

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER M. TECH. DEGREE EXAMINATION, DECEMBER 2016

CIVIL ENGINEERING

10CE7111 STABILITY OF STRUCTURES

Max. Marks : 60

Duration:3 Hrs

Part A

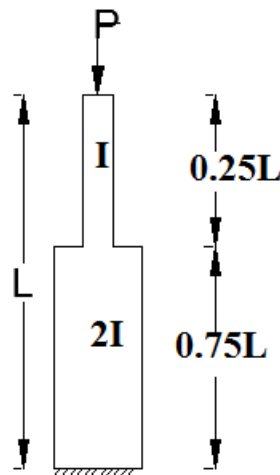
(Answer any *two* questions : $2 \times 9 = 18$ Marks)

1. Discuss the effective length concept of axially loaded columns. 9 marks
2. What are assumptions and limitations of Eulers theory. 9 marks
3. What is Elastica. Explain large deformation theory of columns. 9 marks

Part B

(Answer any *two* questions : $2 \times 9 = 18$ Marks)

1. Discuss importance of energy principles in analysis of stability problems. 9 marks
2. Derive the expression for maximum deflection of a beam column which is subjected to a concentrated lateral load at the center.. 9 marks
3. Evaluate the critical load of the stepped column shown in figure by Galerkins method.



9 marks

Part C

*(Answer any **two** questions : 2 x 12 = 24 Marks)*

1. Derive a general differential equation of plate buckling. 12 marks
2. Discuss the modes of buckling of frames. 12 marks
3. Explain instability of shells and plates. 12 marks

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER M.TECH. DEGREE EXAMINATION, DECEMBER 2017
CIVIL ENGINEERING

10CE7111: STABILITY OF STRUCTURES

Max. Marks : 60

Duration: 3 Hrs

Part A (Modules I - II)

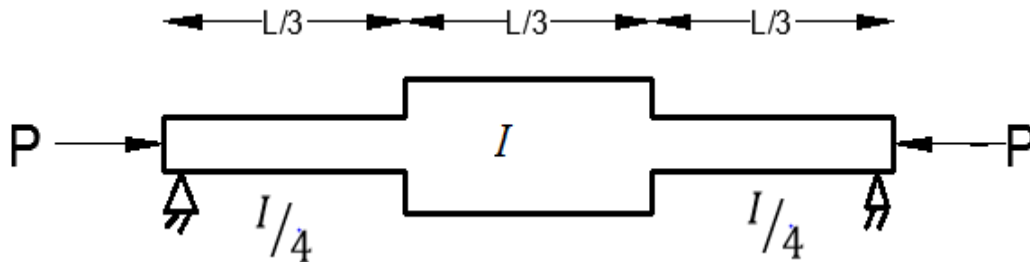
(Answer any two questions : $2 \times 9 = 18$ Marks)

1. Explain elastic instability of columns. 9 Marks
2. Find Eulers critical load for a column with fixed ends. 9 Marks
3. Explain i) Double modulus theory 9 Marks
ii) Tangent modulus theory

Part B (Modules III - IV)

(Answer any two questions : $2 \times 9 = 18$ Marks)

1. Find the critical load using Energy method. 9 Marks

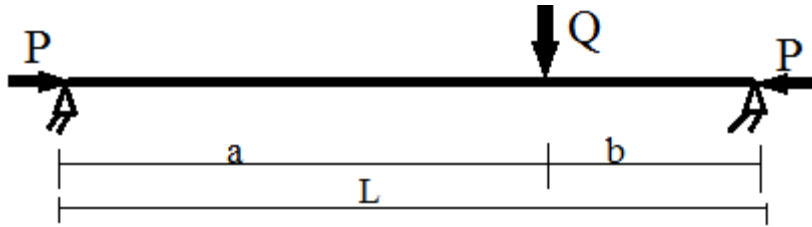


2. Consider a column in which one end is fixed and other end is hinged with an axial load P . Find the critical load using Galerkin's approach. 9 Marks

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3. What is a beam - column. A beam shown in figure carries a non concentrated load. 9 Marks

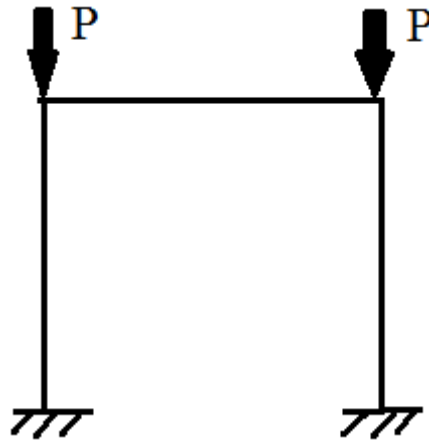
Obtain expression for maximum moment.



