1. A particle is exciting SHM with a frequency of $\frac{1}{8}$Hz. If starts from the mean potion at time t=0, the ratio of distances covered by it in 1st and 2nd second is .....

1) 1 2) $1/(\sqrt{2}-1)$
3) $1/(\sqrt{3}-1)$ 4) $\sqrt{2}-1$

2. The time period of a particle in SHM is 12sec. At t=0, it is at mean position. The ratio of the distance travelled in the second and sixth second is...

1) $(\sqrt{3}-1)$ 2) $(\sqrt{2}-1)$

3) $\frac{1}{(\sqrt{2}-1)}$ 4) $\frac{1}{\sqrt{2}}$

3. A block is placed on a horizontal platform. The system is making horizontal oscillations about a fixed point with a frequency of 0.5Hz. The maximum amplitude of oscillation if the block is not to slide on the horizontal platform is (coefficient of friction between the block and the platform =0.4, $\pi^2 = g = 10ms^{-2}$)

1) 0.1m 2) 0.2m

3) 0.3m 4) 0.4m

4. A forced oscillator is acted upon by a force $F = F_0 \sin \omega t$. The amplitude of the oscillator is given by $\frac{55}{\sqrt{2w2-36w+9}}$. What is the resonant angular frequency?

1) 2units 2) 9units

3) 18units 4) 36units

5. A particle executes S.H.M. in a straight line. The maximum speed of the particle during its motion is V_m. Then the average speed of the particle during its S.H.M. is...

1) $\frac{Vm}{\pi}$ 2) $\frac{Vm}{2\pi}$

3) $\frac{2Vm}{\pi}$ 4) $\frac{3Vm}{\pi}$

6. A point of mass oscillates along the x-axis according to the equation $x = x_0\cos(\omega t - \pi/4)$. If the acceleration of the particle is written as $a = A\cos(\omega t + S)$ .....

1) $A = x_0; S = -\frac{\pi}{4}$ 2) $A = x_0\omega^2; S = \frac{\pi}{4}$

3) $A = x_0\omega^2; S = -\frac{\pi}{4}$ 4) $A = x_0\omega^2; S = \frac{3\pi}{4}$

7. The velocity of a particle executing SHM is 50%of its maximum value at an instant of time. At that moment. Acceleration is .....% of its maximum value.....

1) 50 2) 86.6

3) 75 4) 64.6

8. The displacement –time graph of a particle executing SHM is as shown in the figure. The maximum velocity of the particle is .....

1) πms^{-1} 2) $2\pi ms^{-1}$

3) $4\pi ms^{-1}$ 4) $2ms^{-1}$

9. The acceleration – displacement graph of two particles P and Q executing SHM are represented as shown in the figure. The ratio of time period of P,Q respectively is ...

1) $\sqrt{3}$:1 2) 1: $\sqrt{3}$

3) 3 : 1 4) 1 : 3

10. The slope of $l - T^2$ graph of a simple pendulum on the earth is nearly (l is measured in meters and T in seconds).....

1) $tan^{-1}(4)$ 2) $tan^{-1}(2)$

3) $tan^{-1}(\sqrt{2})$ 4) 45^0

11. A cubical body of mass 'm' and cross-sectional area 'A' is floating in a liquid of density 'σ'. It starts oscillating when it is pressed inside water and released. The time period of oscillation will be...

1) $2\pi\sqrt{\frac{m}{A\sigma g}}$ 2) $2\pi\sqrt{\frac{mg}{A\sigma}}$

3) $2\pi\sqrt{\frac{m}{3A\sigma g}}$ 4) $2\pi\sqrt{\frac{A\sigma}{mg}}$

12. A body executes S.H.M with a period of 11/7 sec and an amplitude of 0.025m. The maximum value of the acceleration is -------- m/s^2 .

1) g 2) $-4\pi^2v^2d$

3) $-2\pi^2 v^2 d$ 4) $\frac{2\pi^2 v^2 d}{M}$

13. Due to some force F_1 a body oscillates with period $\frac{4}{5}$s, and due to other force F_2 it oscillates with period $\frac{3}{5}$s If both the forces act simultaneously new period will be .....

1) 0.72s 2) 0.64s

3) 0. 48s 4) $0.36s$

14. The bob of a simple pendulum is displaced from its equilibrium position 'O' to a position 'Q' which is at a height 'h' above Q and then bob is released. Assuming the mass of the bob to be 'm' and time period of oscillation to be 2.0s, the tension in the string when the bob passes thorough 'O' is ....

1) $m(g+2\pi^2 h)$ 2) $m(g+\pi^2 h)$

3) $m(g+\frac{\pi^2}{2} h)$ 4) $m(g+\frac{\pi^2}{3} h)$

15. A body of mass 15g oscillates about a fixed point with SHM of amplitude 8cm. If the body is attracted towards the fixed point, when at a distance of 4cm from it with a force equal to the weight of 10g, the period of oscillation of the mass about the fixed point is nearly...

1) 5 s 2) 7 s

3) 9 s 4) 1 s

16. The mass and diameter of a planet are twice those of earth. The period of oscillation of a pendulum on this planet if it is a seconds pendulum on the earth is...

1) $2\sqrt{3}s$ 2) $2\sqrt{2}s$

3) 2s 4) 4s

17. The time periods of oscillation of two simple pendulums are 1sec, 1.2 sec. Initially both are in same phase of oscillation. The minimum number of oscillations made by the longer pendulum when they are again in same phase is...

1) 5 2) 6

3) 10 4) 12

18. Two simple pendulums of length 100m and 121m start swinging together. They will swing together again after.....

1) The longer pendulum makes 10 oscillations

2) The shorter pendulum makes 10 oscillations

3) The longer pendulum makes 11 oscillations

4) The shorter pendulum makes 20 oscillations

19. Two simple pendulums of lengths of 100cm and 196cm are in phases at the mean position at a certain time. If T is the time period of shorter pendulum, the minimum time after which they will be again in phase...

1) 2.5 T 2) 3.5 T

3) 5 T 4) 7T

20. Two pendulums with lengths 1.44m and 1m start oscillating simultaneously. After how many oscillations of longer pendulum will they be in the same phase?

1) 2 2) 3 3) 4 4) 5