EXERCISE-I (Conceptual Questions) — Build Up Your Understanding

PERIODIC MOTION AND ITS CHARACTERISTICS

1. A particle of mass m is executing S.H.M. If amplitude is a and frequency n, the value of its force constant will be :

(1) mn^2 (2) $4mn^2a^2$ (3) ma^2 (4) $4\pi^2mn^2$

2. The equation of motion of a particle executing S.H.M. where letters have usual meaning is:

(1) $\frac{d^2x}{dt^2} = -\frac{k}{m}x$ (2) $\frac{d^2x}{dt^2} = +\omega^2x$ (3) $\frac{d^2x}{dt^2} = -\omega^2x$ (4) $\frac{d^2x}{dt^2} = -kmx$

3. The equation of motion of particle executing SHM is $\left(\frac{d^2x}{dt^2}\right) + kx = 0$. The time period of the particle will be :

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

4. Which of the following equation does not represent a simple harmonic motion :

(1) $y = a\sin\omega t$ (2) $y = b\cos\omega t$

(3) $y = a\sin\omega t + b\cos\omega t$ (4) $y = a\tan\omega t$

SIMPLE HARMONIC MOTION (SHM) AND ITS EQUATION

5. The displacement of a particle in S.H.M. is indicated by equation $y = 10\sin(20t + \pi/3)$ where y is in meters. The value of time period of vibration will be (in seconds) :

(1) $10/\pi$ (2) $\pi/10$ (3) $2\pi/10$ (4) $10/2\pi$

6. The value of phase at maximum displacement from the mean position of a particle in S.H.M. is:

(1) $\pi/2$ (2) π (3) Zero (4) 2π

7. The equation of a simple harmonic motion is $x = 0.34\cos(3000t + 0.74)$. Where x and t are in mm and sec. respectively. The frequency of the motion is :

(1) 3000 (2) $3000/2\pi$ (3) $0.74/2\pi$ (4) $3000/\pi$

8. The acceleration of a particle executing S.H.M. is

(1) Always directed towards the equillibrium position

(2) Always towards the one end

(3) Continuously changing in direction

(4) Maximum at the mean position

9. The distance covered by a particle executing SHM, in one time period is equal to :

(1) Four times the amplitude (2) Two times the amplitude

(3) One times the amplitude (4) Eight times the amplitude

10. The phase of a particle in S.H.M. is $\pi/2$, then :

(1) Its velocity will be maximum. (2) Its acceleration will be minimum.

(3) Restoring force on it will be minimum. (4) Its displacement will be maximum.

11. The displacement of a particle in S.H.M. is indicated by equation $y = 10 \sin(20t + \pi/3)$ where y is in meters. The value of maximum velocity of the particle will be :
(1) 100 m/sec. (2) 150 m/sec. (3) 200 m/sec. (4) 400 m/sec.

12. In the above question, the value of phase constant will be :
(1) Zero (2) 45° (3) 60° (4) 30°

13. The phase of a particle in SHM at time t is $\pi/6$. The following inference is drawn from this :
(1) The particle is at $x = a/2$ and moving in + X-direction.
(2) The particle is at $x = a/2$ and moving in – X-direction
(3) The particle is at $x = -a/2$ and moving in + X-direction
(4) The particle is at $x = -a/2$ and moving in – X-direction

14. Two particles execute S.H.M. along the same line at the same frequency. They move in opposite direction at the mean position. The phase difference will be:
(1) 2π (2) $2\pi / 3$ (3) π (4) $\pi / 2$

15. The displacement from mean position of a particle in SHM at 3 seconds is $\sqrt{3}/2$ of the amplitude. Its time period will be :
(1) 18 sec. (2) $6\sqrt{3}$ (3) 9 sec. (4) $3\sqrt{3}$ sec.

