Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem.–7th & 8th)

MECHANICAL VIBRATIONS

Subject Code : ME-408

Paper ID : [A0841]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

SECTION-A

1. **Write briefly :**

a) What do you mean by vibration?

b) Define the degree of freedom of a vibrating system.

c) Differentiate between longitudinal and transverse vibrations.

d) What is semi definite system?

e) Define whirling speed of shafts.

f) What is structural damping?

g) What is the difference between a vibration absorber and vibration isolator?

h) Explain the term resonance.

i) What is orthogonality principle?

j) Write the limitations of Dunkerlay's method.

SECTION - B

2. Draw a neat sketch of centrifugal pendulum working.

3. A spring mass system has spring stiffness k N/ natural frequency of the system is 12 Hz. Wh coupled to m, the natural frequency reduces b k and m.

4. A machine of mass one tonne is acted upon 2450 N at a frequency of 1500 rpm. To reduc isolator of rubber having a static deflection of load and an estimated damping ratio of 0.2 are

(a) the force transmitted to the foundation

(b) the amplitude of vibration of machine and

(c) the phase lag.

5. A vibration of a cantilever are given by y = y frequency using Rayleigh's method using d $m = 6 \times 10^4$ kg, $l = 30$ m, and $I = 0.02$ m^4.

6. Draw a neat sketch of dry friction damper and

SECTION - C

A machine runs at 5000 rpm. Its forcing freq natural frequency. If the nearest frequency of th 20% from the forced frequency, design a suita the system. Assume the mass of the machine as

8. A bar of uniform cross-section having length l bar is subjected to longitudinal vibrations havin all points. Derive suitable mathematical expressio in the bar.

9. Write short notes on the following :

(a) Accelerometers.

(b) Eddy current damping.