CBCS SCHEME

USN | | | | | | | | | | |

15ENG25

Second Semester B.Arch. Degree Examination, Feb./Mar. 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. Discuss the significance of centroid in structures and explain briefly how to find the C.G of a plane surface? Show the centroid of rectangle, triangle with neat sketch. **(10 Marks)**

b. Locate the centroid for the following Fig Q1(b)

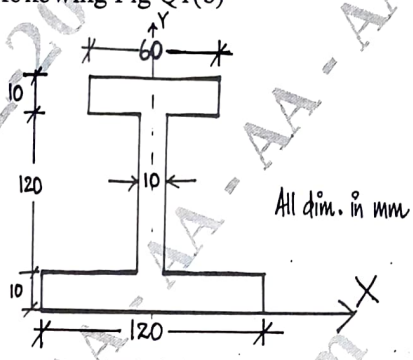

Fig Q1(b) **(10 Marks)**

OR

2 a. Explain the concept of significance of moment of inertia and the parallel axis theorem of moment of inertia. **(06 Marks)**

b. Find the moment of intertia about X-X for the T beam in Fig Q2(b).
Part 1 Width : 8cm Depth 3cm
Part 2 Width : 3cm Depth 8cm

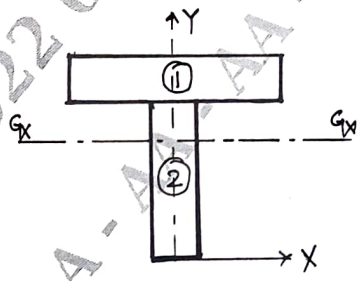

Fig Q2(b) **(14 Marks)**

Module-2

3 a. Draw BMD and SFD for the cantilever beam shown in Fig Q3(a)

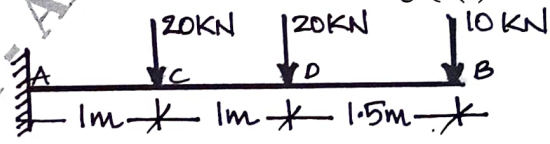

Fig Q3(a) **(10 Marks)**

b. Draw SFD and BMD for the S.S beam shown in Fig Q3(b)

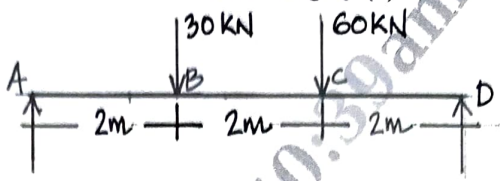

Fig Q3(b) **(10 Marks)**

OR

4 a. Draw SFD and BMD for the cantilever beam shown in Fig Q4(a) **(10 Marks)**

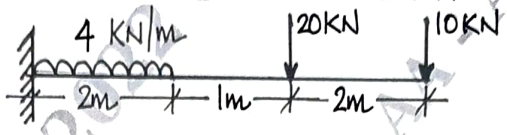

Fig Q4(a)

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

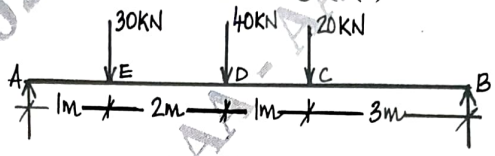

Fig Q4(b) **(10 Marks)**

Module-3

5 a. Explain section modulus in theory of bending. Calculate the section modulus for the following :

i) Rectangular section of size 300mm × 500mm

ii) A circular pipe of external diameter 70mm and thickness 4mm **(10 Marks)**

b. Draw shear stress distribution indicating values at salient points. Fig Q5(b)- i) and ii)

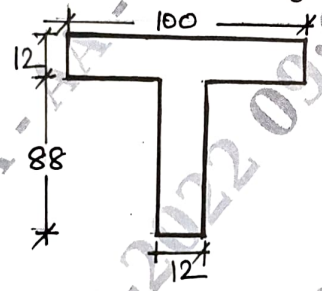

Fig Q5(b)- i)

Shear stress
Bottom of flange – 2.675 N/mm^2
Top of web – 22.288 N/mm^2
@ neutral axis – 23.73 N/mm^2

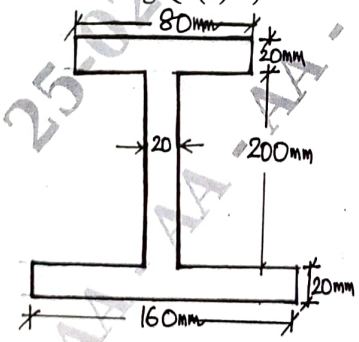

Fig Q5(b) – ii)

Shear stress
Bottom of top flange – 1.528 N/mm^2
Top of web – 6.113N/mm^2
@ neutral axis – 10.345 N/mm^2
Bottom of web – 8.464 N/mm^2
Top of lower flange – 1.058 N/mm^2

(10 Marks)

OR

6 a. Determine the deflection for a cantilever beam @ free end, with concentrated load 'W' @ free end. Given W = 40kN, L = 4m, E = 2×10^5N/mm^2, I = 2×10^8mm^4. **(10 Marks)**

b. A cast iron beam 40mm wide and 80mm deep is simply supported on a span of 1.2m. The beam carries a point load of 15kN at the centre. Find the deflection at the centre. Take E = 108000 N/mm^2. **(10 Marks)**

Module-4

7 a. Write Euler's crippling load for different end conditions of a column. **(08 Marks)**

b. A mild steel tube 4m long 30mm internal diameter and 4mm thick is used as a strut with both ends hinged. Find the collapsing load E = 2.1×10^5 N/mm^2. **(12 Marks)**

OR

8 a. Define Slenderness ration. Write the limitations of Euler's Theory. **(08 Marks)**

b. Calculate the critical load of a strut which is made of a bar, circular in section and 5m long and which is pin jointed at both end. The same bar when simply supported gives a mid span deflection of 10mm with a load of 10N at the centre. **(12 Marks)**

Module-5

9 Calculate the maximum load that can be carried b 300mm × 300mm square column reinforced with 6 bars 16mm dia, use M20 and Fe415 grade of steel and concrete respectively. Also find allowable service load if F.S = 1.5. **(20 Marks)**

OR

10 A circular cross section of 350mm diameter size is reinforced with 6 vertical bases of 20mm diameter. Determine the strength of concrete and steel with following data :

i) f_y – 250N/mm^2, f_{ck} – 15N/mm^2

ii) f_y – 415N/mm^2, f_{ck} – 20N/mm

iii) fy - 500N/mm^2, f_{ck} – 25N/mm^2 **(20 Marks)**

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