1. An oscillatory motion takes place under the action of

(a) an applied force
(b) gravitational force
(c) an elastic restoring force and inertia
(d) periodic force

2. Simple harmonic motion is a type of

(a) linear motion (b) rotational motion
(c) circular motion (d) none of these

3. In a vibratory motion, the

(a) KE of the vibrating body remains constant
(b) PE of the vibrating body remains constant
(c) total energy of the vibrating body remains constant
(d) total momentum of the vibrating body remains constant

4. In simple harmonic motion, the acceleration of a vibrating body is

(a) inversely proportional to the displacement
(b) directly proportional to the displacement
(c) directly proportional to the applied force
(d)directly proportional to the displacement and oppositely directed

5. The waveform a body executing SHM is

(a) square wave (b) sine wave
(c) circular wave (d) pulse

6. At mean position during SHM

(a) PE is maximum and KE is minimum
(b) PE is minimum and KE is maximum
(c) both KE and PE are maximum
(d) both KE and PE are minimum

7. Frequency is related to time period by

(a) $f = \frac{2\pi}{T}$ (b) $f = 2\pi T$

(c) $f = \frac{T}{2\pi}$ (d) $f = \frac{1}{T}$

8. The total energy of a body executing SHM is directly proportional to

(a) its amplitude
(b) square of its amplitude
(c) reciprocal of its amplitude
(d) square root of its amplitude

9. Two identical springs of same spring constant k and length are joined to form a single long spring. The spring constant of this spring will be

(a) 2 k (b) k

(c) $\frac{k}{2}$ (d) none of these

10. If the length of a simple pendulum increases four times, its natural frequency becomes

(a) doubled (b) four times
(c) one half (d) none of these

11. A second's pendulum is one whose time period is equal to

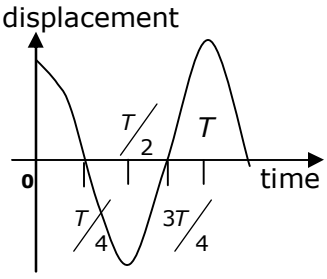
(a) 1s
(b) 2s
(c) changes from place to place
(d) none of these

12. Length of a second's pendulum at a place where g = 9.8 ms^{-2} is

(a) 1.2 m (b) 0.992 m
(c) 0.5 m (d) 2 m

13. The figure shows how the displacement of a particle describing SHM varies with time. Which one of the following statements about the particle is false?

(a) The restoring force is zero at $T/4$
(b) The velocity is maximum at $3T/4$
(c) The acceleration is maximum at $T/4$
(d) The KE is zero at $T/2$



14. Time period of a simple pendulum oscillating in vacuum depends upon

(a) mass of the pendulum
(b) length of the pendulum
(c) length and acceleration due to gravity
(d) none of these

15. The motion of a simple pendulum will be slowest

(a) at the poles (b) at the equator
(c) at the centre of Earth (d) in air

16. If the mass attached with a spring is increased, its frequency of vibration

(a) decreases (b) increases
(c) remains constant (d) none of these

17. An object is moving simple harmonically. As it moves towards the mean position, its

(a) velocity and PE increase
(b) velocity and PE decrease
(c) acceleration and PE decrease
(d) acceleration and PE increase

18. The time period of a simple pendulum is given by

(a) $T = 2\pi\sqrt{l/g}$ (b) $T = \frac{1}{2\pi}\sqrt{\frac{l}{g}}$

(c) $T = 2\pi\sqrt{\frac{g}{l}}$ (d) $T = \frac{1}{2\pi}\sqrt{\frac{g}{l}}$

19. The total energy of a body executing SHM is

(a) kx_o^2 (b) kx_o^2

(c) $\frac{1}{2}kx_o^2$ (d) $2\,kx_o^2$

20. The force responsible for vibratory motion of a simple pendulum is

(a) tension (b) $mg\sin\theta$

(c) $mg\cos\theta$ (d) mg

21. An oscillating simple pendulum comes to rest after some time because

(a) air resistance opposes its motion
(b) of air resistance and frictional forces
(c) of tension is the string
(d) of gravity.

