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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2018

Program: B.Tech. (Civil Engineering)	**Semester – IV**
Subject (Course): Structural Analysis-I	**Max. Marks : 100**
Course Code :CEEG-202	**Duration : 3 Hrs**
No. of page/s: 03	

Instruction:

(i) **Solve all question from section A,B & C**
(ii) **Assume suitable data if necessary**
(iii) **Draw neat sketches whenever required**

Section A

Q1.a Derived the Three Moment Equation for Continuous Beam. **06 [CO2]**

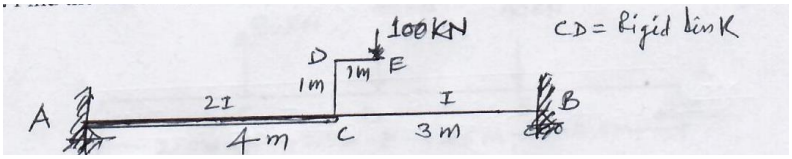
b. State Moment Area Theorems. **04 [CO1]**

Q2.a Show that for a three hinged parabolic arch carrying a uniformly distributed load over whole span, the radial thrust at any section is zero. **07 [CO2]**

b. Define Influence Lines. State the application of same in structural analysis**. 3[CO3]**

Section B (20x2=40)

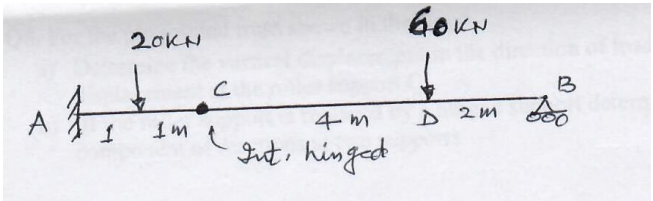
Q3 a. Find the Fixed End Moment of given beam. **08[CO2]**



b. Using Conjugate beam method , compute the following **12[CO1]**

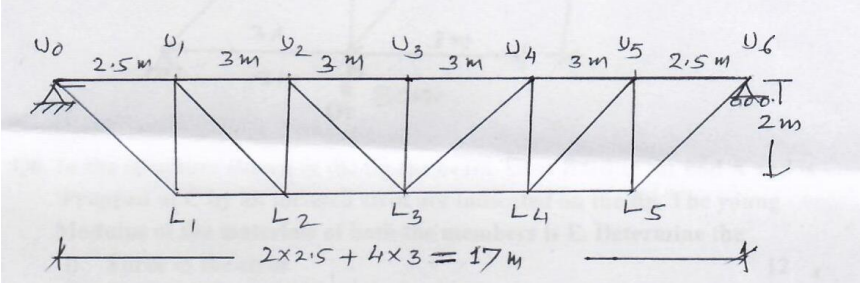
i) Slope at B and deflection at D

ii) Maximum deflection for beam loaded as shown in fig. EI is constant.

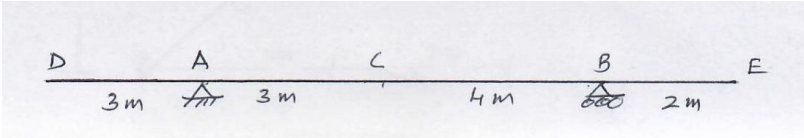


Q4 . Attempt any two **(10x2=20)**

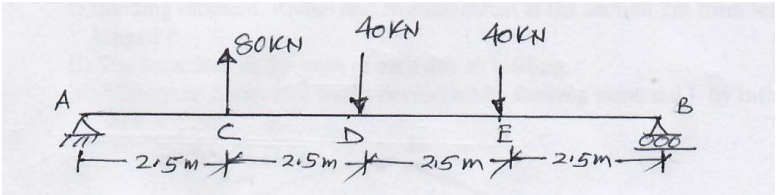
a) Construct the influence lines for the forces in the members U_2-U_3 ,L_3-L_4,U_2-L_2, and L_4-U_5 of the deck bridge truss shown in figure. **[CO3]**



b) Two wheel loads 50 kN and 20 kN spaced 2m apart with load 20kN in the lead rolls on the girder shown in the figure. Use influence lines to determine the maximum (+ve & -ve) shearing force and bending moment at the section C. The load system can move in either direction. **[CO3]**



c) Use direct integration with Macaulay's method to develop the equation of the elastic curve of the simply supported beam of constant EI and loaded as shown in fig. Also determine the position and magnitude of the maximum upward and downward deflection of the beam. **[CO1]**

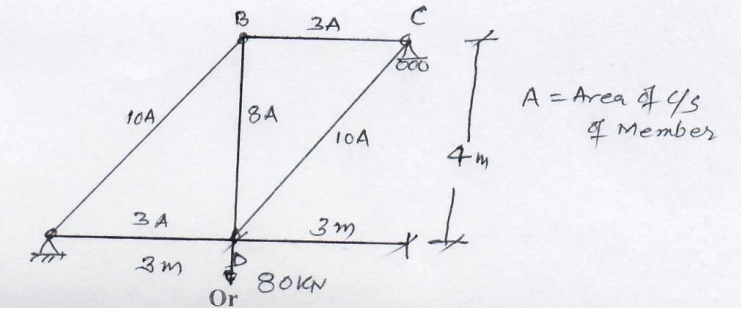


Section C

Q5. For the pin jointed truss shown in the fig **[CO1 & CO2]**

a) Determine the vertical displacement in the direction of load and horizontal displacement at the roller support C**.** **12**

b) If the roller support is replaced by a hinged support determine the horizontal component of reactions at two supports **08**



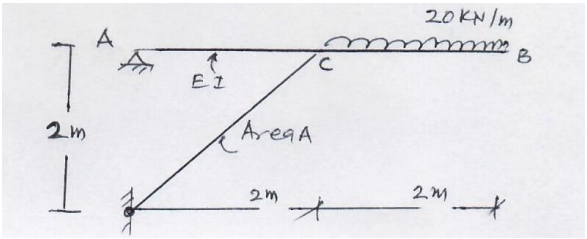
Or

Q6. In the structure shown in the fig the beam AB is fixed at the end A and is Propped at C by an inclined strut are indicated on the fig. The young Modulus of the materials of both the members is E. Determine the

i) Force in the strut **12**

ii) Vertical deflection at the point D **08**

[CO1 & CO2]



Q7. A symmetrical three hinged parabolic arch EDC of span 8m and rise 2m carries a uniformly distributed load of intensity 20kN/m on horizontal length of 3m from end E. The arch is supported on two columns AE and BC which are fixed at their bases as shown in fig. EI of columns are same.

[CO1, CO2& CO3]

Determine the

i) Bending moment, Radial and Normal thrust at the section 2m from left hinged E **08**

ii) The increased in the span of arch due to loading. **06**

iii) Maximum horizontal thrust developed by moving same u.d.l. by influence line concept. **06**