May 2017

Total No. of Questions : 8]

SEAT No. :

P3585

[Total No. of Pages : 5

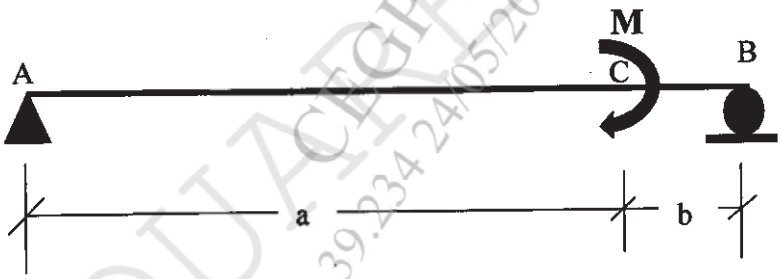
[5152]-509
S.E. (Civil) (Semester - II)
STRUCTURAL ANALYSIS - I
(2015 Pattern)

Time : 2 Hours] *[Max. Marks : 50*

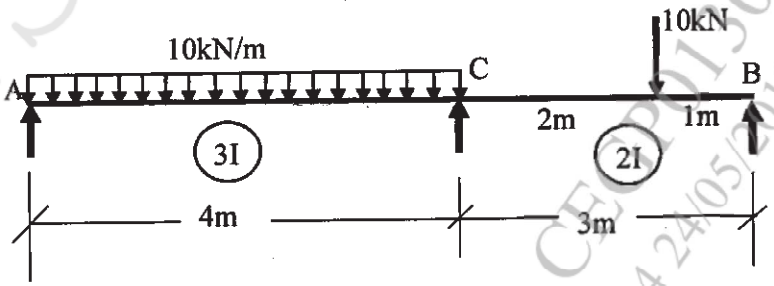
Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicates full marks.***
4) ***Assume suitable data, if necessary.***
5) ***Use of electronic pocket calculator is allowed.***

Q1) a) Derive equation to determine slope at 'A' by Macaulay's method. 'EI' is constant. [L=a+b] **[6]**



b) Analyze the continuous beam shown below by Clapeyron's theorem **[6]**



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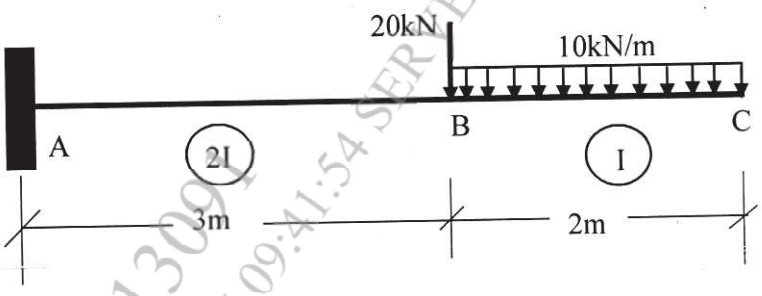
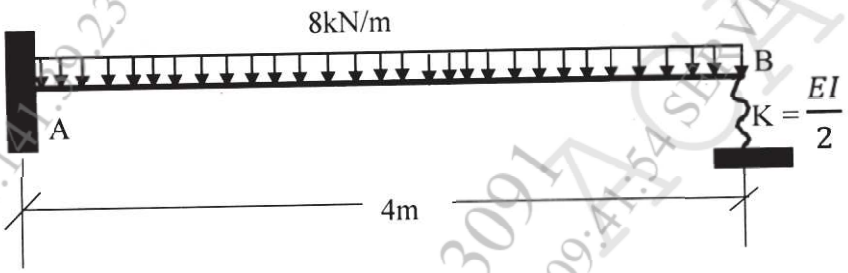
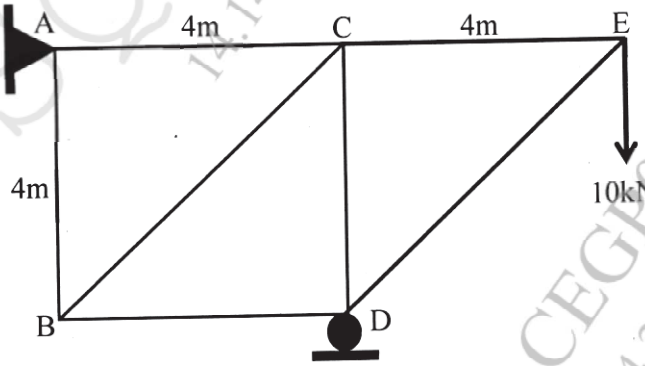
Q2) a) Find slope and deflection at point 'B' for cantilever beam by conjugate beam method **[6]**



