1. A particle executes linear simple harmonic motion with an amplitude of 3 cm. When the particle is at 2 cm from the mean position, the magnitude of its velocity is equal to that of its acceleration. Then, its time period in seconds is **[NEET2017]**

(a.) $\frac{\sqrt{5}}{\pi}$ **(b.)** $\frac{\sqrt{5}}{2\pi}$ **(c.)** $\frac{4\pi}{\sqrt{5}}$ **(d.)** $\frac{2\pi}{\sqrt{3}}$

2. A body of mass **m** is attached to the lower end of a spring whose upper end is fixed. The spring has negligible mass. When the mass m is slightly pulled down and released, it oscillates with a time period of 3 s. When the mass **m** is increased by 1 kg, the time period of oscillation becomes 5 s. The value of m in kg is **[NEET2016]**

(a.) $\frac{3}{4}$ **(b.)** $\frac{4}{3}$ **(c.)** $\frac{16}{9}$ **(d.)**$\frac{9}{16}$

3. When two displacements represented by $Y_1 = \mathrm{a}\sin(\omega t)$ and $Y_2 = \mathrm{b}\sin(\omega t)$ are superimposed, the motion is **[CBSE AIPMT2015]**

(a.) not a simple harmonic.

(b.) simple harmonic with amplitude a/b .

(c.) simple harmonic with amplitude $\sqrt{a^2+b^2}$

(d.) simple harmonic with amplitude $\frac{a+b}{2}$

4. A particle is executing SHM along a straight line. Its velocity at distance X_1 and X_2 from the mean position are V_1 and V_2, respectively. Its time period is **[CBSE AIPMT2015]**

(a.) $2\pi\sqrt{\frac{x_1^2+x_2^2}{v_1^2+v_2^2}}$ **(b.)** $2\pi\sqrt{\frac{x_1^2-x_2^2}{v_1^2-v_2^2}}$ **(c.)** $2\pi\sqrt{\frac{v_1^2+v_2^2}{x_1^2+x_2^2}}$ **(d.)** $2\pi\sqrt{\frac{v_1^2-v_2^2}{x_1^2-x_2^2}}$

5. A particle is executing a simple harmonic motion. Its maximum acceleration is α and maximum velocity is β. Then, its time period of vibration will be **[CBSE AIPMT2015]**

(a.) $\frac{\alpha^2}{\beta^2}$ (b.) $\frac{\alpha}{\beta}$ (c.) $\frac{\beta^2}{\alpha}$ (d.) $\frac{2\pi\beta}{\alpha}$

6. An air column, closed at one end and open at the other, resonates with a tuning fork when the smallest length of the column is 50 cm. The next larger length of the column resonating with the same tuning fork is **[CBSE AIPMT2015]**

(a.) 100 cm **(b.)** 150 cm **(c.)** 200 cm **(d.)** 66.7 cm

7. A string is stretched between fixed points separated by 75.0 cm. It is observed to have resonant frequencies of 420 Hz and 315 Hz. There are no other resonant frequencies between for this strings is **[CBSE AIPMT2015]**

(a.) 155 Hz **(b.)** 205 Hz **(c.)** 10.5 Hz **(d.)** 105 Hz

8.The damping force on an oscillator is directly proportional to the velocity. The units of the constant of proportionality are **[CBSE AIPMT2012]**

(a.) $kg\ ms^{-1}$ **(b.)** kg ms^{-2} **(c.)** kg s^{-1} **(d.)** kg s

9. The displacement of a particle along the x-axis is given by $x = a\ sin^2\omega t$. The motion of the particle corresponds to **[CBSE AIPMT2010]**

(a.) simple harmonic motion of frequency $\frac{\omega}{\pi}$

(b.) simple harmonic motion of frequency $\frac{3\omega}{2\pi}$

(c.) Non-simple harmonic motion

(d.) simple harmonic motion of frequency $\frac{\omega}{2\pi}$

10. The period of oscillation of a mass M suspended from a spring of negligible mass is T. If along with it another mass M is also suspended, the period of oscillation will now be **[CBSE AIPMT2010]**

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

11. 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 **[CBSE AIPMT2009]**

(a.) $\frac{\pi a\sqrt{3}}{2T}$ **(b.)** $\frac{\pi a}{T}$ **(c.)** $\frac{3\pi^2 a}{2T}$ **(d.)** $\frac{\pi a\sqrt{3}}{T}$
