Exam Slot: E

06CE6152 **Reg Number.....**
Name.....

A P J ABDUL KALAM TECHNOLOGICAL UNIVERSITY
M.TECH DEGREE EXAMINATION,MAY/JUNE 2019
SECOND SEMESTER
Computer Aided Structural Engineering
StructuralStability

Time: 3 Hrs **Maximum Marks:60**

PART A
Answer ALL Questions

1. How do you apply Galerkin method in the evaluation of critical load.

2. Differentiate between elastic instability and inelastic stability of columns.

3. Write a brief account on the energy principles in the stability analysis of frames.

4. Explain restraint torsion using a sketch.

4 x 5 marks = 20 marks

PART B

5. Deduce an expression for the critical load of a hinged-hinged column of length, l using Rayleigh-Ritz method. Assume the displacement function, $y = asin\left(\frac{\pi.x}{l}\right)$

OR

6. Define fourth order elasica. Derive an expression for the critical load of a coulmn fixed at one end and hinged at the other using this method

7. Discuss in detail different theories of inelastic buckling.

OR

8. Enumerate various modes of column failures using relevant sketches.

9. What are stability functions? Apply stability functions for obtaining critical load on a non-sway frame .

OR

10. Obtain the deflection of a beam column of length, l carrying uniformly distributed load, q per unit run and subjected to an axial compressive force, P .

11. Derive an expression for critical stress on rectangular plates under compressive stresses.

OR

12. List the significance of FEM in the computation of critical load on structural members.

4 x 10 marks = 40 marks

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A P J ABDUL KALAM TECHNOLOGICAL UNIVERSITY
M.TECH DEGREE EXAMINATION, APRIL/MAY 2018
SECOND SEMESTER
Computer Aided Structural Engineering
StructuralStability

Time: 3 Hrs **Maximum Marks:60**

PART A
Answer ALL Questions

1. Explain the relevance of stability analysis of structures.

2. Why is stability an Eigen value problem?

3. Write brief notes on the stability analysis of frames.

4. Explain St. Venants torsion and warping torsion with sketches.

4 x 5 marks = 20 marks

PART B

5. Under what conditions large deflection theory in stability becomes important? Explain this theory for the determination of critical load in detail.

OR

6. Consider a column of length, land flexural rigidity, EI under hinged-hinged conditions. Estimate the critical load on this column using moment equilibrium method and compare the results using energy method.

7. Write brief notes on structural behavior of columns and the modes of failures encountered by them. Explain using relevant sketches.

OR

8. What do you mean by inelastic stability of columns? Support your arguments with appropriate theories.

9. Obtain an expression for the maximum deflection and subsequently the procedure for the determination of critical load on a simply supported beam column of length l and carrying a uniformly distributed load of q per unit run.

OR

10. Formulate the stiffness matrix and explain the procedure for obtaining critical load for the non-sway frame as shown in Fig.1. The members AB, BC, CD and BE each has a length, l and a flexural rigidity, EI.

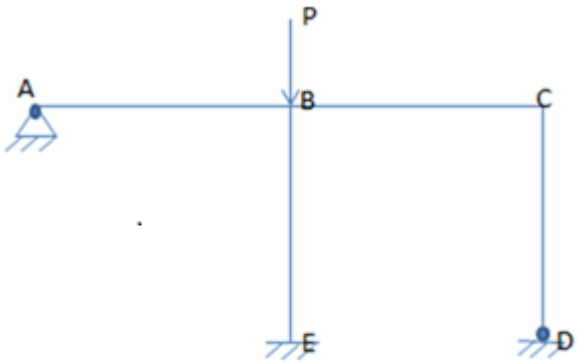


Fig. 1

11. Obtain the critical stress on very long rectangular plates under compressive loads.

OR

12. Enumerate the advantages of Finite Element Method in the stability analysis of structures also explain conforming and complete elements in FEM.

4 x 10 marks = 40 marks

EXAM SLOT : E

06CE6152 **Reg. No _____**

Name _____

A P J ABDUL KALAM TECHNOLOGICAL UNIVERSITY

M.TECH DEGREE EXAMINATION, MAY 2017

SECOND SEMESTER

Branch: COMPUTER AIDED STRUCTURAL ENGINEERING

STRUCTURAL STABILITY

Time: 3 Hours **Max. Marks: 60**

PART A

Answer ALL questions

1. Explain instability of columns
2. Briefly explain Galerkin's method of analysis and its limitations.
3. Explain buckling of frames
4. Discuss the use of finite elements for linearized stability analysis of beams and plates.

(4 x 5 marks =20 marks)

PART B

5. Derive the higher order governing equation for stability of columns. Hence analyse the column with one end clamped and other hinged boundary condition.

OR

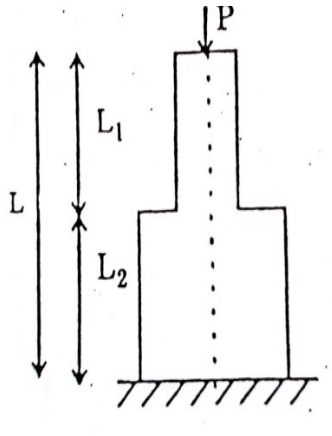
6. Briefly describe the analytical approaches of stability analysis.