Part C (Modules V & VI)

(Answer any two questions : $2 \times 12 = 24$ Marks)

1. With suitable sketches discuss the modes of buckling of frames. 12 Marks
2. Determine the critical load of the portal frame with sway shown in figure using equilibrium approach. Assume EI and L same for all members. 12 Marks



3. Find the critical load of a plate uniformly compressed in one direction. All the edges of the plate are simply supported. 12 Marks

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER M.TECH. DEGREE EXAMINATION, DECEMBER 2018
CIVIL ENGINEERING
10CE7111: STABILITY OF STRUCTURES

Max. Marks: 60

Duration: 3Hrs

Part A (Modules I - II)

(Answer any two questions: 2x9 = 18 Marks)

1. What is Euler column? What are the assumption and limitations of Euler column theory?

9 Marks
2. An Aluminum material of young's modulus 70 GPa. The column built into ground has a length of 2.2 m under axial compressive load P. The cross section given as $b=210$ mm & $d=280$ mm, find
 - (i) critical load to buckle the column
 - (ii) If the allowable compressive stress in the column is 240 MPa, is the column will fail by buckling or yielding?
 - (iii) If factor of safety is 1.95 what is the allowable buckling load?

9 Marks
3. What is elastica? Explain large deformation theory of column.

9 Marks

Part B (Modules III - IV)

(Answer any two questions: 2x9 = 18 Marks)

4. Consider a column with one end fixed other end hinged. Analyse the column using Galerkin's method. Take trial function $y=A(xl^3-3lx^3+2x^4)$.

9 Marks
5. Determine the critical load for a built-up column consisting of 4 angle connected by diagonals.

9 Marks
6. Derive the expression for maximum deflection for a beam-column subjected to uniformly distributed load.

9 Marks

Part C (Modules V & VI)

(Answer any two questions: 2 x 12 = 24 Marks)

7. Explain lateral torsional buckling of beam & what are the factors affecting lateral torsional buckling. **12 Marks**
8. With suitable sketch discuss the modes of buckling of frames. **12 Marks**
9. Determine the buckling load for a rectangular plate of size (a x b) & thickness t subjected to uni-directional uniform in-plane load. All the edges of plates are simply supported. **12 Marks**

B

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER M.TECH. DEGREE EXAMINATION, DECEMBER 2019

COMPUTER AIDED STRUCTURAL ENGINEERING

10CE7111 STABILITY OF STRUCTURES

Max. Marks: 60

Duration:3Hrs

Part A (Modules I - II)

(Answer any two questions:2x9 = 18 Marks)

1. Find the critical load for column with one end fixed and other end hinged using higher differential equation. 9 Marks
2. What is Elastica. Explain large deformation theory of columns. 9 Marks
3. Explain
 - i) Double modulus theory 4.5 marks
 - ii) Tangent modulus theory. 4.5 marks

Part B (Modules III - IV)

(Answer any two questions:2x9 = 18 Marks)

4. Discuss importance of energy principles in analysis of stability problems. 9 Marks
5. Derive the expression for maximum deflection of a beam column which is subjected to a uniformly distributed load. 9 Marks
6. Find the critical load for uniform cross-sectional cantilever column using galerkins approach. 9 Marks

Part C (Modules V & VI)

(Answer any two questions : 2 x12 = 24 Marks)

7. Derive a general differential equation of plate buckling. 12 Marks
8. With suitable sketch discuss the modes of buckling of frames. 12 Marks
9. Explain:
 - a) St. Venant torsion 6 marks
 - b) Non uniform torsion 6 Marks

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

M.Tech S3 (R,S) Exam Dec 2020

(2 Pages)

B

Reg. No.

Name:

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER M.TECH DEGREE EXAMINATION

CIVIL ENGINEERING

10CE7111: STABILITY OF STRUCTURES

Max. Marks : 60

Duration: 3 Hours

PART A (Modules I & II)

Answer any TWO full questions (2 x 9=18 Marks)

- 1 (a) Find critical load for a column with two ends fixed using fourth order differential equation. **(9 Marks)**

- 2 (a) Explain eccentrically loaded column. **(9 Marks)**

- 3 (a) What are assumptions and limitations of Eulers theory ? **(9 Marks)**

PART B (Modules III & IV)

Answer any TWO full questions (2 x 9=18 Marks)

- 4 (a) Consider a column subjected to a axial compressive load P at the two ends which is fixed at both ends. Evaluate the critical load of the column using Galerkin's method choosing $y= a/2 (1-\cos (2\pi x/l))$ **(9 Marks)**

- 5 (a) Explain effect of shear on critical Loads. **(5 Marks)**
(b) Discuss the effect of axial load on bending stiffness **(4 Marks)**

- 6 (a) Derive the expression for maximum deflection for a beam-column subjected to uniformly distributed load. **(9 Marks)**

PART C (Modules V & VI)

Answer any TWO full questions (2 x 12=24 Marks)

- 7 (a) Explain: a) St. Venant torsion (12 Marks)
b) Non uniform torsion
- 8 (a) Derive a general differential equation of plate buckling (12 Marks)
- 9 (a) Explain the tension field behaviour of Plate Girder Webs (6 Marks)
(b) Write a note on Buckling of Frames (6 Marks)
