CBCS SCHEME

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18ENG25

Second Semester B.Arch. Degree Examination, June/July 2019
Building Structures – II

Time: 3 hrs. Max. Marks: 100

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

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.

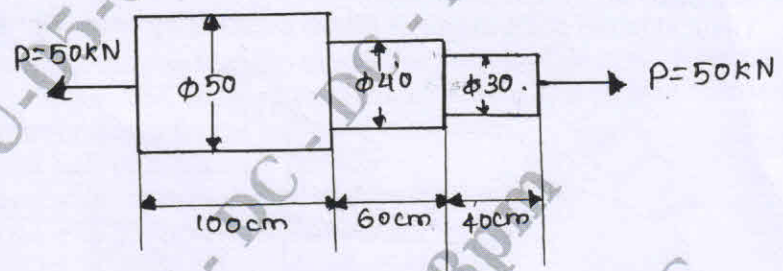

Fig Q1(b) **(10 Marks)**

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)**

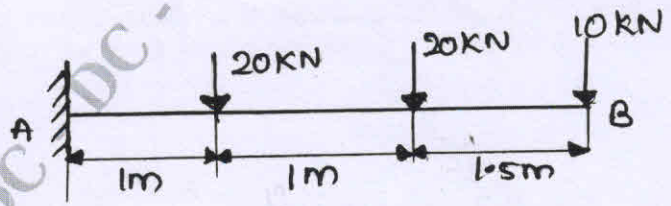

Fig Q3(b)

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)**

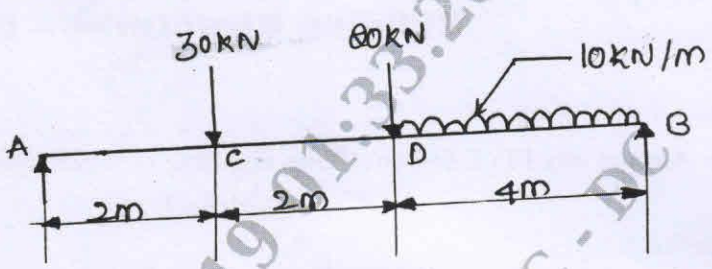

Fig Q3(c)

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).

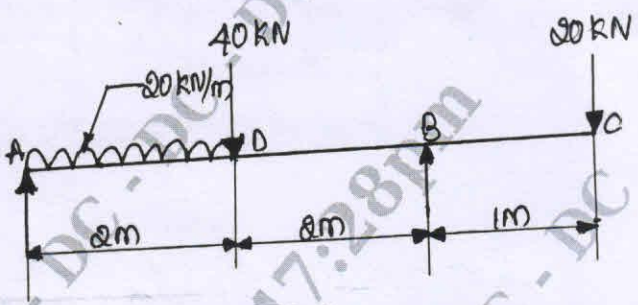

Fig Q4(b) **(10 Marks)**

Module-3

5 a. Write the bending equation for the beams and expand each of the notations in the equation. **(04 Marks)**

b. What re the assumptions made in simple theory of bending. **(04 Marks)**

c. A cost iron beam T section has a length of 2.5m and is subjected to a point load of 61.54kN as shown in Fig Q5(c). Determine the maximum tensile and maximum compressive stress. Draw the bending stress distribution across the cross section of the beam. **(12 Marks)**

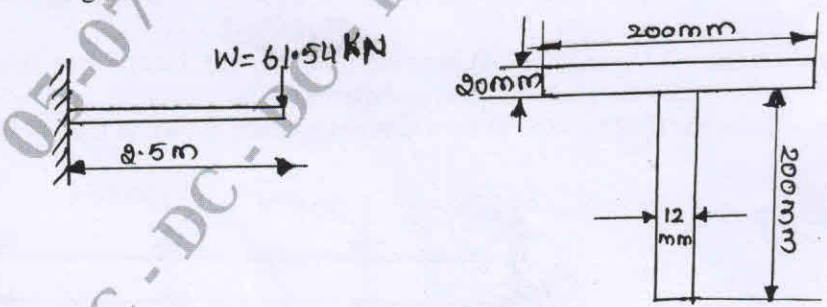

Fig Q5(c)

OR

6 a. Define : i) Neural axis ii) Section modulus iii) Pure bending. **(06 Marks)**

b. Write the shear stress equation for beams and expand each of the notations in the equation. **(04 Marks)**

c. A beam of an I –section consists of 180mm × 15mm flanges and a web of 280mm depth × 15mm thickness it is subjected to a shear force of 60kN. Draw the shear stress variation diagram across the depth. **(10 Marks)**

Module-4

7 a. What are the assumption made in Euler's column theory. **(04 Marks)**

b. Define : i) column ii) critical load iii) effective length of the column iv) slenderness ratio. **(08 Marks)**

c. A hallow cast iron cylindrical column 3m long is hinged at both ends. The external diameters is 150mm and the internal diameter is 100mm. using FOS of 4, determine safe load the column can support Take E = 89.5 kN/mm^2. **(08 Marks)**

OR

8 a. Write the Euler's formula and expand the each of the notations in the equation. **(04 Marks)**

b. A solid round bar 3m long and 5cm in diameter is used as a column determine the critical load using Euler's formula for the following conditions.

i) Both the ends of column are fixed

ii) One end of the column is fixed and the other end free

iii) Both the ends of the column are hinged

Take E = 2.0×10^5 N/mm^2 **(10 Marks)**

c. A hollow mild steel tube 6m long 4cm internal diameter and 5mm thick is used as a column with both end hinged. Find the critical load and safe load taking FOS 3.

Take E = 2×10^5 N/mm^2. **(06 Marks)**

Module-5

9 a. Write the assumption made in the moment curvature equation. **(04 Marks)**

b. Using double integration method determine the slope and deflection for a cantilever beam subjected to concentrated load at free end. **(08 Marks)**

c. A cantilever beam of length 2.5m carries a uniformly distributed load of 16kN/m over the entire length. If the moment of inertia of the beam 7.95×10^7 mm^4 and the value of E = 2×10^5 N/mm^2 determine the deflection at the free end. **(08 Marks)**

OR

10 a. Define : Slope and deflection. **(02 Marks)**

b. Derive an expression for maximum slope and deflection for a cantilever beam subjected to a UDL. **(08 Marks)**

c. A beam 3m long, simply supported at its ends is carrying a point load W at the centre. If the slope at the ends of the beam should not exceed 1°, find the deflection at the centre of the beam. **(10 Marks)**

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