

Name:

Enrolment No:

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, December 2019**

**Course: Structural Dynamics**  
**Program: M.Tech. Structural Engineering**  
**Course Code: CIVL 7006**

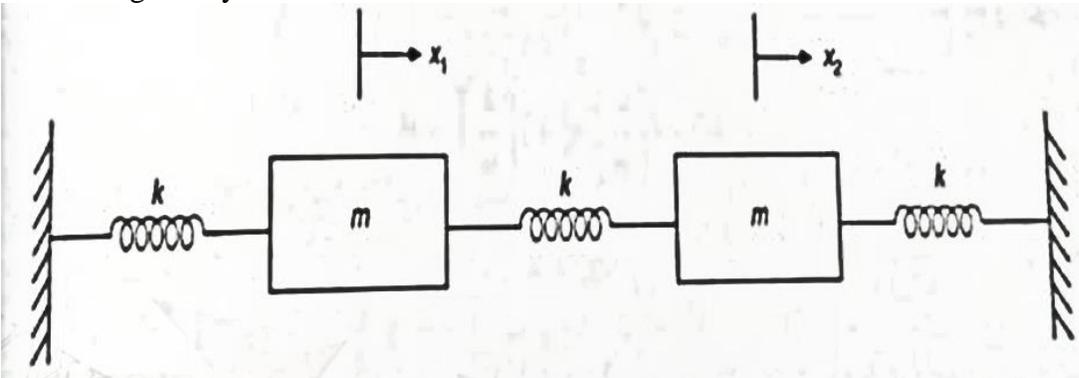
**Semester: I**  
**Time 03 hrs.**  
**Max. Marks: 100**

**Instructions:** Answer all questions of Section A, B & C  
 (Assume all the necessary data if necessary) (Internal Choice is there in Q 4-SectionB and Q 6-Section C)

**SECTION A**

S. No.		Marks	CO
Q 1	a) What is meant by forced vibration? b) Write D'Alembert's Principle of dynamic equilibrium. c) What is meant by two degree of freedom system? d) State the concept of shear building. e) Define Resonance and its effects on the structure.	4 4 4 4 4	CO1 CO1 CO2 CO2 CO1

**SECTION B**

Q 2	A cantilever beam AB length L is attached to a spring K and mass M from the equation of motion and find the expression for frequency.	10	CO1
Q 3	Determine the a) natural frequencies and b) mode shape of the given system  	10 10	CO4
Q 4	Explain "Impulse Response of SDOF system" experiment of Virtual lab. Or Explain "Behavior of Rigid Blocks" experiment of Virtual lab.	10	CO3

**SECTION-C**

Q 5	A vibrating system consist of a mass 5 kg, spring of stiffness 120 N/m and damper with damping coefficient 5 Ns/m. Determine damping factor, natural frequency of damped vibration, logarithmic decrement, ratio of two successive amplitudes, number of cycles after which initial amplitude reduced to 25%.	20	CO1
Q 6	Explain in detail about the free vibration of undamped system. (MDOF) Or Explain in detail about the damped free vibration system.	20	CO2