

[5062] - 2002

F.Y. B.Arch. (End-Semester, Term - II)

THEORY OF STRUCTURES - II

(2015 Pattern)

Time : 3 Hours]

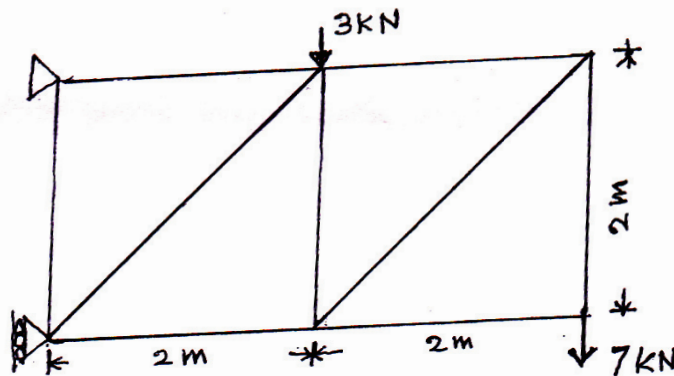
[Max. Marks : 70

Instructions to the candidates :-

- 1) Q.no. 1 & 5 are compulsory.
- 2) Solve any 2 questions out of the remaining 3 from each section. Total solve 3 questions from each section.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data wherever required. Mention the assumption.
- 5) Use of Non-programmable scientific calculator is allowed.

SECTION - I

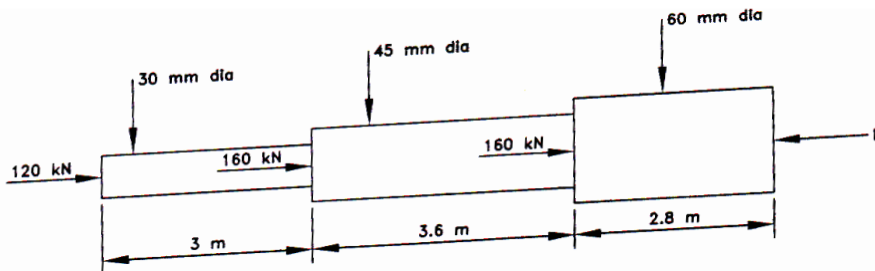
Q1) Analyze the given truss and find out magnitude and nature of forces in all members. [15]



Q2) a) For the member, as per figure below, [7]

- i) Calculate stresses in each part of the member.
- ii) Calculate total change in length.

Take $E = 2 \times 10^5 \text{ N/mm}^2$



P.T.O.

b) Explain with examples, elastic, plastic and brittle materials. [3]

Q3) a) State the assumptions of theory of simple bending. [4]

b) A simply supported beam of cross section 230×600 carries an UDL of 4.5 kN/m over the entire span of 7 m . Calculate maximum bending stress in compression and tension and sketch the bending stress diagram. [6]

Q4) a) Compare with sketch, the bending stress diagram and shear stress diagram of rectangular cross section. Mention key values. [4]

b) Define with units. [4]

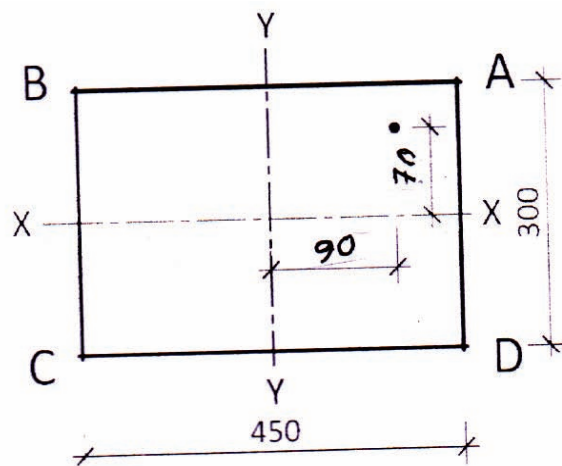
i) Bulk Modulus

ii) Poisson's ratio

c) Define Yield stress & Permissible stress. [2]

SECTION - II

Q5) a) A column carries an eccentric load of 550 kN with eccentricities shown as per figure below. Calculate stresses at all corners of the column. Also sketch the stress diagram. [12]



Note: All dimensions in mm.

b) Explain with sketch, the Middle Third rule. [3]

- Q6)** a) Sketch a typical cantilever beam with end point load. Write the equations for maximum slope and deflection. [3]
- b) A simply supported beam of cross section 230×600 carries an UDL of 10 kN/m over the entire span of 5 m , Calculate maximum deflection only. Take $E = 0.15 \times 10^5 \text{ N/mm}^2$. [7]
- Q7)** a) A simply supported beam of cross section 300×500 carries an UDL of 7 kN/m over the entire span of 5.8 m . It also carries a central point load of 9 kN . Calculate maximum shear stress and sketch the shear stress diagram. [6]
- b) Sketch proportionately, typical shear stress diagrams for a T, L & I section. show max. values. [4]
- Q8)** a) Explain with sketches, perfect frame. deficient frame and redundant frame. [6]
- b) Explain with sketches, how is Middle third rule applied in eccentrically loaded foundations. [4]