b) Analyze the beam by Castigliano's second theorem **[6]**

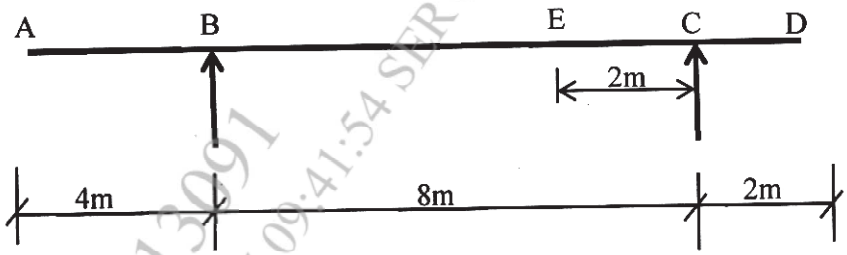


Q3) a) A pin jointed truss as shown below is loaded by a vertical load of 104kN. Find the vertical deflection of joint 'E'. The axial flexibility of all members is 0.3mm/kN. **[6]**

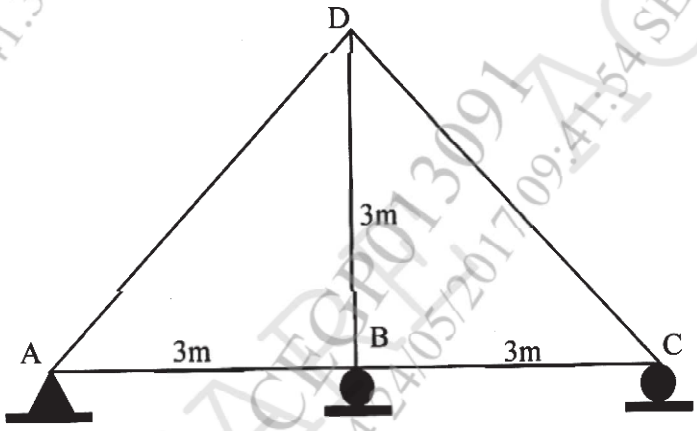


b) A beam shown below is subjected to a uniformly distributed load of 100 kN/m which may occupy any position of girder ABCD. Calculate

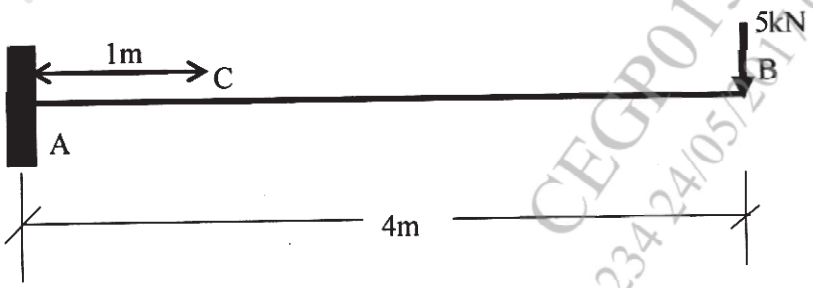
maximum positive shear force and bending moment at 'E'. **[6]**



Q4) a) Analyze the truss as shown below, if support 'B' sinks by 2mm A=400mm^2, E=2x10^{5}MPa. **[6]**



