DPP

DAILY PRACTICE PROBLEMS

CLASS : XITH **SUBJECT : PHYSICS**

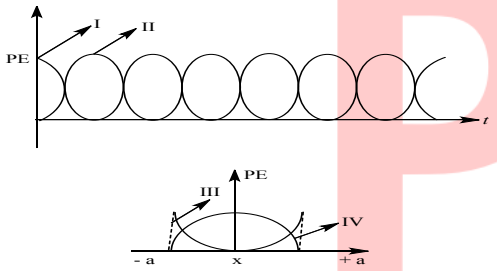
DATE : **DPP NO. : 9**

Topic :- OSCILLATIONS

1. The P.E. of a particle executing SHM at a distance x from its equilibrium position is

   a) $\frac{1}{2}m\omega^2x^2$ b) $\frac{1}{2}m\omega^2a^2$ c) $\frac{1}{2}m\omega^2(a^2 - x^2)$ d) Zero

2. For a particle executing SHM the displacement x is given by $x = A\cos\omega t$. Identify the graph which represents the variation of potential energy (PE) as a function of time t and displacement x.



   a) I, III b) II, IV c) II, III d) I, IV

3. For a particle in SHM, if the amplitude of the displacement is a and the amplitude of velocity is v' the amplitude of acceleration is

   a) va b) $\frac{v^2}{a}$ c) $\frac{v^2}{2a}$ d) $\frac{v}{a}$

4. Two pendulums have time period T and 5T/4. They start SHM at the same time from the mean position. What will be the phase difference between then after the bigger pendulum completed one oscillation?

   a) 45^0 b) 90^0 c) 60^0 d) 30^0

5. In a seconds pendulum, mass of the bob is 30 g. If it is replaced by 90 g mass, then its time period will be

   a) 1 s b) 2 s c) 4 s d) 3 s

6. The time period of a simple pendulum is 2 s. If its length is increased 4 times, then its period becomes

a) 16 s b) 12 s c) 8 s d) 4 s

7. The periodic time of a body executing simple harmonic motion is 3 s. After how much interval from time $t = 0$, its displacement will be half of its amplitude

a) $\frac{1}{8}s$ b) $\frac{1}{6}s$ c) $\frac{1}{4}s$ d) $\frac{1}{3}s$

8. For a body of mass m attached to the spring, the spring factor is given by (ω, the angular frequency)

a) m/ω^2 b) $m\,\omega^2$ c) $m^2\omega$ d) $m^2\omega^2$

9. A body of mass $1kg$ is executing simple harmonic motion. Its displacement $y(cm)$ at t seconds is given by $y = 6\sin(100t + \pi/4)$. Its maximum kinetic energy is

a) 6 J b) 18 J c) 24 J d) 36 J

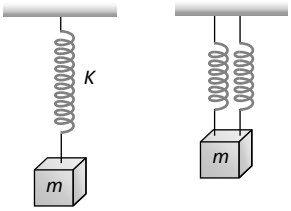
10. If a simple pendulum has significant amplitude (up to a factor of $1/e$ of original) only in the period between $t = 0s$ to $t = \tau s$, then τ may be called the average life of the pendulum. When the spherical bob of the pendulum suffers a retardation (due to viscous drag) proportional to its velocity, with 'b' as the constant of proportionality, the average life time of the pendulum is (assuming damping is small) in seconds

a) $0.693/b$ b) b c) $1/b$ d) $2/b$

11. What is time period of pendulum hanged in satellite? (T is time period on earth)

a) Zero b) T c) Infinite d) $T/\sqrt{6}$

12. A mass m performs oscillations of period T when hanged by spring of force constant K. If spring is cut in two parts and arranged in parallel and same mass is oscillated by them, then the new time period will be



a) $2T$ b) T c) $\frac{T}{\sqrt{2}}$ d) $\frac{T}{2}$

13. A particle moves so that its acceleration a is given by $a = -bx$, where x is displacement from equilibrium position and b is a non-negative real constant. The time period of oscillation of the particle is

a) $2\pi\sqrt{b}$ b) $\frac{2\pi}{b}$ c) $\frac{2\pi}{\sqrt{b}}$ d) $2\sqrt{\frac{\pi}{b}}$

14. A simple pendulum hanging from the ceiling of a stationary lift has time period t_1. When the lift moves downward with constant velocity, the time period is t_2, then

a) t_2 is infinity b) $t_2 > t_1$ c) $t_2 < t_1$ d) $t_2 = t_1$

15. A body of mass 500 g is attached to a horizontal spring of spring constant $8\pi^2$ N m^{-1}. If the body is pulled to a distance of 10 cm from its mean position, then its frequency of oscillation is

a) 2 Hz b) 4 Hz c) 8 Hz d) 0.5 Hz

16. The kinetic energy of a particle executing S.H.M. is 16 J when it is at its mean position. If the mass of the particle is 0.32 kg, then what is the maximum velocity of the particle

a) 5 m/s b) 15 m/s c) 10 m/s d) 20 m/s

17. In SHM restoring force is $F = -k\,x$, where k is force constant, x is displacement and A is amplitude of motion, then total energy depends upon

a) k, A and M b) k, x, M c) k, A d) k, x

18. To make the frequency double of a spring oscillator, we have to

a) Reduce the mass to one fourth b) Quardruple the mass
c) Double of mass d) Half of the mass

19. A particle of mass 10 g is executing simple harmonic motion with an amplitude of 0.5 m and periodic time of $(\pi/5)$ s. The maximum value of the force acting on the particle is

a) 25 N b) 5 N c) 2.5 N d) 0.5 N

20. A block whose mass is 650 g is fastened to a spring whose spring constantly is 65 Nm^{-1}. The block is pulled a distance $x = 11$ cm from its equilibrium position at $x = 0$. On a frictionless surface and released from rest at $t = 0$.The maximum velocity of the vibrating block is

a) 1.1 ms^{-1} b) 0.65 ms^{-1} c) 1.30 ms^{-1} d) 2.6 ms^{-1}