CBCS SCHEME

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18ENG25

Second Semester B.Arch. Degree Examination, July/August 2022
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. With neat sketch draw and explain the stress strain curve for mild steel. **(10 Marks)**

b. A specimen of steel 25mm diameter with a gauge length of 200mm is tested to destruction. It has an extension of 0.16mm under a load of 80kN and the load at elastic limit is 160kN. The maximum load is 180kN. The total extension at fracture is 56mm and diameter at neck is 18mm. Find :

i) Stress at elastic limit
ii) Young's modulus
iii) Bending stress
iv) % reduction in area
v) Ultimate tensile stress. **(10 Marks)**

OR

2 a. Explain the following :

i) Normal stress
ii) Shear stress
iii) Bending stress
iv) Thermal stress. **(10 Marks)**

b. A bar shown in Fig.Q2(b) is tested in UTM. It is observed that at a load of 40kN, the total extension of the bar is 0.285mm. Determine the Young's modulus of the material.

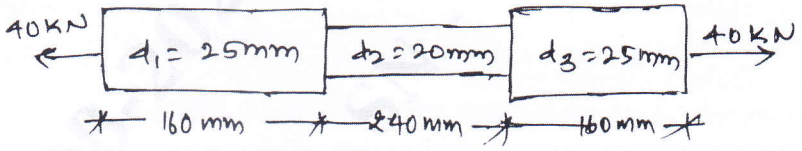

Fig.Q2(b) **(10 Marks)**

Module-2

3 a. Define shear force and bending moment with sign convention. **(06 Marks)**

b. Compute the reactions and draw shear force diagram and bending moment diagram for simply supported beam shown in Fig.Q3(b).

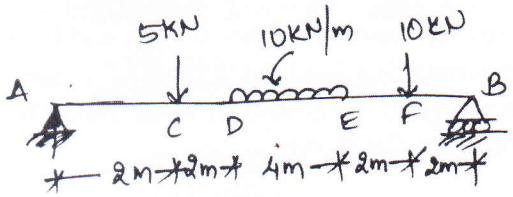

Fig.Q3(b) **(14 Marks)**

OR

4 a. Draw SFD and BMD for a cantilever beam subject to UDL of W kN/m for the whole length 'ℓ'. **(06 Marks)**

b. Calculate shear force and bending moment and draw SFD and BMD for Fig.Q4(b).

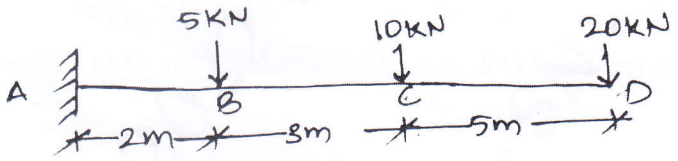

Fig.Q4(b) **(14 Marks)**

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.

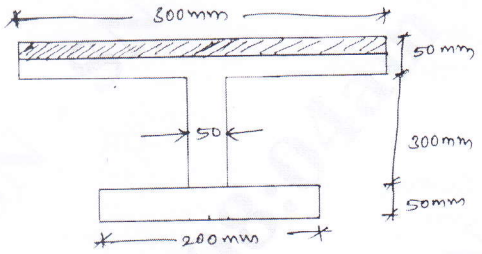

Fig.Q5(b) **(14 Marks)**

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. Write the difference between short column and long column. **(05 Marks)**

b. Determine the buckling load for a strut of T–section, flange width being 100mm, overall depth 80mm and both flange and stem are 10mm thick. The strut is 3m long and is hinged at both ends. Take $E = 200N/mm^2$. **(15 Marks)**

OR

8 a. Define slenderness ratio, effective length, buckling load. **(06 Marks)**

b. Determine Euler's crippling load for an I–section column as shown in Fig.Q8(b), having a length of 6m which is used as a strut with both ends fixed. Take E = 2×10^5 N/mm^2, FOS = 3.

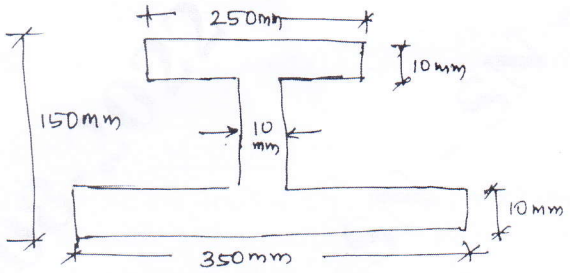

Fig.Q8(b) **(14 Marks)**

Module-5

9 a. Explain the assumptions made in dilution theory. **(06 Marks)**

b. A cantilever of length 2m carries a UDL of 2500N/m for a length of 1.25m from the fixed end and a point load of 1000N at the free end. If the section is rectangular 120mm wide and 240mm deep, find the deflection at free end. Take E = 10000 N/mm^2. (Refer Fig.Q9(b)).

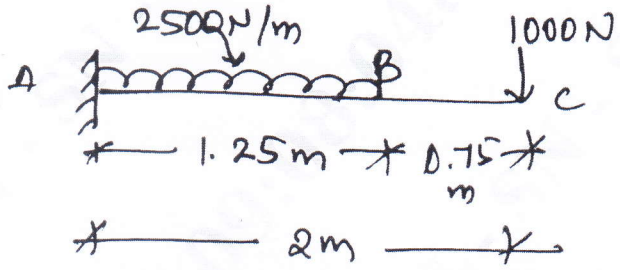

Fig.Q9(b) **(14 Marks)**

OR

10 A beam AB of 8m span is simply supported at the ends as shown in Fig.Q10.
Determine :
i) Deflection at 'C'
ii) Maximum deflection
Take E = 2×10^5 N/mm^2 and I = 1000cm^4.

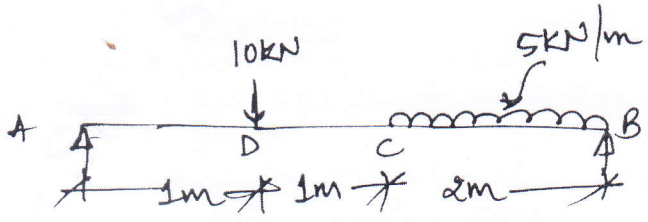

Fig.Q10 **(20 Marks)**

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