BACHELOR OF TECHNOLOGY (C.B.C.S.) (2020 COURSE)
B.Tech.Sem - IV CIVIL :SUMMER- 2022
SUBJECT : ANALYSIS OF DETERMINATE STRUCTURES

Day : Wednesday   Time : 10:00 AM-01:00 PM
Date : 22-06-2022   **S-24374-2022**   Max. Marks : 60

N.B.:

1) All questions are **COMPULSORY**
2) Figures to the right indicate **FULL** marks.
3) **ASSUME** suitable data, if necessary.
4) Use of non-programmable calculator is **ALLOWED**.
5) Draw neat and labelled diagrams **WHEREVER** necessary.

Q.1 **A)** Differentiate static and kinematic indeterminacy   **(04)**

B) Determine static and kinematic indeterminacy for the structure as shown **(06)** in figure

Fig. 1b(i) Rigid jointed Frame

Fig. 1b(ii) Pin jointed Truss
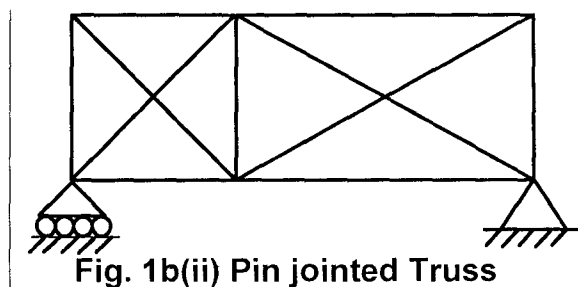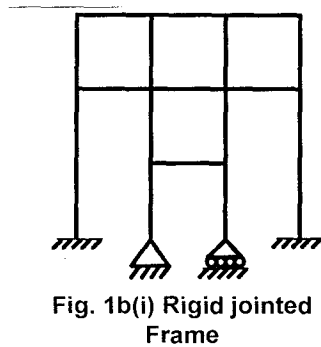
OR

Q.1 Explain with neat sketches the types and classification of structures   **(10)**

Q.2 Determine the vertical deflection of joint B of the pin jointed truss as **(10)** shown in figure, using Castigliano's first theorem. The area of each member is 100 mm^2. Take E = 210 GPa.
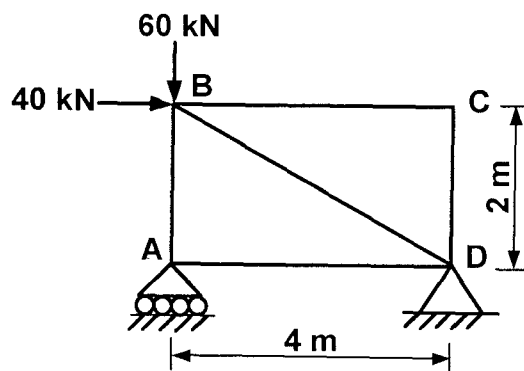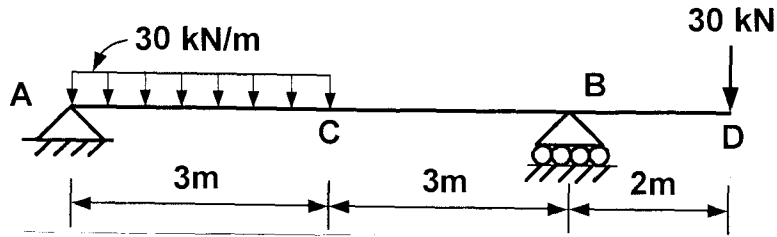

OR

Q.2 Determine the horizontal deflection of joint B of the pin jointed truss as **(10)** shown in figure, using Castigliano's first theorem. The area of each member is 100 mm^2. Take E = 210 GPa.
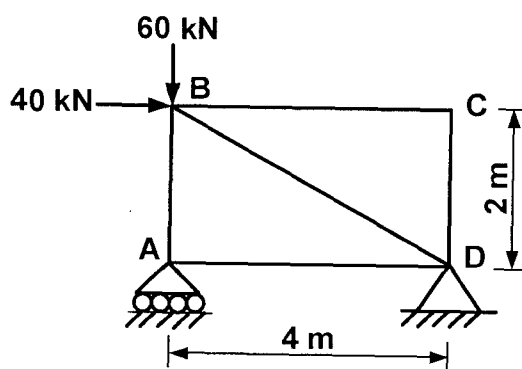
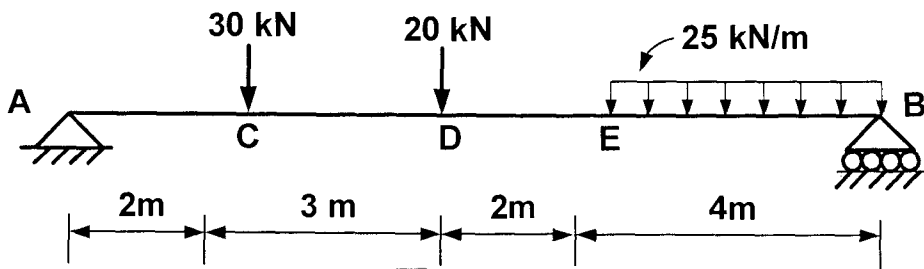(P.T.O.)

Q.3 Calculate the reactions R_A & R_B. Also, calculate shear force and bending **(10)** moment at point C, using Influence Line Diagram.


