PHYSICS

BOOKS - R G PUBLICATION

OSCILLATIONS

Exercise

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1. At what position, velocity of a particle in SHM is maximum?

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2. What is resonance?

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3. What is the unit of spring constant?

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4. Find the expression of time period of a simple pendulum of length l.

5. A mass m attached to a spring oscillates with a period of 2 seconds. If the mass is increased by 2 kg, the period increases by one second. Find the mass m.

6. Prove that the sum of potential and kinetic energies of a body in SHM is constant

7. Show that the motion of a loaded spring is simple harmonic. Find an expression for its time period.

8. Distinguish with illustrations between free and forced oscillations. What is a resonance?

9. Prove that the sum of potential and kinetic energies of a body in SHM is constant

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10. Calculate the potential energy in a spring.

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11. Deduce the expression for velocity, acceleration and time period of a particle

executing a S.H.M.

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12. Define a simple harmonic motion.

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13. What is phase in periodic motion?

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14. What is the difference between periodic motion and oscillatroy motion.

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15. In a simple harmonic motion at what position the acceleration becomes zero.

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16. At what position, velocity of a particle in SHM is maximum?

17. What is second pendulum?

18. What is the phase constant between displacement and acceleration in SHM.

19. Write the general standard equation of SHM.

20. What is the graphical representation of SHM?

21. How force is related with displacement in SHM?

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22. A particle has maximum velocity 100 cm/sec. and maximum acceleration $157cm/\sec^2$ and particle is an SHM. What is the time period.

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23. The time period of SHM is 8 sec. At what time from mean position kinetic energy becomes half of its potential energy.

24. A SHM is represented by y = 10 sin $\left(10t - \dfrac{\pi}{6}\right)$ metres. Calculate its frequency, time period, maximum velocity and maximum acceleration.

25. If an SHM the velocity of a particle is u_1 and u_2 from the mean position x_1 and x_2 shwo that time period $T = 2\pi\sqrt{\dfrac{x_2^2 - x_1^2}{u_1^2 - u_2^2}}$.

26. A mass m attached to a spring oscillates with a period of 2 seconds. If the mass is increased by 2 kg, the period increases by one second. Find the mass m.

27. The acceleration due to gravity on the surface of a moon is $1.7ms^{-2}$. What is the time period of simple pendulum on the surface of moon if the time period on surface of earth in 3.5 sec.

28. A body is SHM with an amplitude 5cm and period of 2sec. Find the acceleration and

velocity of the body when the displacement is

5 cm

29. A body is SHM with an amplitude 5cm and

period of 2sec. Find the acceleration and

velocity of the body when the displacement is

2cm

30. A body is SHM with an amplitude 5cm and period of 2sec. Find the acceleration and velocity of the body when the displacement is 0 cm

31. Calculate the expression of velocity $V = \omega\sqrt{a^2 - y^2}$. In SHM.

32. Show that is SHM force is directly proportional to the displacement.

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33. Establish the relation $T = 2\pi\sqrt{1}/g$ for the time period of a simple pendulum with the help of dimensional analysis.

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34. Show that motion of a simple pendulum is simple harmonic.

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35. Write the general standard equation of SHM.

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36. Calculate the total energy of a simple harmonic motion.

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37. How motion of a loaded spring is simple harmonic?

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38. Show that acceleration $A\alpha - y$ where y is the displacement to SHM.

39. Establish the relation $T = 2\pi\sqrt{1}/g$ for the time period of a simple pendulum with the help of dimensional analysis.

40. Establish the differential equation of SHM.

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41. Calculate the ratio of kinetic energy and potential energy at the equilibrium in SHM. (time=T/12)

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42. What should be the length of second pendulum of Guawahati.

43. Show that a small amplitude, the motion of simple pendulum is SHM.