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Total No. of Questions : 09] **[Total No. of Pages : 02**

B.Tech. (Sem. –7th/8th)

MECHANICAL VIBRATIONS

SUBJECT CODE : ME - 408

Paper ID : [A0841]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours **Maximum Marks : 60**

Instruction to Candidates:

1) Section - A is **Compulsory**.
2) Attempt any **Four** questions from Section - B.
3) Attempt any **Two** questions from Section - C.

Section - A

Q1) ***(10 × 2 = 20)***

a) List the possible causes of vibrations?

b) Differentiate periodic motion from simple harmonic motion.

c) Define the terms natural frequency and phase difference.

d) What do you mean by the fundamental mode of vibration?

e) Enlist the types of damping used in mechanical systems.

f) Define the term logarithmic decrement as applied to damped vibrations.

g) What do you understand by transmissibility?

h) Define the term influence coefficient.

i) Write the significance of eigen value and eigen vector?

j) Define the continuous system.

Section - B

(4 × 5 = 20)

Q2) A body is subjected to two harmonic motions given as $x_1 = 15\sin(\omega t + \frac{\pi}{6})$ and as $x_2 = 8\cos(\omega t + \frac{\pi}{3})$. What harmonic motion should be given to the body to bring it to equilibrium?

Q3) Using Rayleigh's method find the natural frequency of a cantilever beam due to its weight only.

Q4) Explain the principle of working of dynamic vibration absorber.

Q5) Explain the terms under damping, critical damping and over damping. Give the practical use of critical damping feature.

Q6) Explain the concept of a torsionally equivalent shaft.

Section - C

(2 × 10 = 20)

Q7) Write short notes on following:

(a) Accelerometer.

(b) Vibrometer

Q8) Explain the steps involved in Stodola method of determining the fundamental natural frequency of the system with the help of a suitable example.

Q9) A uniform string of length '*l*' and a large initial tension '*T*', stretched between two supports, is displaced laterally through a distance 'a_0'at the centre and is released at t = 0. Find the equation of motion for the string.

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