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DATE :……………………………

CHAPTERS :…14 1 AND 15………………… **OSCILLATIONS & WAVES**

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SECTION-A CONCEPTUAL & APPLICATION TYPE QUESTIONS

1   list any two characteristics of simple harmonic motion

2   On what factors does the energy of a harmonic oscillator depends ?

3   A simple pendulum is inside a space-craft. What should be its time period of vibration?

4   What is the main difference between forced oscillations & resonance?

5   Glass windows may be broken by a far away explosion. Explain why.

6   Name two important properties of a material responsible for the propagation of waves through it .

7   If the pressure of a gas at constant temperature is increased four times, how the velocity of sound in the gas will be affected?

8   What are harmonics?

9   What is beat frequency?

10   What is Doppler effect in sound?

SECTION-B NUMERICAL QUESTIONS

1   The acceleration of a particle performing S.H.M. is 12 c/m^2 at a distance of 3cm from the mean position. Calculate its time-period.

2   The displacement equation for a particle executing simple harmonic motion is
        $y = 0.2 \sin 50\pi (t + 0.01)$ metre, where y is the displacement at the instant t. Calculate the amplitude, time period , maximum velocity and the displacement at the start of motion.

3   A block whose mass is 1 kg is fastened to a spring The spring has a spring constant of 50 N/m. The block is pulled to a distance x=10cm from its equilibrium position at x=0

on a frictionless surface from rest at t=0. Calculate kinetic, potential & total energies of the block when it is 5 cm away from mean position.

4 A simple harmonic wave is expressed by equation , $y = 7x\ 10^{-6} \sin (800\ \pi\ t - \pi\ x/42.5)$ where y & x are in cm & t in seconds. Calculate the following : (i) amplitude (ii) frequency (iii) wave length (iv) wave velocity , & (v) phase difference between two particles separated by 17.0 cm.

5 A metal wire of linear mass density of 9.8g/m is stretched with a tension of 10 kgwt into between two rigid supports 1m apart. The wire passes at its middle point between the poles of a permanent magnet & it vibrates in resonance, when carrying an alternating current of frequency v . Find the frequency of the alternating source.

6 A pipe 20 cm long is closed at one end. Which harmonic mode of the pipe is resonantly excited by a 430 Hz source? Will this same source be in resonance with the pipe if both ends   are open ? Speed of sound =340 m/s.

7 A tuning fork arrangement (pair) produces 4 beats/s with one fork of frequency 288 cps.   A little wax is placed on the unknown fork and it sounded again then produces 2 beats/s.What is the frequency of the unknown fork?

8 A railway engine & a car are moving on parallel tracks in opposite directions with speed of 144 kmph 72 kmph , respectively. The engine is continuously sounding a whistle of frequency 500 Hz. The velocity of sound is 340 m/s. Calculates the frequency of sound heard in the car when   (i) the car & the engine are approaching each other, (ii) the two are moving away from each other.