C. U. SHAH UNIVERSITY
Winter Examination-2019

Subject Name : Structural Analysis-II

Subject Code : 4TE04STA1   **Branch: B.Tech (Civil)**

Semester : 4   **Date : 17/09/2019**   **Time : 02:30 To 05:30**   **Marks : 70**

Instructions:
 (1) Use of Programmable calculator & any other electronic instrument is prohibited.
 (2) Instructions written on main answer book are strictly to be obeyed.
 (3) Draw neat diagrams and figures (if necessary) at right places.
 (4) Assume suitable data if needed.

Q-1   **Attempt the following questions**   **(14)**
 a) State the Eddy's theorem.   **(1)**
 b) Moment distribution method is an iterative method or an exact method?   **(1)**
 c) Write full form of SI.   **(1)**
 d) Draw linear arch.   **(1)**
 e) What is the fixed end moment When both fixed and whole beam loaded   **(1)**
       with U.D.L load?
 f) Define carry over moment.   **(1)**
 g) State the principle of superposition.   **(1)**
 h) What is flexibility?   **(1)**
 i) Enlist various types of skeletal structures.   **(1)**
 j) Define strain energy.   **(1)**
 k) What is qualitative influence line?   **(1)**
 l) Write any two advantages of indeterminate structure.   **(1)**
 m) Consistent deformation method is also known as the …………   **(1)**
 n) Write equation for strain energy due to bending.   **(1)**
Attempt any four questions from Q-2 to Q-8

Q-2   **Attempt all questions**   **(14)**
 (A)   Determine reaction at prop for a propped cantilever beam using   **(7)**
        Castiglione's second theorem as shown in fig 1 below.

Fig.1

 (B)   Determine deflection at B and slope at C for a cantilever beam shown in   **(7)**
        Figure-2 by unit load method. $EI = 10 \times 10^4$ KN.m2.

Fig.2

Q-3   **Attempt all questions**   **(14)**
(A)   Explain Castigliano's second theorem in detail   **(06)**
(B)   Construct the influence lines for, V_a, V_b, V_c, V_d, M_1 and V_2 for a three span   **(08)**
           continuous beam shown in figure 2A below.
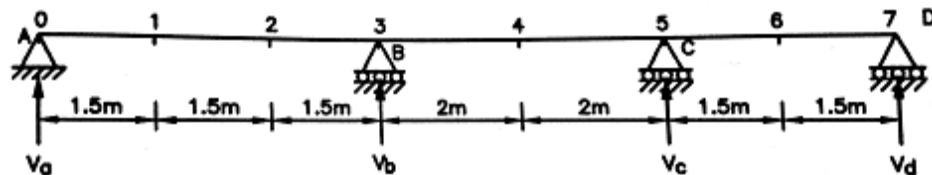

Fig.2A

Q-4   **Attempt all questions**   **(14)**
(A)   A continuous beam ABCD 12 m long is fixed at A and D, and is loaded   **(14)**
           as shown in Figure-3. Analyse the beam completely if the following
           movements take place simultaneously: (i) end A yields, turning through
           1/200 radians in a clockwise direction. (ii) end B sinks 20mm in
           downward direction (iii) end C sinks 20 mm in down ward direction. The
           beam has constant $I = 35.20 \times 10^5$ mm4 and $E = 2 \times 10^5$ N/mm2.
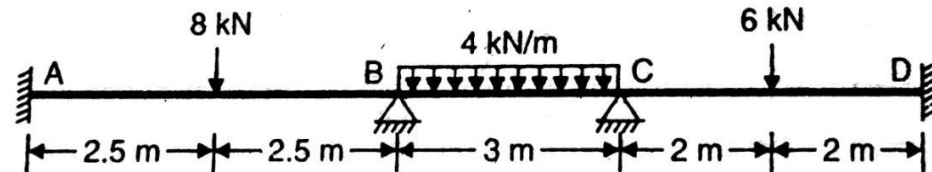
Fig.3

Q-5   **Attempt all questions**   **(14)**
(A)   Write the step by step procedure for slope deflection method.   **(6)**
(B)   Using slope deflection method Analyse the continuous beam shown in   **(8)**
           figure-4. and draw the B.M diagram
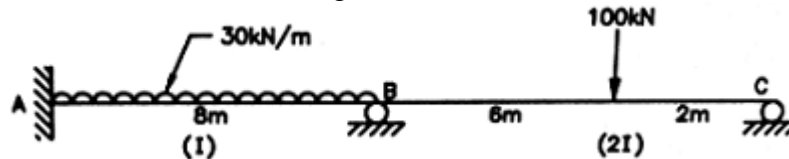
Fig.4

Q-6   **Attempt all questions**   **(14)**
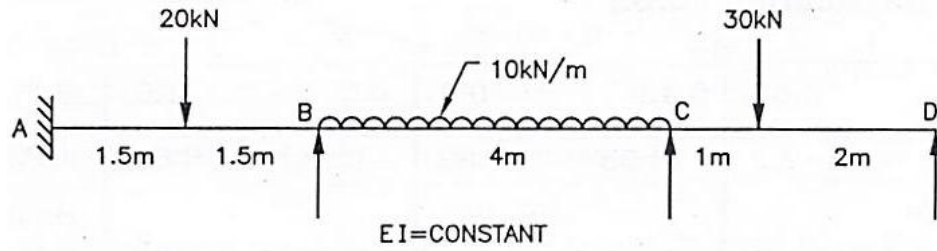**(A)**   Draw B.M diagram for a beam shown in figure 5 using slope deflection   **(7)**
           method

Fig.5

(B) Analyse the continuous beam using Moment Distribution Method ABCD as shown in figure 6 below. **(7)**
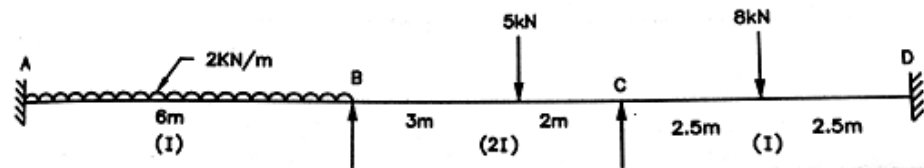

Fig.6

Q-7   **Attempt all questions** **(14)**

(A) A three hinge parabolic arch of 20m span and 4m central rise caries a point load of 4 kN at 4m horizontally from the left hand hinge. Calculate the normal thrust and shear force at the section under the load. Also calculate the maximum B.M positive and negative. **(7)**

(B) Give the following difference: **(7)**
(a) Truss and Frame
(b) SI and KI

Q-8   **Attempt all questions** **(14)**

(A) Derive the formula [Q] = -[F]-1 [DQL] for flexibility method. **(7)**

(B) A three hinge parabolic arch, hinged at the crown and springing has a horizontal span of 10 meters and a centralrise of 2.30m. it carries a uniformly distributed load of 25 kN per horizontal metre run over the left hand half of the span. Calculate the reactions at the end hinges. Also calculate the values of the normal thrust, shear force and bending moment at 2.0m, 6.5 m, from the left hand hinge. **(7)**