Con. 8139-13. **LJ-11245**

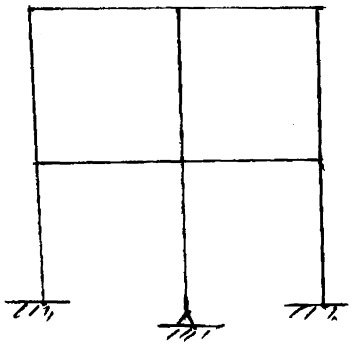
(3 Hours) **[Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** out of remaining **six** questions.
(3) Assume any suitable **data** wherever **required** but **justify** the same.

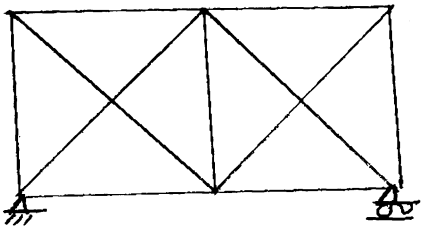
1. (a) Determine the degree of static and kinematic indeterminancy for the following structure. Neglect the axial deformations. **6**

(i)

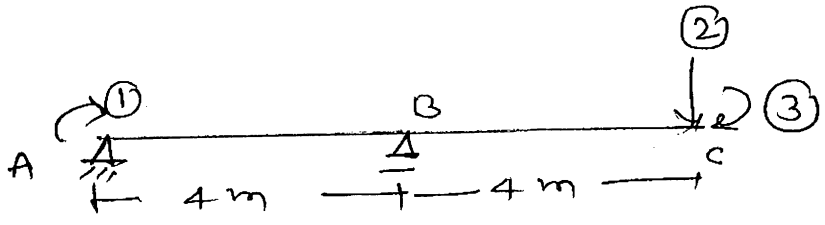
(ii)



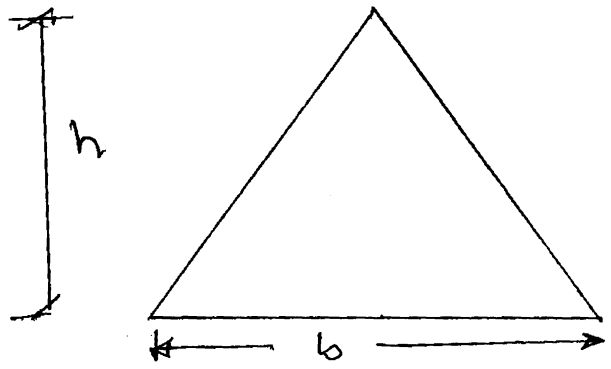
(iii)



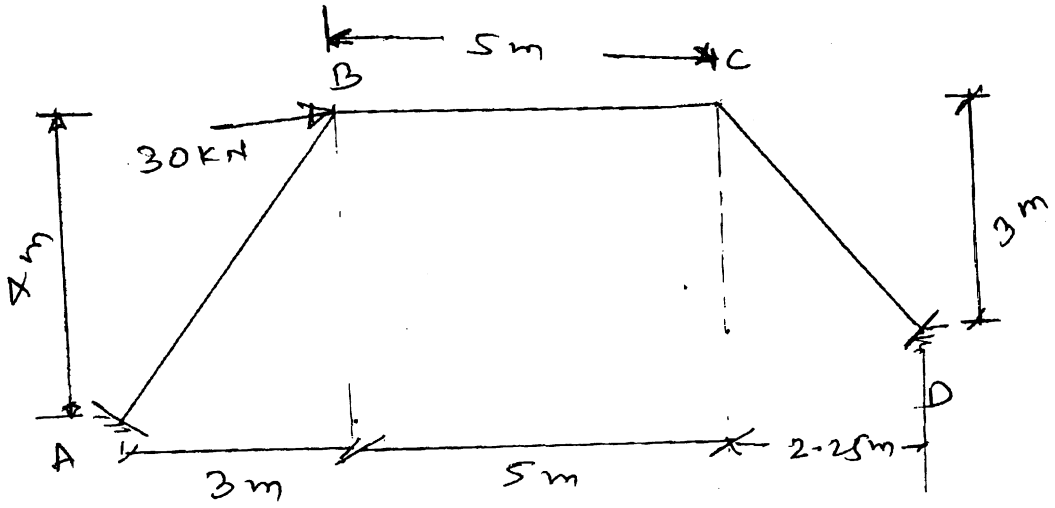
(b) Develop the flexibility matrix for the beam with respect to the co-ordinates shown in **figure** :— **6**