16. A particle executes SHM of type $x = a\sin\omega t$. It takes time t_1 from $x = 0$ to $x = \frac{a}{2}$ and t_2 from $x = \frac{a}{2}$ to $x = a$. The ratio of $t_1 : t_2$ will be :
(1) 1 : 1 (2) 1 : 2 (3) 1 : 3 (4) 2 : 1

17. The time taken by a particle in SHM for maximum displacement is :
(1) T / 8 (2) T / 6 (3) T / 2 (4) T / 4

18. A particle executes SHM with periodic time of 6 seconds. The time taken for traversing a distance of half the amplitude from mean position is :
(1) 3 sec. (2) 2 sec. (3) 1 sec. (4) 1 / 2 sec.

19. The phase difference between the displacement and acceleration of particle executing S.H.M. in radian is :
(1) $\pi / 4$ (2) $\pi / 2$ (3) π (4) 2π

20. The phase difference in radians between displacement and velocity in S.H.M. is:
(1) $\pi / 4$ (2) $\pi / 2$ (3) π (4) 2π

21. If the maximum velocity of a particle in SHM is v_0, then its velocity at half the amplitude from position of rest will be :
(1) $v_0 / 2$ (2) v_0 (3) $v_0 \sqrt{3/2}$ (4) $v_0 \sqrt{3}/2$

22. At a particular position the velocity of a particle in SHM with amplitude a is $\sqrt{3}/2$ that at its mean position. In this position, its displacement is :

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

23. The acceleration of a particle in SHM at 5 cm from its mean position is 20 cm/sec^2. The value of angular frequency in radians / sec will be :

(1) 2 (2) 4 (3) 10 (4) 14

24. The amplitude of a particle in SHM is 5 cms and its time period is π. At a displacement of 3 cms from its mean position the velocity in cms / sec will be :

(1) 8 (2) 12 (3) 2 (4) 16

25. The maximum velocity and acceleration of a particle in S.H.M. are 100 cms / sec and 157 cm / sec^2 respectively. The time period in seconds will be:

(1) 4 (2) 1.57 (3) 0.25 (4) 1

26. If the displacement, velocity and acceleration of a particle in SHM are 1 cm, 1cm/sec, 1cm/sec^2 respectively its time period will be (in seconds) :

(1) π (2) 0.5Tπ (3) 2π (4) 1.5π

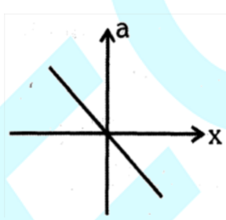
27. The particle is executing S.H.M. on a line 4 cms long. If its velocity at mean position is 12 cm/sec, its frequency in Hertz will be :

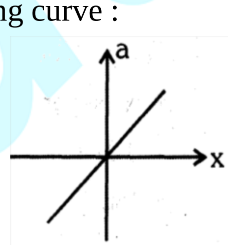
(1) $\frac{2\pi}{3}$ (2) $\frac{3}{2\pi}$ (3) $\frac{\pi}{3}$ (4) $\frac{3}{\pi}$

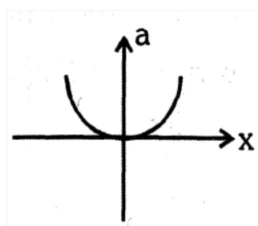
28. Which of the following statement is incorrect for an object executing S.H.M. :

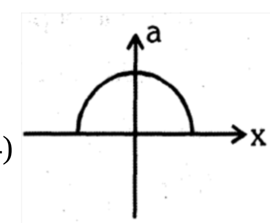
(1) The value of acceleration is maximum at the extreme points
(2) The total work done for completing one oscillation is zero.
(3) The energy changes from one form to another
(4) The velocity at the mean position is zero

29. The variation of acceleration (a) and displacement (x) of the particle executing SHM is indicated by the following curve :

(1) 

(2) 

(3) 

(4) 

