

Total No. of Questions : 8]

SEAT No. :

P3332

[Total No. of Pages : 3

[5257]-2002

First Year B.Arch. (Semester - II)

THEORY OF STRUCTURES - II

(2015 Pattern)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Q.1 in section I and Q.5 in section II are compulsory questions.
- 2) Answer any Two Questions out of remaining Three in each section.
- 3) Use of Scientific Calculator is allowed.
- 4) Marks to the right indicate Full Marks.

SECTION - I

Q1) For the given truss, find forces and mention their nature. (figure 1).

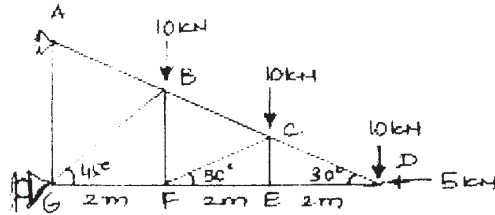


figure 1

Finding reactions [3]

Finding member forces [12]

Q2) a) Explain following terms : [2]

- i) Axial stress
- ii) Bending stress

b) Draw shear stress distribution diagram and find maximum shear stress for a simply supported beam having length 6 m, with uniformly distributed load 8 kN/m. Cross section of beam is a symmetrical I section, having moment of inertia  $22926667 \text{ mm}^4$ , top and bottom flanges 100mm wide, total depth including flanges is 200 mm and thickness of flange and web for I section is 10 mm. [8]

P.T.O.

- Q3)** a) Explain stress strain curve for mild steel with following terms : [6]
- Limit of elasticity
  - Yield stress
  - Ultimate stress
- b) Draw shear stress distribution diagrams for rectangular section and T section indicating maximum value of shear stress. [4]
- Q4)** a) For a cantilever beam having span 3m, if the permissible bending stress is  $5 \text{ N/mm}^2$ , what will be the maximum udl it can carry? Cross section is a rectangular section having 500 mm depth, 250 mm width. [8]
- b) What is lateral strain? What is poisson's ratio? [2]

### SECTION - II

- Q5)** a) For a masonry column cross section  $400 \text{ mm} \times 600 \text{ mm}$  carrying compressive load of 800 kN with eccentricities from xx and yy axis as shown. Find the resultant stresses at four corners A,B, C and D. Sketch the tensile zone for the column section. [12]

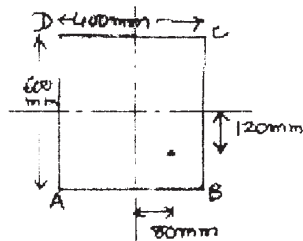


figure 2

- b) For a rectangular cross section having width 300 mm and depth 600 mm, sketch the kernel of the section. [3]
- Q6)** a) For a cantilever RCC beam having  $230 \text{ mm} \times 460 \text{ mm}$  section, and length 3 m, has modulus of elasticity  $E = 0.15 \times 10^5 \text{ N/mm}^2$ . The beam carries udl of 5 kN/m including self weight. Find maximum deflection for the same. [6]
- b) What is condition of perfect truss? Explain. [4]

**Q7)** a) For a circular RCC column having 400 mm diameter, compressive axial load is 900 kN. If the column is reinforced with 12 bars of 20 mm diameter, find the load carried by steel and concrete. Modulus of elasticity for steel is  $2 \times 10^5$  N/mm<sup>2</sup> and modulus of elasticity for concrete is  $0.15 \times 10^5$  N/mm<sup>2</sup>. [8]

b) Explain : section modulus. [2]

**Q8)** a) Explain bending stress equation and terms involved in it. [6]

b) Explain : [4]

Modulus of rigidity

Modular ratio

