Total No. of Questions – [09] Total No. of Printed Pages: 02

| G.R. No. | |
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P118-152 (ESE)

**DECEMBER 2018 / END-SEM**

**F. Y. M. TECH. (MECHANICAL) (SEMESTER - I)**

**COURSE NAME: ADVANCED VIBRATIONS AND ACOUSTICS**

**COURSE CODE: MEPA11182**

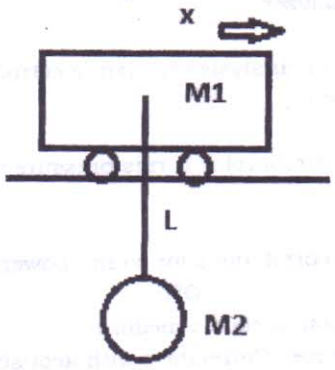
**(PATTERN 2018)**

Time: [3 Hour] [Max. Marks: 50]

**(*) Instructions to candidates:**

1) **Answer Q.1, Q.2, Q.3, Q.4 OR Q.5, Q.6 OR Q.7, Q.8 OR Q.9**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

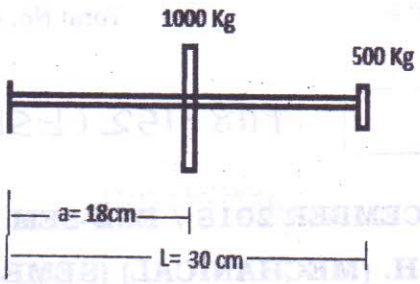
Q.1) Draw FBD and write the displacement equations of the following system [3 marks]




**OR**

b) What are different types of Damping? Determine the equation for energy dissipation in viscous damping. [3 marks]

Q.2) a) Determine the lowest natural frequency of the following system [3 marks]
Take $E=1.96\times10^{11}$ N/m and $I=4\times10^{-7}$ $m^4$




**OR**

b) Explain Matrix iteration method with suitable example. [3 marks]

Q.3) a) Write the one dimensional wave equation for longitudinal vibration of bar with neat Sketch [2 Marks]

**OR**

b) How the analysis of continuous system is different than multi degree freedon system [2 marks]

Q.4) a) Differentiate Vibration absorber and Vibration Isolators, Explain centrifugal pendulum absorber with neat sketch [6 marks]

b) Enlist different vibration exciters with its application. Describe time domain analysis of signals in detail. [8 marks]

**OR**

Q.5)a) What are the different methods to control undesirable vibrations? Explain the block diagram of FFT spectrum analyzer [6 marks]

b) What is experimental modal analysis? Explain electrodynamic and hydraulic shaker used in vibration testing. [8 marks]

Q.6) a) Calculate the sound pressure level if 1) rms pressure value is 30 μμPa.2) sound pressure level is 40 dB [6 marks]

b) Explain all mathematical correlations for sound power calculation. [8 marks]

**OR**

Q.7) a) Describe sound propagation in elastic medium. [6 marks]

b) What is acoustics Impedance? Correlate it with acoustic energy and reflection coefficient [8 marks]

Q.8) a) What are different types of masking. Explain Sound masking in detail. [6 marks]

b) Write short Notes on 1)Equal loudness levels 2) Pitch and Beats. [8 marks]

**OR**

Q.9) a) Describe mechanism of hearing and its consideration in psychoacoustics [6 marks]

b) Calculate the sound intensity level in decibels for a sound wave traveling in air having a pressure amplitude of 0.659 Pa [8 marks]