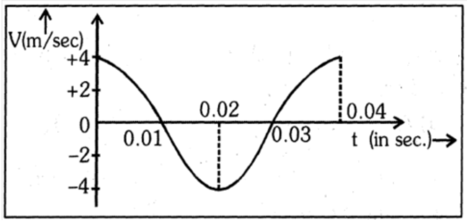
30. The time period of an oscillating body executing SHM is 0.05 sec and its amplitude is 40 cm. The maximum velocity of particle is :

(1) 16π ms^{-1} (2) 2π ms^{-1} (3) 3.1 ms^{-1} (4) 4π m/s

31. A body of mass 5 gm is executing S.H.M. about a point with amplitude 10 cm. Its maximum velocity is 100 cm/sec. Its velocity will be 50 cm/sec at a distance from mean position :

(1) 5 cm (2) $5\sqrt{2}$ cm (3) $5\sqrt{3}$ cm (4) $10\sqrt{2}$ cm

32. The velocity-time diagram of a harmonic oscillator is shown in the adjoining figure. The frequency of oscillation is :



(1) 25 Hz (2) 50 Hz (3) 12.25 Hz (4) 33.3 Hz

33. A particle is executing S.H.M. of frequency 300 Hz and with amplitude 0.1 cm. Its maximum velocity will be :
(1) 60π cm/s (2) 0.6π cm/s (3) 0.50π cm/s (4) 0.05π cm/s

34. If amplitude of the particle which is executing S.H.M., is doubled, then which quantity will become double ?
(1) Frequency (2) Time period (3) Energy (4) Maximum velocity

35. Which one of the following statements is true for the speed 'v' and the acceleration 'a' of a particle executing simple harmonic motion
(1) Value of 'a' is zero, whatever may be the of 'v'
(2) When 'v' is zero, 'a' is zero
(3) When 'v' is maximum, 'a' is zero
(4) When 'v' is maximum, 'a' is maximum

36. For a particle executing simple harmonic motion which of the following statement is not correct :
(1) The total energy of particle always remains the same
(2) The restoring force is always directed towards a fix point.
(3) The restoring force is maximum at the extreme positions.
(4) The acceleration of particle is maximum at the equilibrium positions.

37. In SHM velocity is maximum:
(1) At extreme position (2) Where displacement is half of amplitude
(3) At the central position (4) When Displacement is $\frac{1}{\sqrt{2}}$ of amplitude

38. A body oscillates with SHM according to the equation $x = 5.0 \cos(2\pi t + \pi)$. At time t = 1.5 s, its displacement, speed and acceleration respectively is :
(1) $0, -10\pi, +20\pi^2$ (2) $5, 0, -20\pi^2$
(3) $2.5, +20\pi, 0$ (4) $-5.0, +5\pi, -10\pi^2$

39. A particle executing simple harmonic motion of amplitude 5 cm has maximum speed of 31.4 cm/s. The frequency of oscillation is :
(1) 1 Hz (2) 3 Hz (3) 2 Hz (4) 4 Hz

40. The maximum velocity of simple harmonic motion represented by $y = 3\sin\left(100 + \frac{\pi}{6}\right)$ is given by

(1) 300 (2) $\frac{3\pi}{6}$ (3) 100 (4) $\frac{\pi}{6}$

41. The maximum velocity of a particle, executing simple harmonic motion. with an amplitude 7 mm is 4.4 m/s. The period of oscillation is :

(1) 100 s (2) 0.01 s (3) 10 s (4) 0.1 s

42. Average velocity of a particle performing SHM in one time period is :-

(1) Zero (2) $\frac{A\omega}{2}$ (3) $\frac{A\omega}{2\pi}$ (4) $\frac{2A\omega}{\pi}$

43. A particle is executing S.H.M. With amplitude A and Time period T. Time taken by the particle to reach from extreme position to $\frac{A}{2}$

