CBCS SCHEME

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15ENG25

Second Semester B.Arch. Degree Examination, Dec.2019/Jan.2020
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 the types of beams, support reaction and loads acting on beam along with neat sketches. **(16 Marks)**

b. What is the difference between centroid and centre of gravity? **(04 Marks)**

OR

2 a. Determine the centroid for the lamina shown in the Fig.Q2 (a). **(10 Marks)**

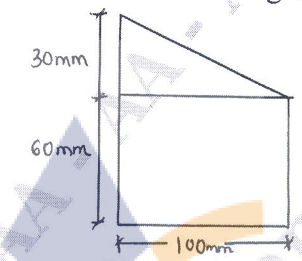

Fig. Q2 (a)

b. Determine the Moment of Inertia for the figure shown in Fig. Q2 (b). **(10 Marks)**

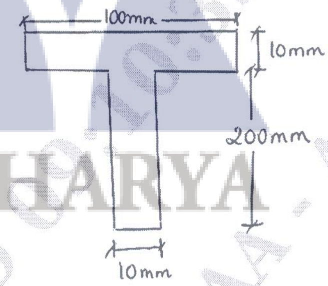

Fig. Q2 (b)

Module-2

3 a. Draw SFD & BMD for the beam shown in Fig. Q3 (a). **(10 Marks)**

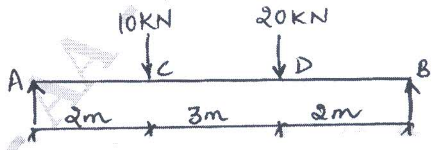

Fig. Q3 (a)

b. Draw SFD & BMD for the beam shown in Fig. Q3 (b). **(10 Marks)**

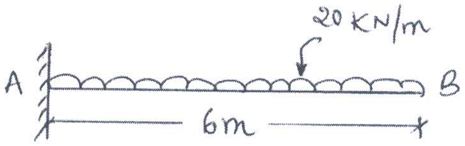

Fig. Q3 (b)

OR

4 a. Define shear force and bending moment along with sign convention. **(08 Marks)**

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

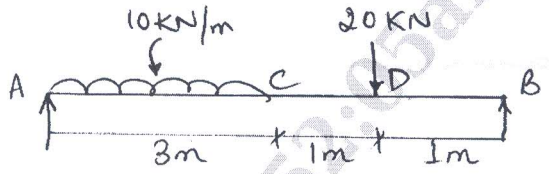

Fig. Q4 (b) **(12 Marks)**

Module-3

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

b. A simply supported beam carries a load of UDL 20 kN/m along a span 5 m. The C/S of the beam is a rectangle of dimension (100×200)mm. Find the maximum bending stress in the beam if the beam is placed such that depth is (a) 100 mm (b) 200 mm. **(14 Marks)**

OR

6 a. A simply supported beam of span 10 m carries a central point load 50 kN. The C/S of the beam is a rectangle of width 50 mm and depth 100 mm. Find the maximum shear stress induced in the beam. **(10 Marks)**

b. A rectangular beam (40 mm×80mm) is subjected to a deflection of 5 mm when it is acted upon a simply supported beam of span 6 m carrying UDL throughout. Find the UDL acting on it. Take $E = 2\times10^5$ N/mm^2. **(10 Marks)**

Module-4

7 a. Differentiate between short and long columns. **(04 Marks)**

b. A hollow mild steel tube 6 m long, 40 mm internal diameter & 50 mm external diameter is used as a strut with both ends hinged. Find the crippling load and safe load taking factor of safety as 2.0 and $E = 2\times10^5$ N/mm^2. **(16 Marks)**

OR

8 a. Define :

(i) Strut (ii) Slenderness ratio (iii) Buckling load (iv) Safe load **(08 Marks)**

b. A round bar 3 m long and 30 mm dia is used as a strut. Determine the crippling load, when it is used in the following conditions: $E = 2\times10^5$ N/mm^2.

(i) Both ends hinged. (ii) One end fixed other ends hinged.

(iii) Both ends fixed. (iv) One end. **(12 Marks)**

Module-5

9 Calculate the maximum load that can be carried by 450mm×450mm. Column reinforced with 6 bars of 20 mm dia. Use $\sigma_{cc} = 5$ N/mm^2 and $\sigma_{sc} = 190$ N/mm^2. **(20 Marks)**

OR

10 A square column of concrete 500mm×500mm reinforced with 8 bars of 12mmϕ, determine the strength of concrete and steel with the following data:

(i) $f_y = 250$ MPa, $f_{ck} = 15$ MPa.

(ii) $f_y = 415$ MPa, $f_{ck} = 20$ MPa

(iii) $f_y = 500$ MPa, $f_{ck} = 25$ MPa **(20 Marks)**

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