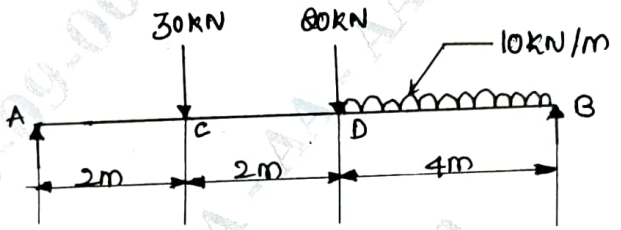

Fig Q3(c)

OR

4 a. A cantilever of length 2m carries a uniformly distributed load of 1.5kN/m run over the whole length and a point load of 2kN at a distance of 0.5m form the free end. Draw the SFD and BMD for the cantilever beam. **(10 Marks)**

b. Draw SFD and BMD diagrams for the overhanging beam shown in Fig Q4(b).

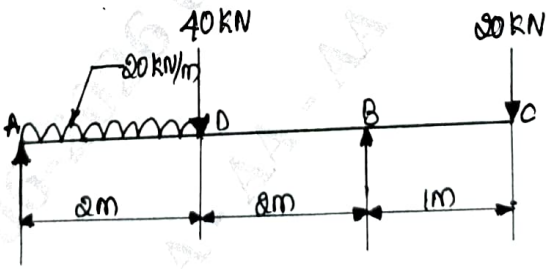

Fig Q4(b) **(10 Marks)**

Module-3

5 a. What are the assumptions made in bending theory and explain bending equation? **(10 Marks)**

b. A beam with cross section shown in Fig.Q5(b) is simply supported and carries a maximum bending moment of 16 kN-m. Calculate maximum compressive and tensile stress.

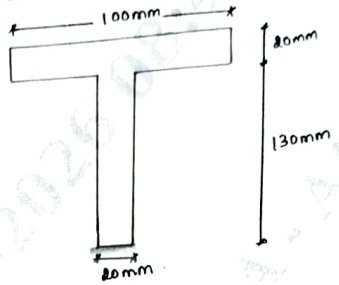

Fig.Q5(b) **(10 Marks)**

OR

6 The unsymmetrical I-section shown in Fig.Q6 is subjected to a shear force of 40 kN. Draw the shear stress variation diagram across the depth.

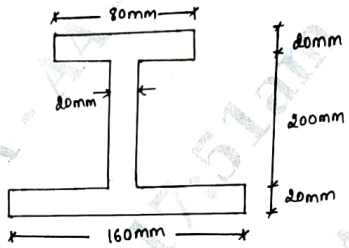

Fig.Q6 **(20 Marks)**

Module-4

7 a. Write expression for effective length of columns for various end conditions. **(10 Marks)**

b. Explain Euler's formula for long columns. What are the assumptions and limitations of Euler's theory for critical load on long column? **(10 Marks)**

OR

8 a. Write the expressions for section modulus of:
(i) Hollow rectangular section with symmetrically placed opening
(ii) Triangular section
(iii)Rectangular section **(10 Marks)**

b. Determine the Euler's crippling load for an I-section column 400 × 200 × 10 mm having length of 5m which is used as a strut with both ends fixed. Take $E = 2.1 \times 10^5$ N/mm^2. **(10 Marks)**

Module-5

9 Determine the deflection under the loads, maximum deflection and slope at the supports for a simply supported beam shown in Fig. Q9, values of $E = 2.1\times10^5$ N/mm^2 and $I = 160\times10^7$ mm^4. **(20 Marks)**

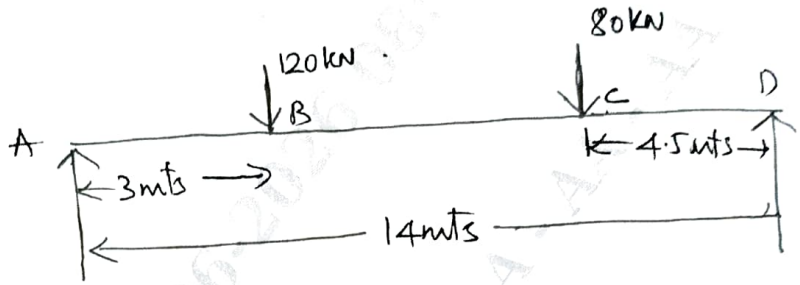

Fig. Q9

OR

10 a. For simply supported beam shown in Fig. Q10 (a), determine the maximum deflection. Find the ratio of maximum deflection to deflection at the point under one of the loads, in terms of EI. **(10 Marks)**

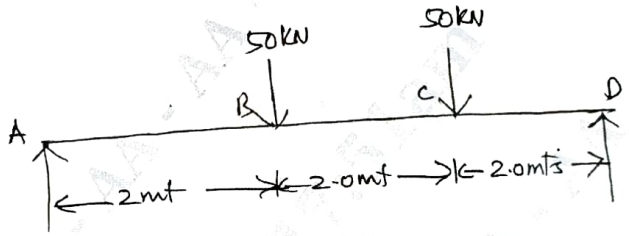

Fig. Q10 (a)

b. For Cantilever beam shown in Fig. Q10 (b), determine the deflection at B and D. $E = 1\times10^5$ N/mm^2, $I = 10\times10^7$ mm^4 **(10 Marks)**

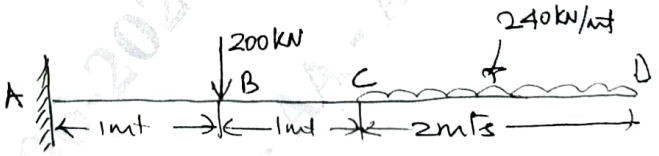

Fig. Q10 (b)

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