Roll No. | | | | | | | | | | |

Paper Code: MTST023

M TECH
(SEM I) ODD SEMESTER EXAMINATION 2016-17
STABILITY OF STRUCTURES

Time: 3 Hours ***Maximum Marks: 70***

Note: Attempt all questions. All questions carry equal marks.

1. Attempt any two parts of the following: (2x7=14)

a) What is meant by stability of a structure? Explain the concept with reference to the equilibrium conditions.

b) Describe the Design procedure of a plate girder of most efficient and economical size of web and flanges.

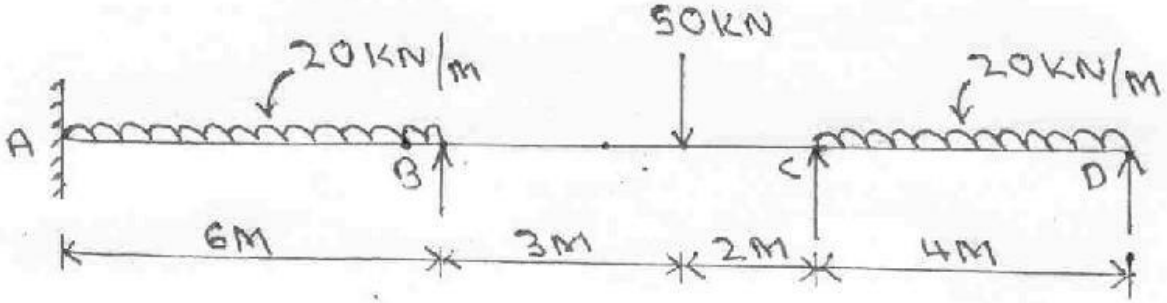
c) i) What is buckling? Write eff. length constant (k) for different end conditions.
ii)A both end cast Iron hollow cylindrical column of three meter length has a critical Buckling load of PKN .When the column is fixed at both the ends its per load rises by 300KN,if the ratio of external dia to internal dia is 1.25 and Young's Modulus Es=100GPa .Determine the external dia of column.

2. Attempt any two parts of the following: (2x7=14)

a) Determine the buckling strength of a W12 x 50 columns. Its length is 20 ft. For minor axis buckling, it is pinned at both ends. For major buckling, is it pinned at one end and fixed at the other end.

b) Determine the local buckling slenderness (b/t) limit and evaluate the W14 x74 section .Does local buckling limit the column strength?

c) Find the bending moment of the structure using moment distribution method.



3. Attempt any two parts of the following: (2x7=14)

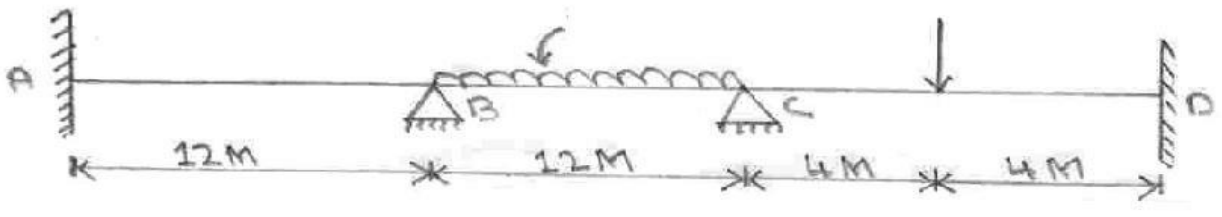
a) Explain the behaviour of a slender column subjected to concentric loading. Explain Euler's load.

b) i) Explain the role of finite element method in structural stability analysis
ii) Briefly describe torsional buckling, lateral buckling and inelastic buckling.

c) Explain Lateral Torsional Buckling of beams and derive the expression for I section.

4. Attempt any two parts of the following: (2x7=14)

a) Draw the SFD and BMD of the beam using slope deflection method.

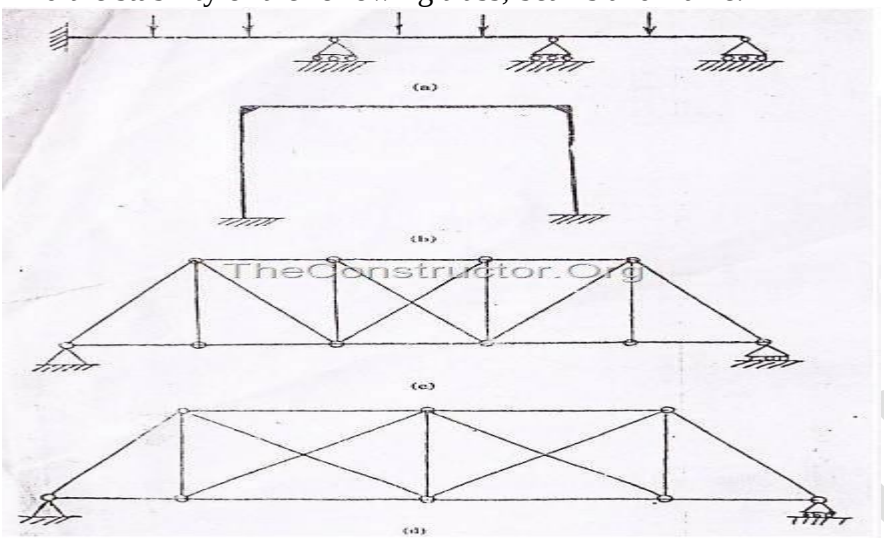


b) Discuss the stability of plates under in plane and transverse loading.

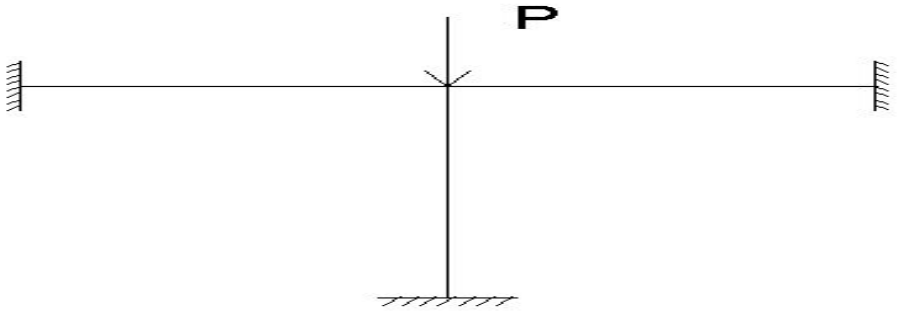
c) What is similarity between column buckling and lateral buckling of beam?

5. Attempt any two parts of the following: **(2x7=14)**

a) Find the stability of the following truss, beams and frame.



b) Compute the critical load of the frame shown in fig.1 by energy method. All Members have same EI & l.



c) Derive the expression for the maximum bending moment of a simply supported Beam of length 'l' carrying an axial compressive force 'P' and a uniformly distributed load q/ unit length.