22. The time period of a simple pendulum is independent of its

(a) length (b) mass
(c) g (d) string

23. The frequency of a vibrating mass-spring system is proportional to

(a) $\sqrt{m}$ (b) $\sqrt{km}$
(c) $\sqrt{\frac{k}{m}}$ (d) $\sqrt{\frac{m}{k}}$

24. Time period of a vibrating mass-spring system is equal to

(a) $T = 2\pi\sqrt{\frac{k}{m}}$ (b) $T = 2\pi\sqrt{\frac{m}{k}}$
(c) $T = \frac{1}{2\pi}\sqrt{\frac{k}{m}}$ (d) $T = \frac{1}{2\pi}\sqrt{\frac{m}{k}}$

25. The frequency of a second's pendulum is

(a) 2 Hz (b) 1 Hz
(c) 0.5 Hz (d) 1.5 Hz

26. SI unit of force constant is

(a) N (b) Nm^{-1}
(c) Nm (d) None of these

27. The acceleration of the projection on the diameter axis for a particle moving along a circle is

(a) $-\omega^2$ (b) $-\omega^2 x$
(c) ωx^2 (d) $-\omega^2 x^2$

28. At its extreme position, the potential energy of the simple pendulum is

(a) zero
(b) one half of the kinetic energy
(c) maximum
(d) may have any value

29. The force that provides energy to a damped oscillator is called

(a) weight
(b) damping force
(c) driving force
(d) frictional force

30. Microwave ovens produce waves of frequency

(a) 2450 kHz
(b) 245 MHz
(c) 2450 MHz
(d) 24.50 MHz

31. Periodic motion is one that

(c) is back and forth over the path
(d) under the influence of an elastic restoring force
(c) does not repeat itself
(d) repeats itself after regular intervals of times

32. Waveform of simple harmonic motion is a

(a) pulsed wave
(b) sine wave
(c) square wave
(d) stationary wave

33. The quantity describing both displacement as well as direction of motion of a vibrating body is called its

(a) angular velocity of motion
(b) phase of motion
(c) period of motion
(d) frequency of vibration.

34. The maximum velocity of a horizontal mass spring system is given by

(a) $v_o\sqrt{\frac{k}{m}}$
(b) $v_o\sqrt{\frac{m}{k}}$
(c) $x_o\sqrt{\frac{k}{m}}$
(d) $x_o\sqrt{\frac{m}{k}}$

35. A physical system undergoing forced vibrations is called

(a) damped oscillator
(b) un-damped oscillator
(c) driven oscillator
(d) ideal oscillator

36. Damping results in

(a) creation of energy (b) dissipation of energy
(c) irregular vibrations (d) neither of these

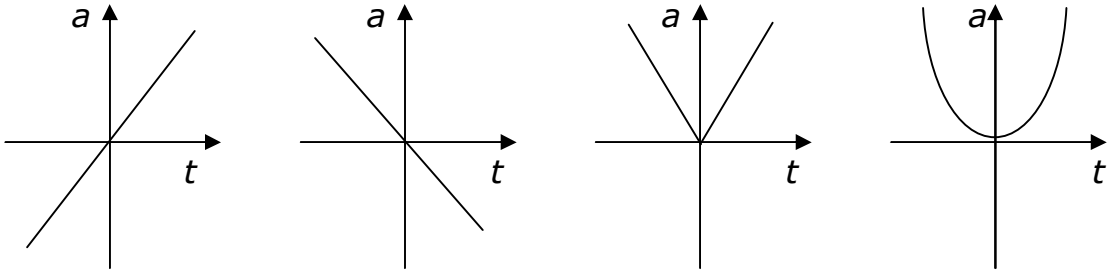
37. A heavily damped oscillator has a

(a) sharp resonance curve (b) good quality
(c) both 'a' and 'b' (d) flat resonance curve

38. The instantaneous position of an oscillator is described by the equation $x = x_0 \cos 4\pi t$. The frequency of the oscillator is

(a) 4 Hz (b) 2 Hz
(c) 0.5 Hz (d) 0.25 Hz

39. The relation between the acceleration of a body executing SHM and the displacement x of the body can be represented graphically by



(a) (b). (c) (d)

40. The velocity of a simple harmonic oscillator leads its displacement by an angle of

(a) π rad (b) $\frac{\pi}{2}$ rad
(c) 2π rad (d) zero

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