(DCE 311)

B.Tech. DEGREE EXAMINATION, MAY - 2015

(Examination at the end of Third Year)

Civil Engineering

Paper - I : STRUCTURAL ANALYSIS - I

Time : 3 Hours **Maximum Marks : 75**

Answer question No.1 compulsory ***(15 × 1 = 15)***

Answer ONE question from each unit ***(4 × 15 = 60)***

1) a) State clapeyrons theorem of three moments.

b) What is a propped cantilever?

c) Explain sinking & rotation of a support.

d) What are influence lines?

e) Define Redundancy.

f) What is a composite structure?

g) Draw BMD for a fixed beam of length 5m & carrying a UDL of 10kN/m.

h) State Maxwells reciprocal theorem.

i) Write any two applications of Castigliano's theorem.

j) Draw a simple truss.

k) Define shear force & Bending moment.

l) State Castigliano's first theorem.

m) What are the various types of beams.

n) Write two advantages of fixed beams.

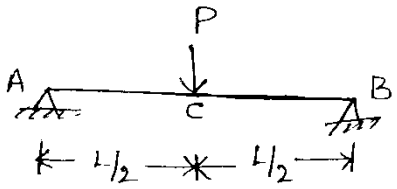
o) Define Betti's Law.

UNIT – I

2) a) State and explain Virtual Work method for deflections. **(7)**

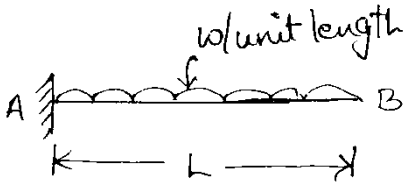
b) Using Castigliano's Second theorem find the deflections in the following cases : EI = Constant. **(8)**

i)



Find deflection at C.

ii)



Find deflection and rotation at B.

OR

3) a) Explain Maxwell – Betti's generalised reciprocal theorem. **(7)**

b) Find the deflection at the centre of the beam of span *l* carrying a varying load of Intensity 'O' at one end and W per unit length at the other end. Assume uniform flexural rigidity. **(8)**

UNIT - II

4) a) Write the importance of influence line diagrams. **(5)**

b) Draw influence line diagram for reactions at supports for a fixed beam of length *l*. **(5)**

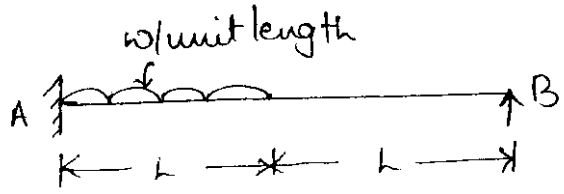
c) Write short notes on absolute bending moment. **(5)**

OR

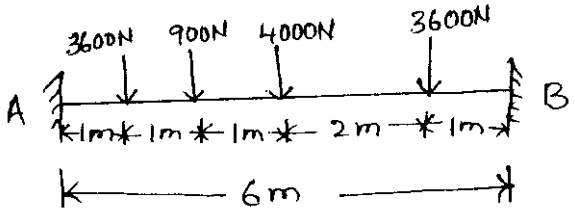
5) A girder of span 20 m carries two wheel loads 100 kN and 200 kN spaced 4m apart. They move on the girder. Find maximum & negative shear force at a section 6m from the left end. Also find BM that can occur at 10 m from the left end. Any wheel load can lead the other. Use ILD method. **(15)**

UNIT - III

6) a) For the Propped Cantilever shown find the support reaction and plot the BMD. **(8)**

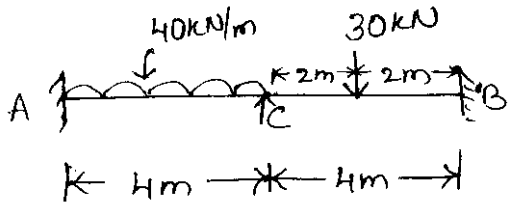


b) Find the fixed end moments and plot the SF & BMD for the beam loaded as shown in figure. **(7)**



OR

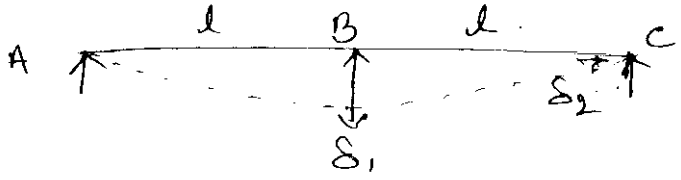
7) a) Analyse the given fixed beam by using clapeyron's theorem of three moments. **(7)**



b) Draw SFD & BMD for a fixed beam of span 4 meters, carrying a point load of 80kN from left end at 1m distance. **(8)**

UNIT - IV

8) a) A continuous beam ABC of uniform section has two equal spans AB & BC, each of length *l*. During loading support B sinks by δ_1 & support C sinks by δ_2. Find the reactions at supports in terms of δ_1, δ_2, *l* and flexural rigidity EI of the beam. **(8)**



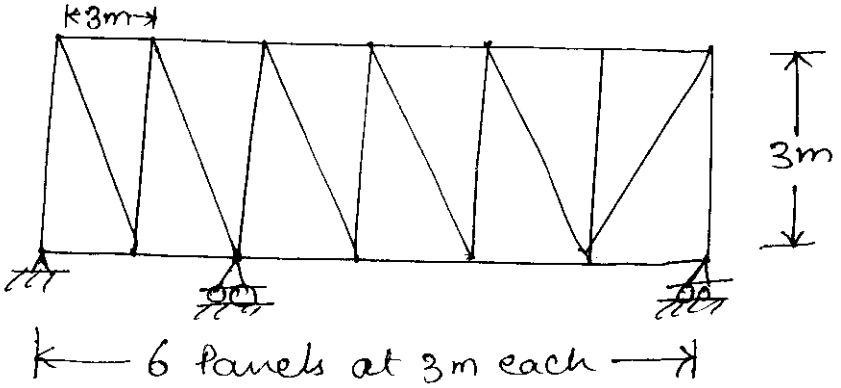
b) Write short notes on : **(7)**

i) Statically determinate structures.

ii) Statically Indeterminate structures.

OR

9) Find the forces in all the members of the flame shown. Due to vertical settlement of 1cm at support 'B'. All the members have same cross sectional area of 20 cm^2. 'E' young's modulus for all members is 2×10^5 N/mm^2. **(15)**



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