Lakshya®

CRP25

NEET CRASH 2019

DAILY TEST - PHYSICS

Time : 30 min
Marks : 120

(Simple Harmonic Oscillations, Wave Motion)

1. If a particle takes 0.5 sec to reach position of minimum velocity from the previous such position, then

1) T= 6 sec, v =1/6 Hz
2) T= 2 sec, v =1 Hz
3) T= 3 sec, v =3 Hz
4) T= 1 sec, v =1 Hz

2. The angular velocities of three bodies in simple harmonic motion are $\omega_1, \omega_2, \omega_3$ with their respective amplitudes as A1 , A2, A3. If all the three bodies have the same mass and velocity, then:

1) $A_1\omega_1 = A_2\omega_2 = A_3\omega_3$
2) $A_1\omega_1^2 = A_2\omega_2^2 = A_3\omega_3^2$
3) $A_1^2\omega_1 = A_2^2\omega_2 = A_3^2\omega_3$
4) $A_1^2\omega_1^2 = A_2^2\omega_2^2 = A_3^2\omega_3^2$

3. A simple pendulum oscillates in a vertical plane. When it passes through the mean position, the tension in the string of 3 times the weight of the pendulum bob. What is the maximum displacement of the string of the pendulum with respect to the vertical?

1) 30^0
2) 45^0
3) 60^0
4) 90^0

4. A simple pendulum is executing simple harmonic motion with a time period T. If the length of the pendulum is increased by 21%, the increase in the time period of the pendulum of increased length is

1) 10%
2) 21%
3) 30%
4) 50%

5. In a sinusoidal wave, the time required for a particular point to move from maximum displacement to zero displacement is 0.17 sec. The frequency of the wave is

1) 0.36 Hz
2) 0.73 Hz
3) 1.47 Hz
4) 2.94 Hz

6. The potential energy of a simple harmonic oscillator when the particle is half way to its end point is (where E is the total energy)

1) $\frac{1}{8}E$
2) $\frac{1}{4}E$
3) $\frac{1}{2}E$
4) $\frac{2}{3}E$

7. When a body of mass 1.0 kg is suspended from a certain light spring hanging vertically, its length increases by 5 cm. By suspending 2.0 kg block to the spring and if the block is pulled through 10 cm and released, the maximum velocity of it(in m/s) is

1) 0.5
2) 1
3) 2
4) 4

8. An object is attached to the bottom of a light vertical spring and set vibrating. The maximum speed of the object is 15 cm/sec and the time period is 628 milliseconds. The amplitude of the motion(in centimeters) is

1) 3.0
2) 2.0
3) 1.5
4) 1.0

9. Two particles A and B of equal masses are suspended from two massless springs of spring constant k1 and k2, respectively. If **maximum** velocities during oscillation are equal the ratio of amplitudes of A and B is

1) $\frac{k_1}{k_2}$
2) $\frac{k_2}{k_1}$
3) $\sqrt{\frac{k_1}{k_2}}$
4) $\sqrt{\frac{k_2}{k_1}}$

10. Which of the following functions represents a simple harmonic oscillation?

1) $\sin\omega t - \cos\omega t$
2) $\sin^2\omega t$
3) $\sin\omega t + \sin 2\omega t$
4) $\sin(\omega t - \sin 2\omega t)$

11. If the length of a pendulum is made 9 times and mass of the bob is made 4 times, then the value of time period becomes:

1) 3T
2) (3/2)T
3) 4T
4) 2T

12. A body oscillates with an amplitude of 10 cm on a horizontal platform. The maximum angular frequency with which the platform can vibrate vertically such that the body of mass 10 kg will not leave constant, is

1) 1 rad/sec
2) 10 rad/sec
3) 20 rad/sec
4) None of these

13. A simple pendulum performs simple harmonic motion about x=0 with an amplitude a and time period T. The speed of the pendulum at x = a/2 will be

1) $\frac{\pi a}{T}$
2) $\frac{3\pi^2 a}{T}$
3) $\frac{\pi a\sqrt{3}}{T}$
4) $\frac{\pi a\sqrt{3}}{2T}$

14. A particle executes simple harmonic motion with a period of 8 s and amplitude 4 cm. Its maximum speed(in cm/s) is:

1) π
2) $\frac{\pi}{2}$
3) $\frac{\pi}{3}$
4) $\frac{\pi}{4}$

15. A uniform spring of force constant (k) is cut into two pieces whose lengths are in the ratio of 1:2. What is the force constant of second piece in terms of k?