(1) $\frac{T}{6}$ (2) $\frac{T}{12}$ (3) $\frac{T}{3}$ (4) $\frac{T}{4}$

44. Total work done on a simple pendulum in one complete oscillation will be :-

(1) $\frac{1}{2}kx^2$ (2) $\frac{1}{2}kA^2$ (3) kA^2 (4) Zero

45. In S.H.M. Which one of the following quantities has constant ratio with acceleration :-

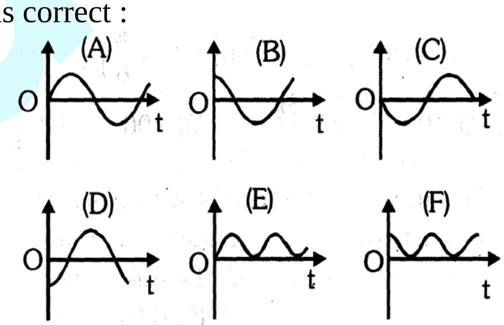
(1) Time (2) Displacement (3) Velocity (4) Mass

46. The displacement y of a particle varies with time t, in seconds, as $y = 2\cos(\pi t + \pi/6)$. The time period of the oscillations is

(1) 2 s (2) 4 s (3) 1 s (4) 0.5 s

ENERGY IN SHM-KINETIC AND POTENTIAL ENERGIES

47. The displacement of a particle in S.H.M. is $x = a\sin\omega t$. Which of the following graph between displacement and time is correct :



(1) A (2) B (3) C (4) D

48. In Question 47 which of the graph between velocity and time is correct ?

(1) A (2) B (3) C (4) D

49. In Question 47 which of the graph between kinetic energy and time is correct ?

(1) A (2) B (3) E (4) F

50. In Question 47 which of the graph between potential energy and time is correct ?
(1) A (2) B (3) E (4) F

51. In Question 47 which of the graph between acceleration and time is correct ?
(1) A (2) B (3) C (4) D

52. In Question 47 if the displacement of a particle executing SHM is $x = a \cos\omega t$, which of the graph between displacement and time is correct ?
(1) A (2) B (3) C (4) D

53. In question 52 which of the graph between velocity and time is correct ?
(1) A (2) B (3) C (4) D

54. In question 52 which of the graph between acceleration and time is correct ?
(1) A (2) B (3) C (4) D

55. In question 52 which of the graph between K.E. and time is correct ?
(1) A (2) B (3) E (4) F

56. In question 52 which of the graph between P.E. and time is correct ?
(1) A (2) B (3) E (4) F

57. The energy of SHM at the mean position of a pendulum will be :
(1) Zero (2) Partial P.E and partial K.E.
(3) Totally K.E. (4) Totally P.E.

58. The total energy of a particle executing SHM is directly proportional to the square of the following quantity :
(1) Acceleration (2) Amplitude (3) Time period (4) Mass

59. The total energy of a vibrating particle in SHM is E. If its amplitude and time period are doubled, its total energy will be :
(1) 16E (2) 8E (3) 4E (4) E

60. The total vibrational energy of a particle in S.H.M. is E. Its kinetic energy at half the amplitude from mean position will be :
(1) E/2 (2) E/3 (3) E/4 (4) 3E/4

61. If total energy of a particle in SHM is E, then the potential energy of the particle at half the amplitude will be :
(1) E/2 (2) E/4 (3) 3E/4 (4) E/8

62. A particle executes SHM on a line 8 cm long. Its K.E. and P.E. will be equal when its distance from the mean position is :
(1) 4 cm (2) 2 cm (3) $2\sqrt{2}$ cm (4) $\sqrt{2}$ cm

63. The average P.E. of a body executing S.H.M. is :

(1) $\frac{1}{2}ka^2$ (2) $\frac{1}{4}ka^2$ (3) ka^2 (4) Zero

64. The value of total mechanical energy of a particle in S.H.M. is :
(1) Always constant (2) Depend on time
(3) $\frac{1}{2}kA^2\cos^2(\omega t + \phi)$ (4) $\frac{1}{2}mA^2\cos^2(\omega t + \phi)$

65. The maximum K.E of a oscillating spring is 5 joules and its amplitude 10 cm. The force constant of the spring is :
(1) 100 Newton/m. (2) 1000 Newton-m (3) 1000 Newton/m. (4) 1000 watts.

