

6. Find expression for average power supplied to the forced oscillator by driving force. Find the condition for its maximum value and write the maximum value. What is the effect of varying the value of damping constant r on the value of maximum average power ? 5
7. Define quality factor of a forced mechanical oscillator in terms of absorption band width and derive its expression. 5
8. Discuss the variation of magnitude of velocity versus driving force frequency in forced oscillator. Show it graphically. 5

SECTION—C

9. (a) What is phase relationship between displacement and velocity in simple harmonic oscillator ?
- (b) Show graphically the variation of potential energy, kinetic energy and total energy with the displacement of a particle executing SHM.
- (c) In an oscillatory circuit $L = 0.2H$, $C = 0.0012\mu F$. What is maximum value of resistance so that circuit is oscillatory ?
- (d) What are the different methods of measuring damping effect in a damped harmonic oscillator ?
- (e) What is mechanical reactance ? What are its two constituents ?
- (f) What is absorption resonance curve ? Why is it so called ? Define absorption band width.
- (g) Write difference between forced and resonant vibrations.

5×2=10

Roll No.

Total No. of Pages : 2

PC 11442-NH

AS/2111

VIBRATIONS AND WAVES—B

Semester—I

Time Allowed : 3 Hours]

[Maximum Marks : 30

Note :— The candidates are required to attempt *two* questions each from Sections A and B. Section C will be compulsory. Attempt any *five* questions from Section C.

SECTION—A

1. Define periodic motion and simple harmonic motion. Derive differential equation for SHM. 5
2. What is Compound Pendulum ? Derive an expression for its time period. Show that centre of Suspension and centre of Oscillation are interchangeable in Compound Pendulum. 5
3. Write the equation of motion of a damped simple harmonic oscillator. Find its solution. Discuss briefly the case of light damping. 5
4. What is meant by logarithmic decrement and relaxation time of damped simple harmonic oscillator ? Deduce expression for them. 5

SECTION—B

5. Explain the steady state behavior of forced oscillator. Write its equation and find the expression for displacement. 5