

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

- 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

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

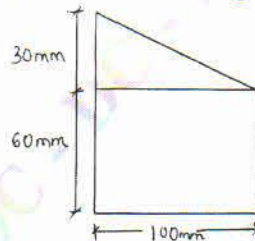


Fig. Q2 (a)

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

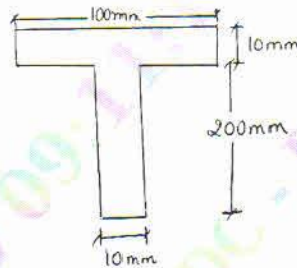


Fig. Q2 (b)

Module-2

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

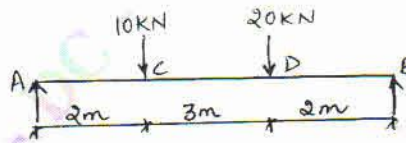


Fig. Q3 (a)

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

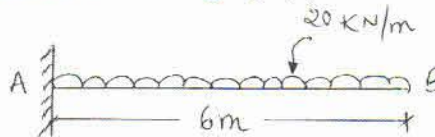


Fig. Q3 (b)

1 of 2

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8=50, will be treated as malpractice.

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).

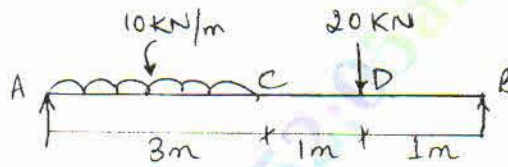


Fig. Q4 (b)

(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 $E = 2 \times 10^5 \text{ N/mm}^2$. (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 $E = 2 \times 10^5 \text{ N/mm}^2$. (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: $E = 2 \times 10^5 \text{ N/mm}^2$.
 (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 $\sigma_{cc} = 5 \text{ N/mm}^2$ and $\sigma_{sc} = 190 \text{ N/mm}^2$. (20 Marks)

OR

- 10 A square column of concrete 500mm×500mm reinforced with 8 bars of 12mm ϕ , determine the strength of concrete and steel with the following data:
 (i) $f_y = 250 \text{ MPa}$, $f_{ck} = 15 \text{ MPa}$.
 (ii) $f_y = 415 \text{ MPa}$, $f_{ck} = 20 \text{ MPa}$.
 (iii) $f_y = 500 \text{ MPa}$, $f_{ck} = 25 \text{ MPa}$. (20 Marks)