66. The force acting on- a 4 gm mass in the energy region $U = 8x^2$ at $x = -2$cm is :
(1) 8 dyne (2) 4 dyne (3) 16 dyne (4) 32 dyne

67. Displacement between max. P.E. position and max. K.E. position for a particle executing simple harmonic motion is :
(1) $\pm \frac{a}{2}$ (2) + a (3) ± a (4) –1

68. A particle is describing SHM with amplitude 'a'. When the potential energy of particle is one fourth of the maximum energy during oscillation, then its displacement from mean position will be :
(1) $\frac{a}{4}$ (2) $\frac{a}{3}$ (3) $\frac{a}{2}$ (4) $\frac{2a}{3}$

69. The ratio of K.E. of the particle at mean position to the point when distance is half of amplitude will be :
(1) $\frac{1}{3}$ (2) $\frac{2}{3}$ (3) $\frac{4}{3}$ (4) $\frac{3}{2}$

70. A particle is executing S.H.M., If its P.E. & K.E. is equal then the ratio of displacement & amplitude will be :
(1) $\frac{1}{\sqrt{2}}$ (2) $\sqrt{2}$ (3) $\frac{1}{2}$ (4) $\frac{3}{2}$

71. Which of the following is constant during SHM :
(1) Velocity (2) Acceleration (3) Total energy (4) Phase

72. If. <E> and <V> denotes the average kinetic and average potential energies respectively of mass describing a simple harmonic motion over one period then the correct relation is:
(1) <E> = <V> (2) <E> = 2<V> (3) <E> = –2<V> (4) <E> = – <V>

73. The elongation of spring is 1 cm and its potential energy is U. If the spring is elongated by 3cm then potential energy will be :-

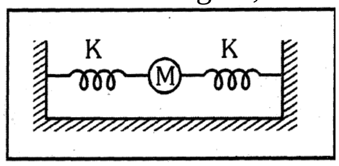
(1) 3U (2) $\frac{U}{3}$ (3) 9U (4) $\frac{U}{9}$

74. The potential energy of a spring when stretched by distance x is E. The energy of the spring when stretched by x / 2 is

(1) E (2) E / 2 (3) E / 4 (4) E / 6

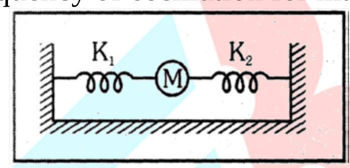
OSCILLATIONS OF A SPRING

75. On suspending a mass M from a spring of force constant K, frequency of vibration f is obtained. If a second spring as shown in the figure, is arranged then the frequency will be :



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

76. In the adjoining figure the frequency of oscillation for mass M will be proportional to :

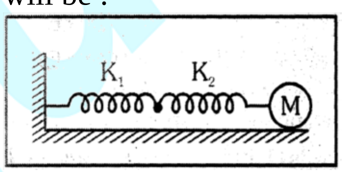


(1) K_1K_2 (2) $K_1 + K_2$ (3) $\sqrt{K_1+K_2}$ (4) $\sqrt{1/K_1+K_2}$

77. An object of mass m is suspended from a spring and it executes S.H.M. with frequency u. If the mass is increased 4 times, the new frequency will be :

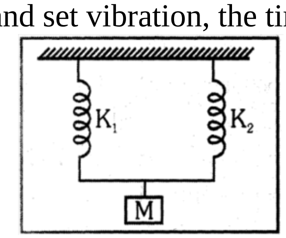
(1) 2υ (2) $\upsilon / 2$ (3) υ (4) $\upsilon / 4$

78. As shown in the figure, two light springs of force constant K_1 and K_2 oscillate a block of mass M. Its effective force constant will be :