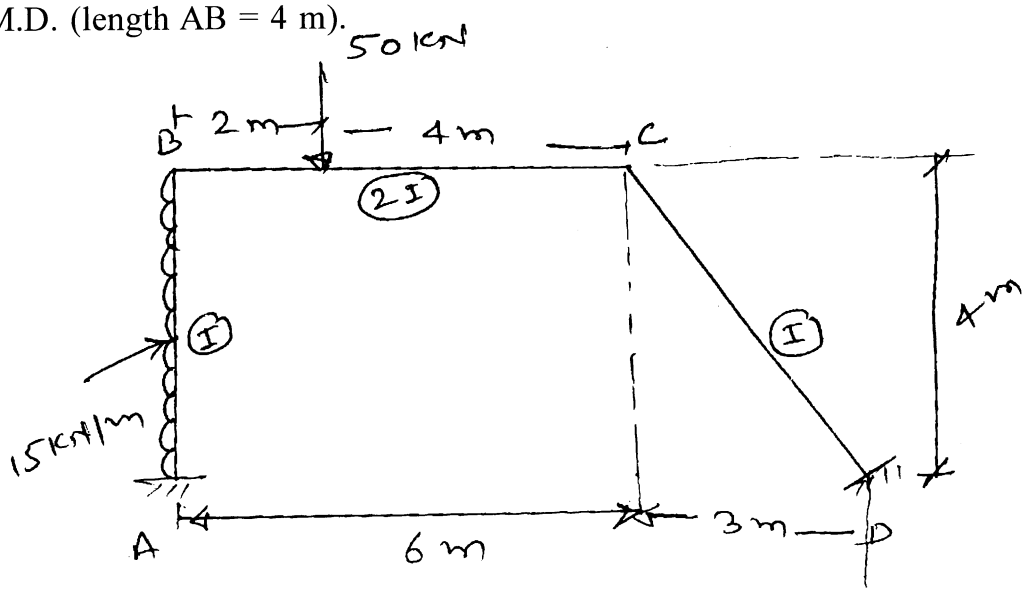
(c) Determine the shape factor for the triangular section as shown in **figure** :— **8**



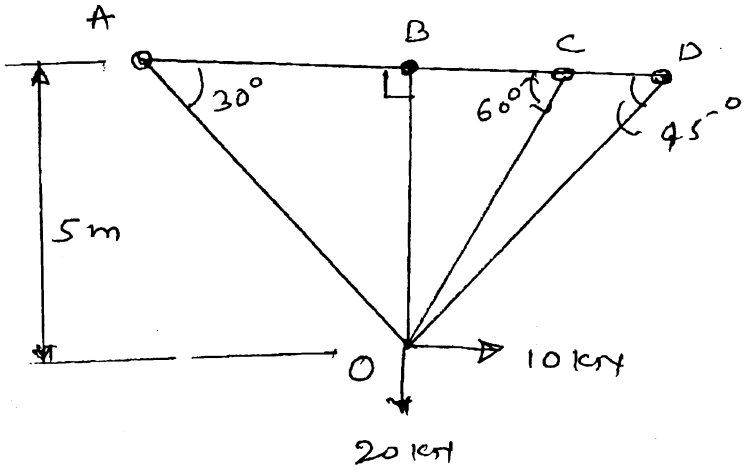
2. Analyse the structure shown in **figure** by slope deflection method and draw BMD and deflected shape. **20**



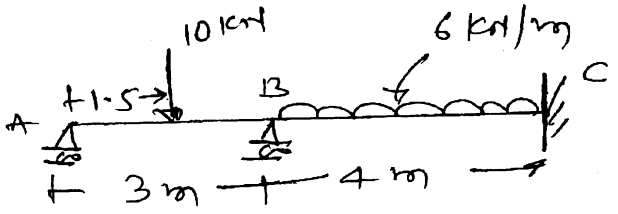
3. Analyse the frame as shown in **figure** by method of moment distribution and draw B.M.D. (length AB = 4 m). **20**