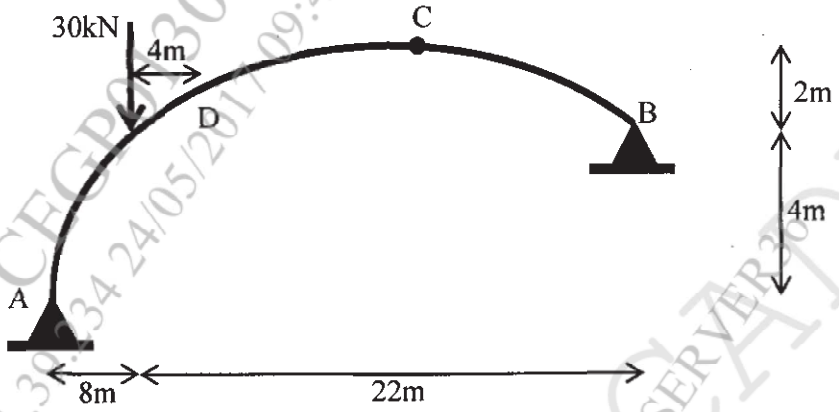
b) For the cantilever beam shown below, calculate reactions at fixed end and shear force and bending moment at 'C' by influence line diagram method. Also draw influence line diagrams **[6]**



Q5) A three hinged parabolic arch is loaded and supported as shown in figure below. Determine **[13]**

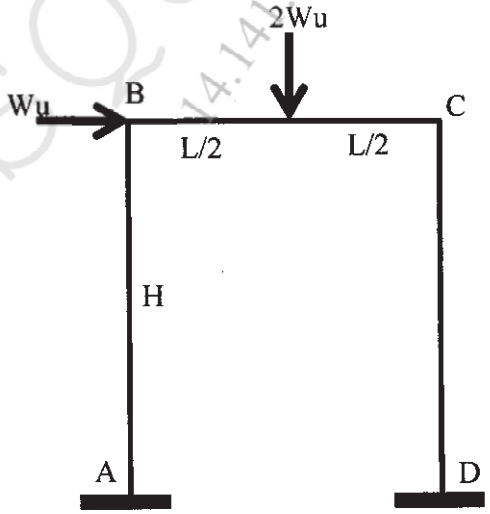
a) Support reactions

b) Normal thrust and radial shear at a distance of 12m from support 'A'.

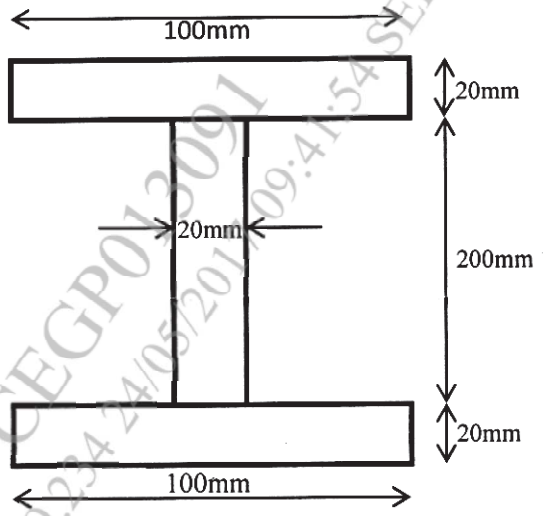


Q6) Prove $H = \dfrac{\int My d_s}{\int y^2 d_s}$ and determine horizontal thrust for concentrated load 'W' at crown of two hinged parabolic arch. **[13]**

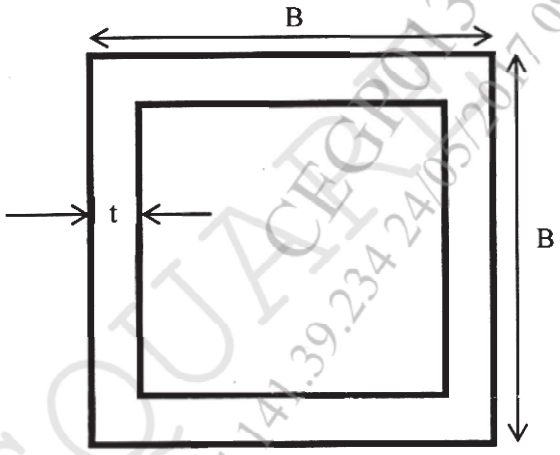
Q7) a) For the portal frame shown below draw various mechanisms possible. **[4]**



b) For the cross section of the beam shown below find the shape factor and plastic moment if permissible stress in compression and tension is 250MPa. **[9]**



Q8) a) For the cross section shown below, find the shape factor **[9]**



b) Write a note on elastic-plastic bending **[4]**