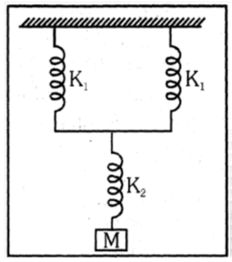
(1) K_1K_2 (2) $K_1 + K_2$ (3) $\frac{1}{K_1}+\frac{1}{K_2}$ (4) $\frac{K_1K_2}{K_1+K_2}$

79. The spring constants of two springs of same length are K_1 and K_2 as shown in figure. If an object of mass M is suspended and set vibration, the time period will be :



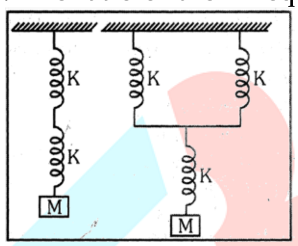
(1) $2\pi\sqrt{\frac{MK_1}{K_2}}$ (2) $2\pi\sqrt{\frac{M}{K_1K_2}}$ (3) $2\pi\sqrt{\frac{M}{K_1-K_2}}$ (4) $2\pi\sqrt{M/(K_1+K_2)}$

80. The total spring constant of the system as shown in the figure will be :



(1) $\frac{K_1}{2}+K_2$ (2) $\left[\frac{1}{2K_1}+\frac{1}{K_2}\right]^{-1}$ (3) $\frac{1}{2K_1}+\frac{1}{K_2}$ (4) $\left[\frac{2}{K_1}+\frac{1}{K_2}\right]^{-1}$

81. Some springs are combined in series and parallel arrangement as shown in the figure and a mass M is suspended from them. The ratio of their frequencies will be :



(1) 1 : 1 (2) 2 : 1 (3) $\sqrt{3}:2$ (4) 4 : 1

82. A spring is made to oscillate after suspending a mass m from one of its ends. The time period obtained is 2 seconds. On increasing the mass by 2 kg, the period of oscillation is increased by 1 second. The initial mass m will be :
(1) 2 kg (2) 1 kg (3) 0.5 kg (4) 1.6 kg

83. The time period of a spring pendulum on earth is T. If it is taken on the moon and made to oscillate, the period of vibration will be :
(1) Less than T (2) Equal to T (3) More than T (4) None of these

84. On loading a spring with bob, its period of oscillation in a vertical plane is T. If this spring pendulum is tied with one end to the a friction less table and made to oscillate in a horizontal plane, its period of oscillation will be :
(1) T (2) 2T (3) T / 2 (4) will not execute S.H.M.

85. In a winding (spring) watch, the energy is stored in the form of :
(1) Kinetic energy (2) Potential energy
(3) Electrical energy (4) None of these

86. In an artificial satellite, the object used is :
(1) Spring watch (2) Pendulum watch
(3) Watches of both spring and pendulum (4) None of these

87. Mass 'm' is suspended from a spring of force constant K. Spring is cut into two equal parts and same mass is suspended from it, then new frequency will be :

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

88. The spring constant of two springs are K_1 and K_2 respectively springs are stretch up to that limit when potential energy of both becomes equal. The ratio of applied force (F_1 and F_2) on them will be :

(1) $K_1 : K_2$ (2) $K_2 : K_1$ (3) $\sqrt{K_1} : \sqrt{K_2}$ (4) $\sqrt{K_2} : \sqrt{K_1}$

89. Force constant of a spring is K. If one fourth part is detach then force constant of remaining spring will be :

(1) $\frac{3}{4}K$ (2) $\frac{4}{3}K$ (3) K (4) 4K

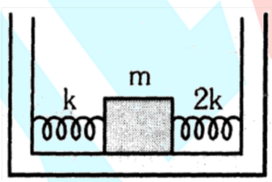
90. The spring constant of a spring is K. When it is divided into n equal parts, then what is the spring constant of one part :

