CBCS SCHEME

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18ENG25

Second Semester B.Arch. Degree Examination, Dec.2024/Jan.2025
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. Explain different types of stresses and strain with neat sketches. **(10 Marks)**

b. Explain stress-strain curve for Mild Steel. **(10 Marks)**

OR

2 a. Write brief notes on Poisson's ratio, Elastic constants, Temperature stresses. **(10 Marks)**

b. A brass bar having cross section area of 1000 mm^2 is subjected to axial forces as shown in Fig.Q2(a). Calculate the force 'P' necessary for equilibrium of bar. Determine the total Elongation of the bar. Take E = 1.05 * 10^5 N/mm^2.

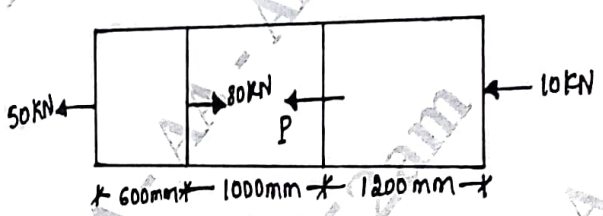

Fig.Q2(a) **(10 Marks)**

Module-2

3 a. Explain Bending moment diagram and shear force diagram. **(06 Marks)**

b. Write a note on sign convention in S.F.D and B.M.D. **(04 Marks)**

c. Draw and derive S.F.D and B.M.D for following beam as shown in Fig.Q3(c).

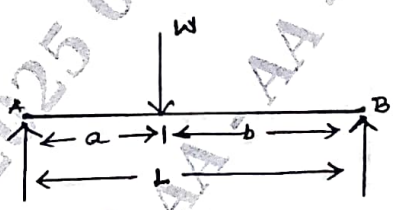

Fig.Q.3(c) **(10 Marks)**

OR

4 a. Write the expression on relationship between rate of loading, shear force and bending moment. **(08 Marks)**

b. Draw S.F.D and B.M.D for the following beam as shown in Fig.Q4(b).

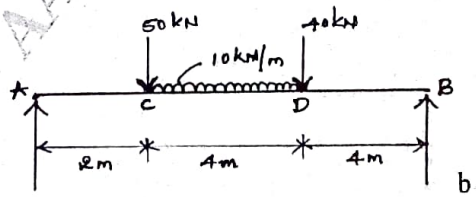

Fig.Q.4(b) **(12 Marks)**

Module-3

5 a. State the assumptions made in theory of simple bending. **(06 Marks)**

b. A cast iron bracket, subjected to bending has a cross section of I–shape with unequal flanges as shown in Fig.Q5(b). If the section is subjected to a shear force of 1600kN, draw the shear stress distribution over the depth of section.

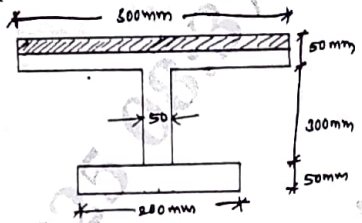

Fig.Q5(b) **(14 Marks)**

OR

6 a. Write the expression for sectional modulus for the following :

i) Rectangular section
ii) Hollow rectangular
iii) Circular
iv) Hollow circular section. **(08 Marks)**

b. A simply supported beam of span 10m is 350mm deep. The section of the beam is symmetrical. The moment of inertia of the section is $9.5 \times 10^7 mm^4$. If the permissible bending stress is $120N/mm^2$.

Find :

i) the safe point load that can be applied at the centre of the span
ii) the safe uniformly distributed load that can be applied on the span

Neglect the dead load of the beam. **(12 Marks)**

Module-4

7 a. Explain long column and short column. **(06 Marks)**

b. Write the expressions for crippling load

i) One end fixed and other free
ii) Both ends fixed
iii) One end fixed and other pin jointed
iv) Both ends hinged. **(04 Marks)**

c. A rectangular column of timber section 15cm × 20cm is 6m long and both ends are being fixed. If $E = 17.5kN/mm^2$. Determine safe load for column (factor of safety is 3). **(10 Marks)**

OR

8 a. Write the assumptions and limitation of Euler's theory for critical load on long column. **(08 Marks)**

b. A solid round bar 3cm long and 5cm in diameter is used as a street with both ends hinged. Determine the crippling load. Take $E = 2 \times 10^5 N/mm^2$. **(12 Marks)**

Module-5

9 Explain moment curvature equation. Determine a simply supported beam subjected to a central concentrated load. **(20 Marks)**

OR

10 A simply supported beam of 6m span subjected to a concentrated load of 18 kN at 4m from left support. Calculate:

i) The position and value of maximum deflection
ii) Slope at mid-span
iii) Deflection at the load point

by Macaulay's method. Take E = 200 GPa and $I = 15 \times 10^6 mm^4$. **(20 Marks)**

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