Total No. of Questions : 6]

SEAT No. :

P3978

[Total No. of Pages : 2

[4860] - 49

M.E. (Civil) (Structure) (Semester - II)

STRUCTURAL STABILITY

(2008 Pattern) (Elective - III)

Time : 4 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Solve any two questions from each section.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of calculator is allowed.***
6) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Explain the concept of elastic stability and instability of structure with reference to the equilibrium conditions. **[10]**

b) What are the methods of stability analysis, explain one method. **[10]**

c) Explain stable and unstable equilibrium sketch appropriately. **[5]**

Q2) a) Describe the dynamic approach for column buckling with suitable example. **[10]**

b) Derive the higher order governing equation for stability of columns. Hence analyse the column with both ends hinged boundary condition. **[15]**

Q3) a) Stability of structure is an Eigen value problem. Discuss. **[10]**

b) Differentiate between elastic buckling and Inelastic buckling of columns. **[15]**

P.T.O.

SECTION - II

Q4) a) A beam column subjected to a Concentrated moment M at the mid span as shown in figure 1. Obtain the expression for maximum deflection and maximum moment. **[12]**

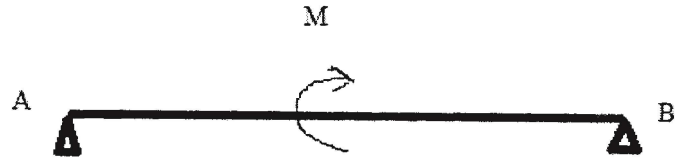

Fig.1

b) Compute the critical load of the frame shown in figure 2 by the energy method. All the members have the same EI and L. **[13]**

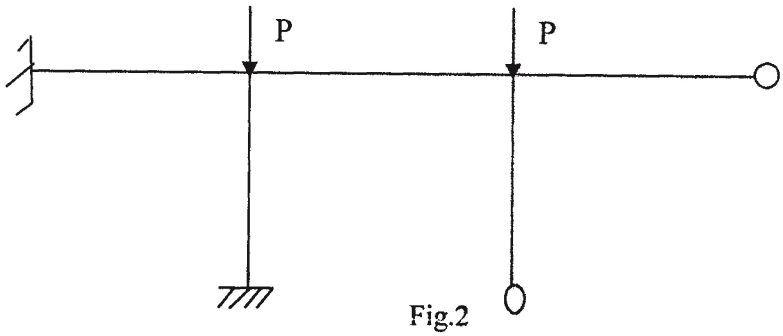

Fig.2

Q5) a) Explain the equilibrium approach for the buckling analysis of beam columns with example. **[10]**

b) With suitable sketches discuss the different modes of buckling of portal frames. **[5]**

c) Explain Finite Difference method of analysis for stability problem. **[10]**

Q6) a) Explain the role of finite element method in structural stability analysis. What is stress stiffness matrix? **[10]**

b) Derive the governing moment equilibrium equation for the buckling of a thin plate. **[15]**