(1) nK (2) K/n (3) $\frac{nK}{(n+1)}$ (4) $\frac{(n+1)K}{n}$

91. The time period of a mass suspended from a spring is T. If the spring is cut into four equal parts and the same mass is suspended from one of the parts, then the new time period will be

(1) $\frac{T}{4}$ (2) T (3) $\frac{T}{2}$ (4) 2T

92. Two springs of force constant k and 2k are connected to a mass as shown below. The frequency of oscillation of the mass is :



(1) $\frac{1}{2\pi}\sqrt{\frac{k}{m}}$ (2) $\frac{1}{2\pi}\sqrt{\frac{2k}{m}}$ (3) $\frac{1}{2\pi}\sqrt{\frac{3k}{m}}$ (4) $\frac{1}{2\pi}\sqrt{\frac{m}{k}}$

93. Two springs of spring constants k_1 and k_2 are joined in series. The effective spring constant of the combination is given by :

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

94. A mass of 10g is connected to a massless spring then tune period of small oscillation is 10 second. If 10 g mass is replaced by 40 g mass in same spring, then its time period will be:-

(1) 5s (2) 10s (3) 20s (4) 40s

SIMPLE PENDULUM

95. The mass of a bob, suspended in a simple pendulum, is halved from the initial mass, its time period will:

(1) Be less (2) Be more

(3) Remain unchanged (4) None of these

96. If the amplitude of a simple pend!Jiumis doubled, how many times will the value of its maximum velocity be that of the maximum velocity in initial case:

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

97. The length of a simple pendulum is $39.2/\pi^2$ m. If g = 9.8 m/sec^2, the value of time period is:

(1) 4 s (2) 8 s (3) 2 s (4) 3 s

98. The length of a simple pendulum is increased four times of its initial value, its time period with respect to its previous value will :

(1) Become twice (2) Not be different (3) Be halved (4) Be $\sqrt{2}$ times

99. The time taken for a second pendulum from one extreme point to another is :

(1) 1 s (2) 2 s (3) 1/2 s (4) 4 s

100. The length of a seconds pendulum is (approximately) :

(1) 1m (2) 1 cm (3) 2m (4) 2 cm

101. The acceleration due to gravity at height R above the surface of the earth is g/4. The periodic time of a simple pendulum in an artificial satellite at this height will be :

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

(3) Zero (4) Infinity

102. In an artificial satellite, the use of a pendulum watch is discarded, because :

(1) The satellite is in a constant state of motion

(2) The effective value of g becomes zero in the artificial satellite

(3) The periodic time of the pendulum watch is reduced

(4) None of these

103. An oscillating pendulum stops, because its energy

(1) Changes into kinetic energy (2) Change into potential energy

(3) Change into heat energy (4) Is destroyed

104. Simple pendulum of large length is mage equal to the radius of the earth. Its period of oscillation will be :

(1) 84.6 min. (2) 59.8 min. (3) 42.3 min. (4) 21.15 min.

105. The maximum time period of oscillation of a simple pendulum of large length is:

(1) Infinity (2) 24 hours (3) 12 hours (4) 1½ hours

106. In a simple oscillating pendulum, the work done by the string in one oscillation will be:

(1) Equal to the total energy of the pendulum

(2) Equal to the K.E. of the pendulum

(3) Equal to the P.E. of the pendulum

(4) Zero

107. A lift is ascending with acceleration g/3. What will be the time period of a simple pendulum suspended from its ceiling if its time period in stationary lift is T?4

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

108. A child swinging on ~ swing in sitting position, stands up, then the period of the swing will be:
(1) Increase
(2) Decrease
(3) Remain same
(4) Increase if child is long and decrease if child is short.

