END TERM EXAMINATION

FIFTH SEMESTER [B.TECH] DECEMBER 2017

|	
Paper Code: ETCE-303 *(Batch 2013-17)* Subject: Advanced Structural Analysis	75
Time: 3 Hours Maximum Marks:	

Note: Attempt all questions as directed. Internal choice is indicated. Assume suitable missing data if any.

Q1   Attempt **any five** of the following: -   **(5x5=25)**
   a) A continuous beam simply supported at A, B and C. The AB and BC are each of length L. Find the value of W at collapse acting on $L/2$ distance from each end on both the spans.
   b) Draw ILD for the following in two hinged arches
       i.   ILD for bending moment at a given section
       ii. ILD for normal thrust at a given section
       iii. ILD for radial shear at a given section
   c) Define stiffness coefficient and stiffness matrix. How is the structure stiffness matrix related to the element stiffness coefficient?
   d) Describe theory of arches and derive the Eddy's Theorem.
   e) The Stiffness method is also known as displacement method or equilibrium method. Why?

Q2   A two hinged parabolic arch of span 20m and rise 4cm carries a UDL of 50kN/m on left half of span. Find the reactions at supports and position and magnitude of maximum bending moment.   **(12.5)**

OR

The circular link as shown in fig has a circular cross-section 3 cm in diameter. The inside diameter of ring is 4 cm. the load P is 1000 kg. Calculate the stress at A and B. Compare the values with those found by straight beam formula. Assume that the material is not stressed above its elastic strength.
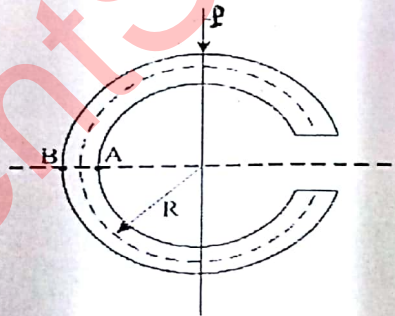

Q3   Analyse the continuous beam as shown in fig. if the support B of the continuous beam has a downward settlement of 30 mm. Take EI = 45600 kN-m². By flexibility method   **(12.5)**
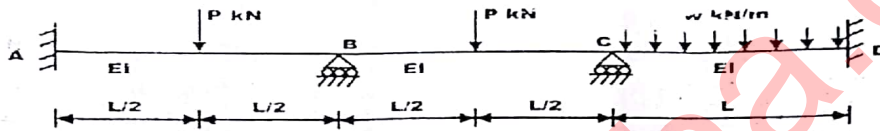
OR

By stiffness method

Assume any type continues beam with vertical load (P)
B downward settlement of 30 mm

P.T.O.

ETCE-303
P.1/2

Q4   What do you mean by flexibility matrix? Explain in brief. Generate the flexibility matrix with the coordinate shown in fig.   (12.5)
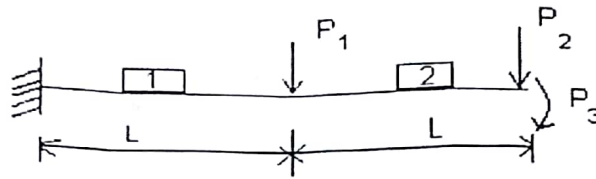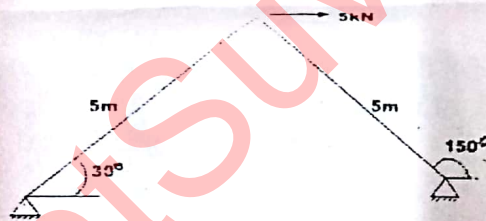

OR

Briefly explain stiffness matrix, Generate the stiffness matrix of the structure as shown in fig.
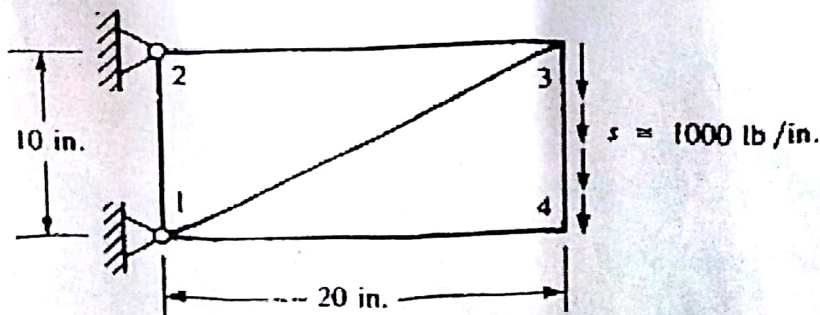

Q5   Analyse the two member truss shown in fig. Assume EI to be constant for all members. The length of each member is 5 m.   (12.5)

OR

Determine the nodal displacements and element stresses, including principal stresses, for the thin plate of section 6.5 with a uniform shear load (instead of a tensile load) acting on the right edge as shown in fig. Use E= 30 x 10⁶ psi, n = 0.30 and t= 1 in.

****

ETCE-303
P2/2