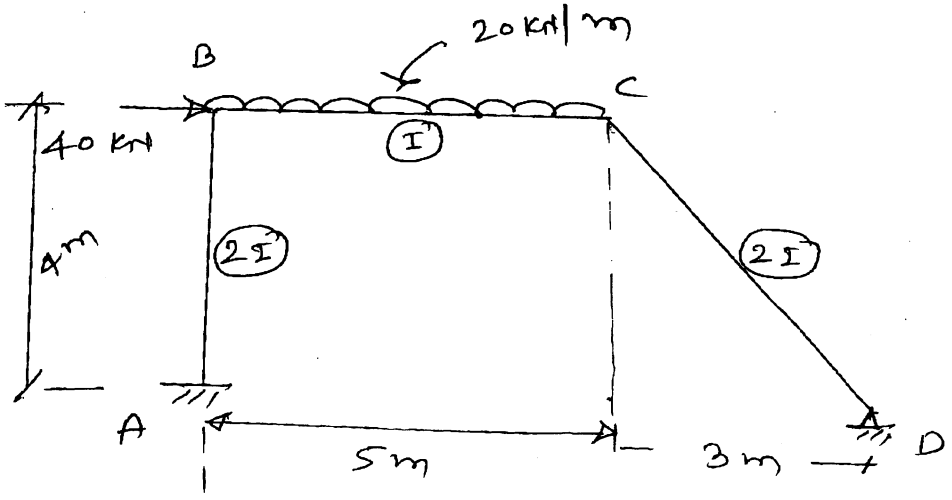
4. (a) Analyse the pin-jointed structure shown in **figure** by flexibility method the cross sectional area of each member is 20 cm^2. Take E = 2000 kN/cm^2. **12**



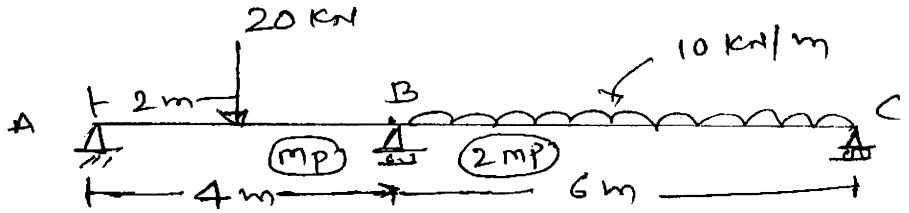
(b) Analyse the continuous beam shown in **figure** by using Stiffness method. **8**



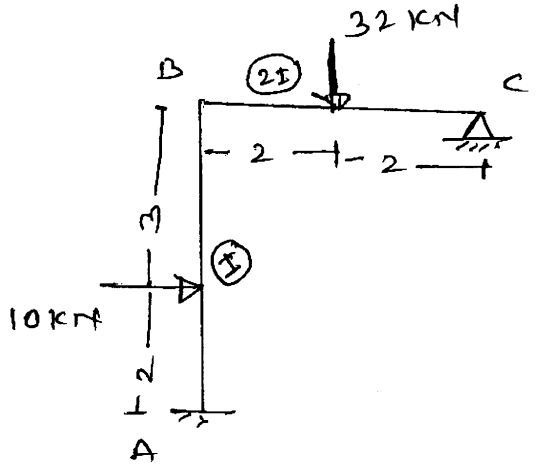
5. Analyse the frame shown in **figure** by using Force method and draw B.M.D. **20**



6. (a) Calculate the plastic moment capacity required for the continuous beam with working loads as shown in **figure**. **10**



(b) Analyse the frame as shown in **figure** using Stiffness method. Draw B.M.D. **10**



7. (a) A two hinged parabolic arch of span 20 m and rise 4 m carries two point loads, each 30 kN, acting at 5 m and 10 m from the left end respectively the moment of inertia varies as the secant of slope. Determine the horizontal thrust and maximum positive and negative moments in the arch rib. **10**

(b) Analse the continuous beam shown in **figure** by three moment theorem and draw BMD. Note the support B settles vertically down by 10 mm and EI = 1600 kN-m^2. **10**