

Name:	 UPES UNIVERSITY WITH A PURPOSE
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, Dec 2021

Course: Stability of Structures	Semester: I
Program: M.Tech. Structural Engineering	Time 03 hrs.
Course Code: CIVL 7009	Max. Marks: 100

Instructions:

(Internal choice is available for Q 6 and Q 10)

SECTION A

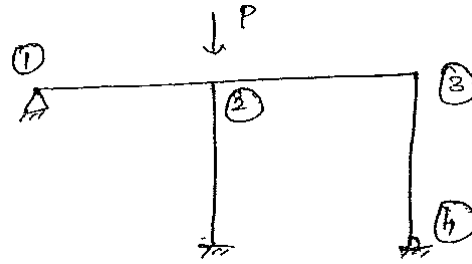
S. No.		Marks	CO
Q 1	What are the modes of buckling in frames?	4	CO3
Q 2	Draw the load vs deflection curves of eccentrically loaded columns.	4	CO1
Q 3	Why energy approach in structural analysis is considered superior to other methods?	4	CO1
Q 4	Write beam column interaction equation.	4	CO2
Q 5	Draw the typical buckling mode for a rectangular plate size “a × 3a” When it is simply supported along all edges and uni-axially compressed along the shorter edges.	4	CO4

SECTION B

Q 6	Determine the critical load of a column which is fixed at both the ends using equilibrium approach using fourth order differential equation. <p style="text-align: center;"><u>OR</u></p> Determine the critical load of a column which is hinged at both the ends using equilibrium approach using fourth order differential equation.	10	CO1
Q 7	A beam column is subjected to compressive forces at the ends in addition to moments at the two end Find the expression for a) Deflection Curve b) Max deflection c) Max Moments	10	CO2
Q 8	Find the critical load of a hinged-hinged column of length 2.5 m. The column is made with a thin walled channel section having flange with of 100 mm, mean depth of 220mm and uniform thickness of 2mm. The load is applied axially at the centroid. Take modulus of elasticity as 200Gpa and Modulus of rigidity as 80 Gpa.	10	CO2
Q 9	A Prismatic member is simply supported and subjected to combined axial force P and a transverse load of W at the midspan. Derive the equation which defines its failures criteria. The member is adequately laterally supported against lateral/weak axis buckling?	10	CO3

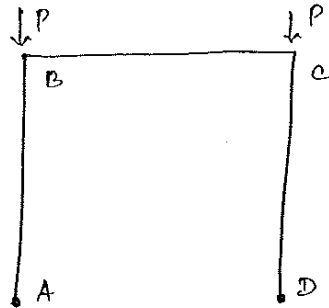
SECTION-C

Q 10	Determine the critical load of the frame	20	CO3
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OR

Determine the critical load of the frame



Q 11

Using energy method determine the critical load of a square plate of size " $a \times a$ " Whose edges are fixed and compressed by a uniformly distributed force " N " along the entire boundary.

20

CO4