[4962]-2002
F.Y.B.Arch (Semester - II)
THEORY OF STRUCTURES - II
(2015 Pattern)

Time : 3 Hours]   *[Max. Marks : 70*

Instructions to the candidates:-

     1)   *Q.Nos. 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) a)   For the truss given in figure below, determine the forces in magnitude & type (tension or compression) in the members, AC, AH, CH, CD & CJ. Use appropriate method for analyzing.   **[12]**
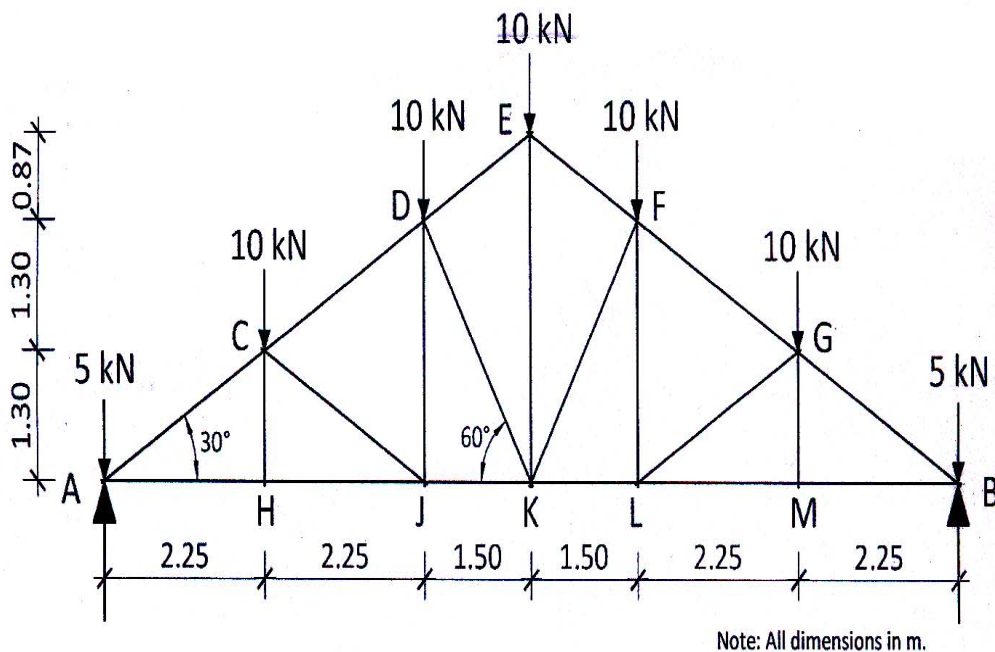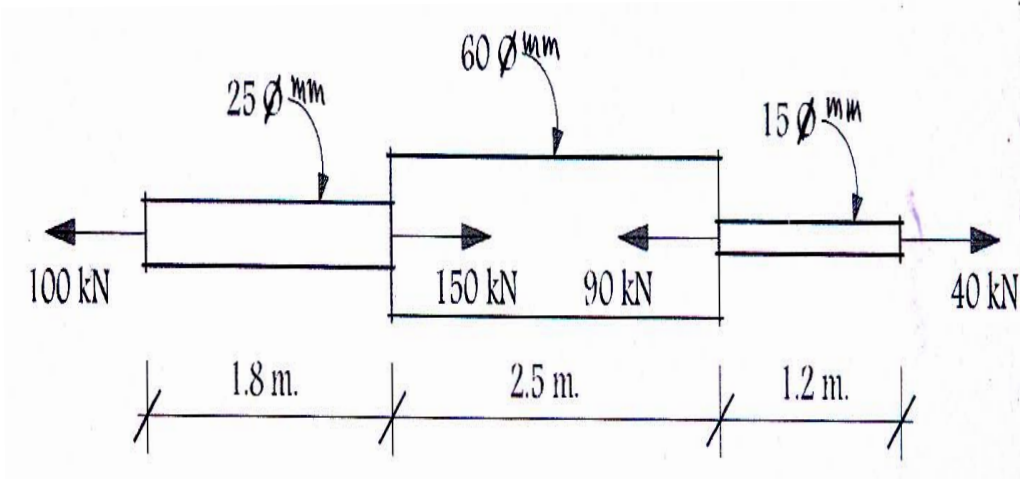

Note: All dimensions in m.

    b)   Write 3 assumptions for analysis of perfect frames.   **[3]**

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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= 2×10^5 N/mm²

   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 230×450 carries an UDL of 6 kN/m over the entire span of 5 m. It also carries a central point load of 10 kN. 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 a rectangular cross section. Mention key values.   **[4]**

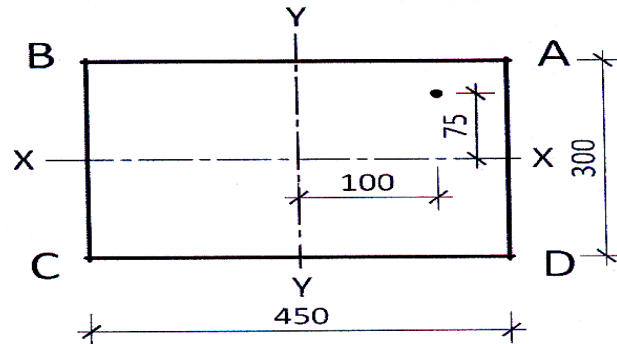   b) Define with units   **[4]**

   i) Modulus of elasticity

   ii) Poisson's ratio

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

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Q5) a) A column carries an eccentric load of 600 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 UDL (w) over the entire span. Write the equations for maximum slope and deflection. **[3]**

b) A simply supported beam of cross section 230×600 carries an UDL of 8 kN/m over the entire span of 6 m. Calculate maximum deflection only. Take $E = 0.15 \times 10^5$ N/mm² **[7]**

Q7) a) A simply supported beam of cross section 230 x 450 carries an UDL of 7 kN/m over the entire span of 5 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]**

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