109. A simple pendulum is suspended from the ceiling of a vehicle, its time period is T. Vehicle is moving with constant velocity, then time period of simple pendulum will be :
(1) Less than T (2) Equal to T (3) More than T (4) Cannot predict

SUPERPOSITION OF SHMs, FREE, FORCED AND DAMPED OSCILATIONS, RESONANCE

110. The vibrations taking place in the diaphragm of a microphone will be :-
(1) free vibrations (2) damped vibrations
(3) forced vibrations (4) electrically maintained vibrations

111. In the case of sustained forced oscillations the amplitude of oscillations :-
(1) decreases linearly (2) decreases sinusoidally
(3) decreases exponentially (4) always remains constant

112. Two sources of sound are in resonance when:
(1) they look alike
(2) they are situated at a particular distance from each other
(3) they produce the sound of same intensity
(4) they are excited by the same exciting device

113. When a tuning fork is vibrated, another in the neighbourhood begins to vibrate. This is due to the phenomenon of :-
(1) gravitation (2) Newton's III law
(3) Resonance (4) None

114. The amplitude of a SHM reduces to 1/3 in first 20 second then in first 40 second its amplitude becomes:

(1) $\frac{1}{3}$ (2) $\frac{1}{9}$ (3) $\frac{1}{27}$ (4) $\frac{1}{\sqrt{3}}$

115. Amplitude of vibrations remains constant in case of
(i) free vibrations (ii) damped vibrations
(iii) maintained vibrations (iv) forced vibrations

(1) i, iii, iv (2) ii, iii (3) i, ii, iii (4) ii, iv

ANSWER KEY

EXERCISE-I (Conceptual Questions)

1.	(4)	**2.**	(1)	**3.**	(1)	**4.**	(4)	**5.**	(2)	**6.**	(1)	**7.**	(2)
8.	(1)	**9.**	(1)	**10.**	(4)	**11.**	(3)	**12.**	(3)	**13.**	(1)	**14.**	(3)
15.	(1)	**16.**	(2)	**17.**	(4)	**18.**	(4)	**19.**	(3)	**20.**	(2)	**21.**	(4)
22.	(1)	**23.**	(1)	**24.**	(1)	**25.**	(1)	**26.**	(3)	**27.**	(4)	**28.**	(4)
29.	(1)	**30.**	(1)	**31.**	(3)	**32.**	(1)	**33.**	(1)	**34.**	(4)	**35.**	(3)
36.	(4)	**37.**	(3)	**38.**	(2)	**39.**	(1)	**40.**	(1)	**41.**	(2)	**42.**	(1)
43.	(1)	**44.**	(4)	**45.**	(2)	**46.**	(1)	**47.**	(1)	**48.**	(2)	**49.**	(4)
50.	(3)	**51.**	(3)	**52.**	(2)	**53.**	(3)	**54.**	(4)	**55.**	(3)	**56.**	(4)
57.	(3)	**58.**	(2)	**59.**	(4)	**60.**	(4)	**61.**	(2)	**62.**	(3)	**63.**	(2)
64.	(1)	**65.**	(3)	**66.**	(4)	**67.**	(3)	**68.**	(3)	**69.**	(3)	**70.**	(1)
71.	(3)	**72.**	(1)	**73.**	(3)	**74.**	(3)	**75.**	(1)	**76.**	(3)	**77.**	(2)
78.	(4)	**79.**	(4)	**80.**	(2)	**81.**	(3)	**82.**	(4)	**83.**	(2)	**84.**	(1)
85.	(2)	**86.**	(1)	**87.**	(2)	**88.**	(3)	**89.**	(2)	**90.**	(1)	**91.**	(3)
92.	(3)	**93.**	(3)	**94.**	(3)	**95.**	(3)	**96.**	(2)	**97.**	(1)	**98.**	(1)
99.	(1)	**100.**	(1)	**101.**	(4)	**102.**	(2)	**103.**	(3)	**104.**	(2)	**105.**	(4)
106.	(4)	**107.**	(2)	**108.**	(2)	**109.**	(2)	**110.**	(3)	**111.**	(4)	**112.**	(4)
113.	(3)	**114.**	(2)	**115.**	(1)								