OR

Q.3 Calculate the reactions R_A & R_B. Also, calculate shear force and bending **(10)** moment at point D, using Influence Line Diagram.


Q.4 The system of point loads as shown in figure rolls from right to left across **(10)** a beam simply supported over a span of 20 m, the 80 kN load is leading. For the section 7.5 m from the left hand support, determine the maximum shear force using Influence Line Diagram.
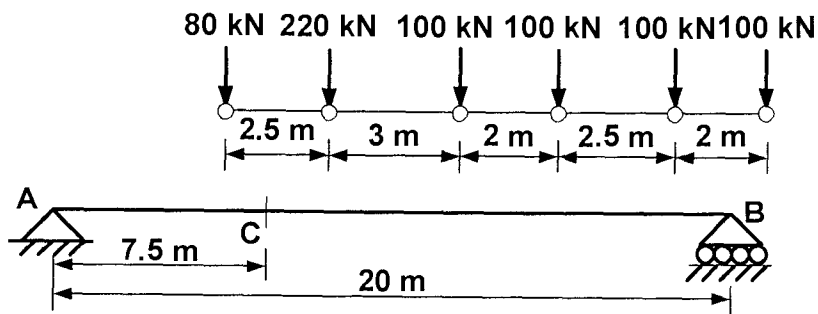
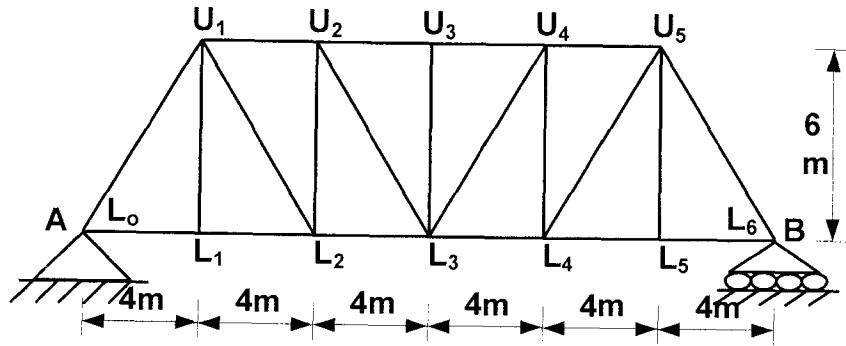**OR**

Q.4 Using Influence Line Diagram, calculate maximum bending moment at **(10)** point C for the beam as shown in figure.
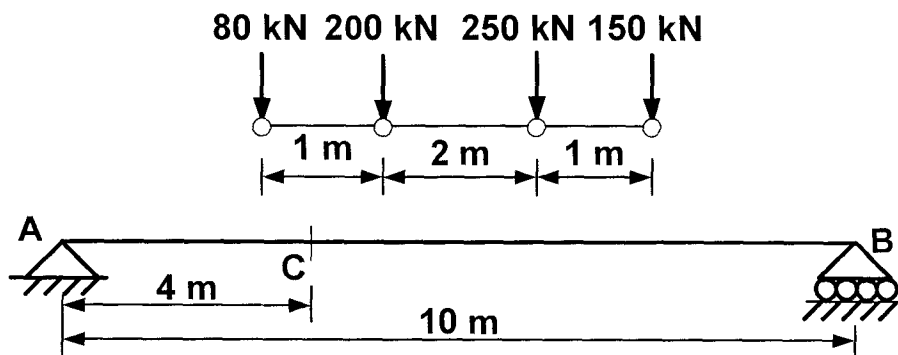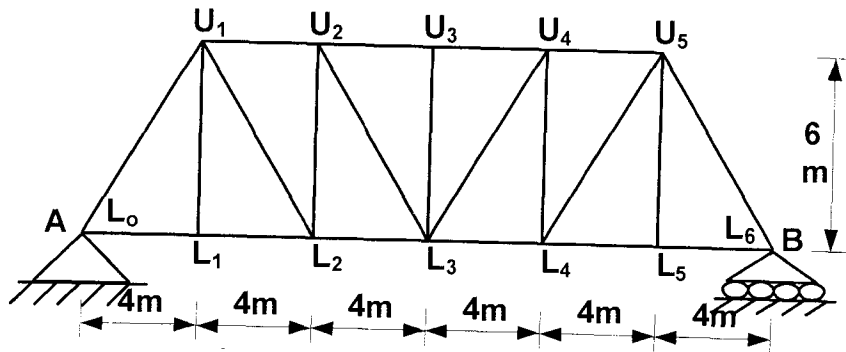
Q.5 Draw Influence Line Diagram for U_1U_2, U_1L_2, and L_1L_2 for the truss as **(10)** shown in figure.

OR

Q.5 Draw Influence Line Diagram for U_2U_3, U_2L_3, and L_2L_3 for the truss as **(10)** shown in figure.

Q.6 A three hinged parabolic arch of span 20 m, rise 5 m is subjected to **(10)** uniformly distributed load of 20 kN/m over the right half span and a point load of 20 kN at 6 m from the left support. Find the reaction at the supports. Also, find the bending moment, radial shear and normal thrust at 5 m from the left support.

OR

Q.6 A three hinged parabolic arch of span 20 m and central rise of 5 m is **(10)** subjected to uniformly distributed load of 25 kN/m over the right half span and a point load of 120 kN at left quarter span point. Find the reaction at the supports. Also, find the bending moment, radial shear and normal thrust at 8 m from the left support.

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