1) $\frac{k}{2}$
2) $\frac{2k}{2}$
3) $\frac{3k}{2}$
4) $\frac{4k}{2}$

16. A wave travelling in the + ve direction having displacement along y- direction as 1 m, wavelength 2^{π} m and frequency of $\frac{1}{\pi}$ Hz is represented by

1) y= $\sin(2^{\pi x - 2\pi t})$
2) y= $\sin(10^{\pi x - 20\pi t})$
3) y= $\sin(2^{\pi x + 2\pi t})$
4) y= $\sin(^{x - 2t})$

17. A uniform rope of length L and mass m1 hangs vertically from a rigid support. A block of mass m2 is attached to the free end of the rope. A transverse pulse of wavelength λ_1 is produced at the lower end of the rope. The wavelength of pulse when it reaches the top of the rope is λ_2. The ratio λ_2 / λ_1 is

1) $\sqrt{\frac{m_1}{m_2}}$
2) $\sqrt{\frac{m_1 + m_2}{m_2}}$
3) $\sqrt{\frac{m_2}{m_1}}$
4) $\sqrt{\frac{m_1 + m_2}{m_1}}$

18. Stationary waves are so called because in them:

1) There occurs no flow of energy along the wave
2) The particles of the medium do not execute SHM
3) The particles of the medium are not disturbed at all
4) The interference effect cannot be observed

19. If two tuning forks A and B are sounded together, they produce 4 beats per second. A is then slightly loaded with max, they produce beats when sounded again. The frequency of A is 256 Hz. The frequency of B will be

1) 250 Hz 2) 252 Hz

3) 260 Hz 4) 262 Hz

20. There are three sources of sound of equal intensity with frequencies 400, 401, 402 vibrations /sec. the number of beats heard per second is?

1) 0 2) 1

3) 2 4) 3

21. If $n_1, n_2, n_3 \ldots$ are the frequencies of segments of a stretched string, the frequency n of the string is given by

1) $n=n_1+n_2+n_3+\ldots$ 2) $\frac{1}{n}=\frac{1}{n_1}+\frac{1}{n_2}+\frac{1}{n_3}+\cdots$

3) $n=\sqrt{n_1 \times n_2 \times n_3 \times \ldots}$ 4) none of these

22. In a sonometer experiment, the bridges are separated by a fixed distance. The wire which may be slightly elastic emits a tone of frequency n when held by a tension T. Tension is increased to 4 T; the tone emitted by the wire will be of frequency

1) n 2) 2n

3) Slightly greater than 2n 4) Slightly less than 2n

23. A sonometer wire, 100 cm in length has a fundamental frequency of 330 Hz. The velocity of propagation of transverse waves along the wire is

1) 330 meter per second 2) 660 meter per second

3) 115 meter per second 4) 990 meter per second

24. The fundamental frequency of a string stretched with a weight of 4 kg is 256 Hz. The weight required to produce its octave is

1) 4 kg-wt 2) 12 kg-wt

3) 16 kg-wt 4) 24 kg-wt

25. In brass the velocity of longitudinal wave is 100 times the velocity of the transverse wave. If Y= 1×1011 N/m2, then stress in the wire is :

1) 1×10^{13} N/m^2 2) 1×10^{9} N/m^2

3) 1×10^{11} N/m^2 4) 1×10^{7} N/m^2

26. A tuning fork of frequency n is held near the open end of a tube which is closed at the other end and the length of the tube is adjusted until resonance occurs. If the two shortest lengths that produce resonance are L1 and L2, the speed of the sound is :

1) $n(L_2-L_1)$ 2) $n(L_2-L_1)/2$

3) $2n(L_2+L_1)$ 4) $2n(L_2-L_1)$

27. A loaded string of length one meter and weighing 0.5 gm is hanging from a tuning fork of frequency 200 Hz and is vibrating in four loops. For the transverse arrangement, the tension is :(in dyne)

1) 1.25×10^5 2) 2.5×10^5

3) 5×10^5 4) 10×10^5

28. Two strings with masses per unit length of 25 gm/cm and 9 gm/cm are joined together in series. The reflection coefficients for the vibration waves are

1) 9/25 2) 3/5

3) 1/16 4) 9/16

29. The speed of longitudinal waves in a thin brass rod is 3480 m per second. If the rod is clamped at one end and gives a fundamental frequency of 435 Hz, the length of the rod is

1) 0.5 m 2) 1.0 m

3) 2.0 m 4) 4.0 m

30. The end correction of a resonance column is 1.0 cm. If the shortest length resonating with a tuning fork is 15.0 cm, the next resonating length is:

1) 31 cm 2) 45 cm

3) 46 cm 4) 47 cm