7. Discuss the procedure of evaluating buckling load of columns by energy method.

OR

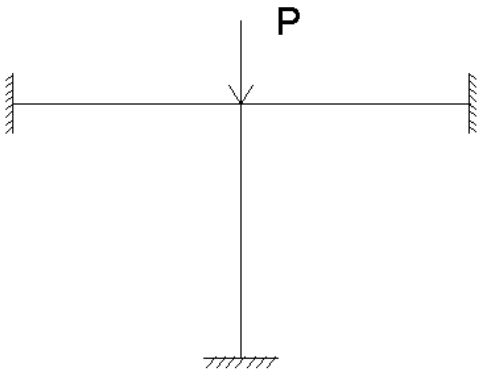
8. Evaluate the critical load of a clamped simply supported column by Rayleigh- Ritz method

9. Evaluate the critical load of the stepped column shown in figure by Galerkin's method.Moment of Inertia of one section is double that of other.



OR

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



11. Discuss the stability of plates under inplane and transverse loading.

OR

12. (a) Briefly describe torsional buckling, lateral buckling and inelastic buckling(5marks)

(b) Explain the role of finite element method in structural stability analysis.(5marks)

(4 x 10 marks =40 marks)

EXAM SLOT: E

06CE6152

Reg. No _____

Name _____

A P J ABDUL KALAM TECHNOLOGICAL UNIVERSITY

M.TECH DEGREE EXAMINATION, MAY 2016

SECOND SEMESTER

Branch: Civil Engineering

Structural Stability

Time: 3 Hours **Max. Marks: 60**

PART A

Answer ALL questions

1. Explain the relevance of stability analysis of structures.
2. Why is stability an Eigen value problem?
3. Prove that linear superimposition of compressive and bending loads is not applicable in beam columns.
4. Explain St. Venant's torsion and warping torsion with sketches

(4 x 5 marks =20 marks)

PART B

5. Under what conditions large deflection theory in stability becomes important? Explain this theory for the determination of critical load in detail.

OR

6. Consider a column of length 'l'and flexural rigidity, 'EI' under hinged-hinged conditions. Estimate the critical load on this column using moment equilibrium method and compare the results using energy method.
7. (a) Write brief notes on structural behavior of columns.
   (b) What are the types of failures encountered in columns? Explain.

OR

8. What do you mean by inelastic stability of columns? Support your arguments with appropriate theories.

9. Obtain an expression for the maximum deflection and subsequently the procedure for the determination of critical load on a simply supported beam column of length 'l' and carrying a uniformly distributed load of 'q' per unit run.

OR

10. Formulate the stiffness matrix and explain the procedure for obtaining critical load for the non-sway frame as shown in Fig.1. The members AB, BC, CD and BE each has a length, 'l'and a flexural rigidity, 'EI'.

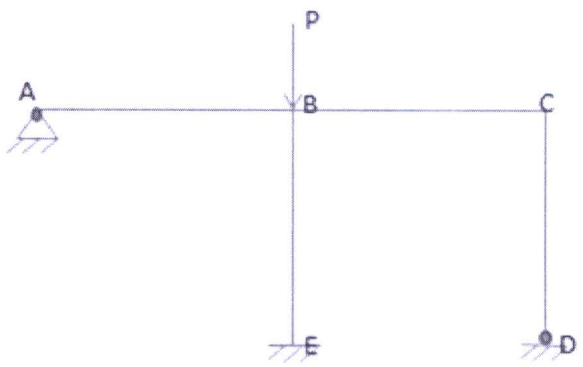


Fig. 1

11. Obtain the critical stress on very long rectangular plates under compressive loads.

OR

12. Enumerate the advantages of Finite Element Method in the stability analysis of structures alsoexplain conforming and complete elements in FEM.

(4 x 10 marks =40 marks)

EXAM SLOT : E

06CE6152 **Reg. No _____**

Name _____

A P J ABDUL KALAM TECHNOLOGICAL UNIVERSITY

M.TECH DEGREE EXAMINATION,MAY 2015

SECOND SEMESTER

Branch: COMPUTER AIDED STRUCTURAL ENGINEERING

STRUCTURAL STABILITY

Time: 3 Hours **Max. Marks: 60**

PART A

Answer ALL questions

1. Explain instability of columns
2. Briefly explain Galerkin's method of analysis and its limitations.
3. Explain buckling of frames
4. Briefly discuss inelastic buckling of beams and columns

(4 x 5 marks =20 marks)

PART B

5. Discuss about the concept of stability of structures with reference to the equilibrium conditions

OR

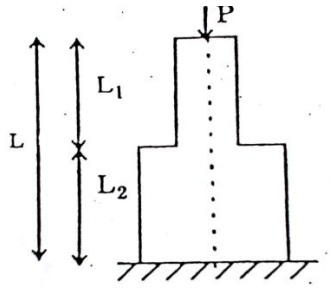
6. Briefly describe the analytical approaches of stability analysis.

7. Stability of structure is an eigen value problem. Discuss

OR

8. Evaluate the critical load of a cantilever column by Rayleigh- Ritz method

9. Evaluate the critical load of the stepped column shown in figure by Galerkin's method



OR

10. Explain the equilibrium approach for the buckling analysis of beam column with examples

11. Discuss the stability of plates under inplane and transverse loading.

OR

12. Derive the geometric stiffness matrix of a beam element.

(4 x 10 marks =40 marks)