Name: Enrolment No:	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2019

Course: Seismic Design of Structures — **Semester: II**
Program: M.Tech. Structural Engineering — **Time 03 hrs.**
Course Code: CIVL 7013 — **Max. Marks: 100**

Instructions: IS 1893 (Part I) :2002 must be allowed/Provided

SECTION A

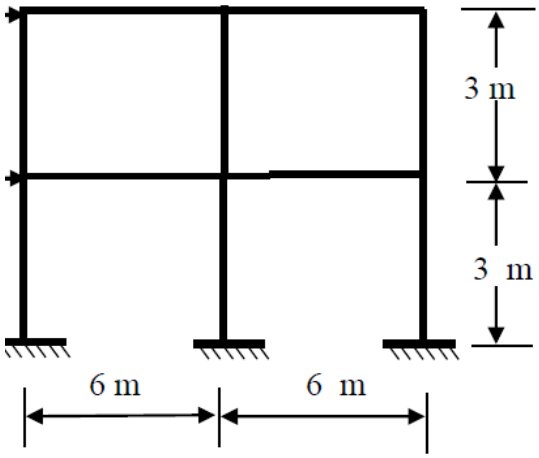
S. No.		Marks	CO
Q 1	Write a short note on Plate Tectonic Theory.	4	CO1
Q 2	Explain different type of waves in tectonic plate.	4	CO1
Q 3	How the earthquakes are classified?	4	CO1
Q 4	What are the methods available on site Modification?	4	CO4
Q 5	What are the basic concepts for ductile performance structures?	4 = 2+2	CO1 CO2

SECTION B

Q 6	Explain Retrofitting techniques with examples.	10	CO4
Q 7	Calculate base shear for one story residential building contains 6 columns.	10= 5+5	CO1 CO2
Q 8	Explain soft storey & discuss its performance of soft storey building in past earthquakes. How will you avoid soft storey?	10	CO2
Q 9	Write design steps for exterior column with limiting values.	10	CO2

SECTION-C

Q 10	A 3 storey building need to be designed. Storey height is 3m. Location: Dehradun. Calculate Loads on the structure by Equivalent Static Method Live load = 2 kN/m^2 Assume Necessary data if required	20	CO2 Or CO3

	 OR Calculate Loads on the same structure by Response spectrum Method		
Q 11	A. Sketch and describe a RCC Column showing qualitative ductile detailing. B. Sketch and describe a RCC beam showing qualitative ductile detailing.	**20= 10+10**	**CO1 CO2**

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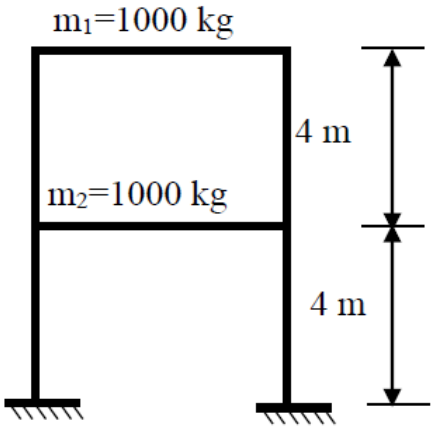
SECTION A

S. No.		Marks	CO
Q 1	Explain Epicenter and focus with help of neat sketch.	4	CO1
Q 2	What are the types of Body waves and surface waves?	4	CO1
Q 3	Compare Magnitude and Intensity of an earthquake.	4	CO1
Q 4	Write a short note on Push over analysis.	4	CO3
Q 5	Mention the different Variable affecting sectional ductility.	4	CO2
	SECTION B		
Q 6	Explain Retrofitting techniques for a bridge pier.	10	CO4
Q 7	Explain earthquake resistant feature of masonry structure with neat sketch.	10	CO2
Q 8	Write design steps of a flexural member with limiting values.	10	CO2
Q 9	Explain the concept of base isolation. Discuss its suitability.	10	CO4
	SECTION-C		
Q 10	Plot the mode shapes for the frame shown in the figure. Take $EI_{column} = 1.0 \times 10^{12}$ Nmm, $EI_{beam} = \infty$.  OR Obtain Stiffness matrix and mass matrix for the frame. Then obtain ω matrix for the frame.	20	CO2

Q 11	Sketch and describe the following RCC Components showing qualitative ductile detailing. A. Anchorage of beam bars in an external joint B. Lap splice in beam C. Special confining reinforcement	**5+5+10=20**	**CO2**