Chapter 7

OSCILLATIONS

Each question has four possible answers, encircled the correct answer:

1. To and fro motion of a body about its mean position is known as:

(a) Linear motion **(b)** Rotatory motion
(c) Angular motion **(d)** Vibratory motion

2. A motion which repeats itself in equal intervals of time is:

(a) Rotatory motion **(b)** Periodic motion
(c) Oscillatory motion **(d)** Translatory motion

3. In SHM, the acceleration of a body is directly proportional to:

(a) Applied force **(b)** Displacement
(c) Restoring force **(d)** Amplitude

4. The law which derived in SHM by:

(a) Hook's law **(b)** Ampere's law
(c) Dalton's law **(d)** Newton's law

5. The wave form of SHM is:

(a) Square wave **(b)** Sine wave
(c) Cosine wave **(d)** None of these

6. The maximum distance of the vibrating body from the mean position is called:

(a) Displacement **(b)** Time period
(c) Frequency **(d)** Amplitude

7. The number of vibrations completed in one second is called:

(a) Amplitude **(b)** Frequency
(c) Time period **(d)** Revolution

8. The relation between time period and frequency is:

(a) $f = 2\pi T$ **(b)** $f = \frac{1}{2\pi T}$
(c) $f = \frac{T}{2\pi}$ **(d)** $f = \frac{1}{T}$

9. The time taken to complete one revolution is called:

(a) Frequency **(b)** Time period
(c) Time **(d)** Displacement

10. A force 20 N is applied on an elastic spring. If the extension produced in the spring is 10 cm, the spring constant k is:

(a) 20 N/m **(b)** 40 N/m
(c) 10 N/m **(d)** 200 N/m

11. An example of SHM is:

(a) Motion of earth around the sun **(b)** Motion of simple pendulum
(c) Motion of cricket ball **(d)** None of these

12. A body attached to a spring is pulled to a distance of 20 cm. If the spring constant k is 48 N/m then find the force applied:

(a) 5.3 N **(b)** 9.6 N
(c) 96 N **(d)** 192 N

13. The main cause of an oscillatory motion of an elastic spring is:

(a) Mass of the spring **(b)** Weight of spring
(c) K.E of the spring **(d)** Restoring force of the spring

14. The restoring force is directly proportional to the displacement within elastic limit, this is the statement of:

(a) Hook's law **(b)** Newton's law
(c) Meld's law **(d)** Youngs law

15. The unit of frequency is:

(a) m/s **(b)** Hz
(c) N/m **(d)** None of these

16. A particle performing SHM has displacement equal to:

(a) $x_0 \sin \omega t$ **(b)** $x_0 \cos \omega t$
(c) $x_0 \cos^2 \omega t$ **(d)** $x_0 \sin^2 \omega t$

17. Instantaneous acceleration of a system executing SHM is directed:

(a) Towards the mean position
(b) Away from the mean position
(c) Perpendicular to the mean position upward
(d) Perpendicular to the mean position downward

18. The angular speed of mass attached with spring is:

(a) $\omega = \frac{1}{2\pi}\sqrt{\frac{m}{m}}$ **(b)** $\omega = \sqrt{\frac{k}{m}}$
(c) $\omega = \frac{2\pi}{T}$ **(d)** $\omega = 2\pi\sqrt{\frac{m}{k}}$

19. The time period of mass attached with the spring is:

(a) $T = 2\pi\sqrt{\frac{m}{k}}$ (b) $T = 2\pi\sqrt{\frac{k}{m}}$

(c) $T = \frac{2\pi}{\omega}$ (d) $T = \frac{1}{2\pi}\sqrt{\frac{l}{g}}$

20. The velocity of a body in SHM is maximum at the:

(a) Extreme position (b) Between mean and extreme position

(c) Mean position (d) Between extreme and mean

21. The velocity of the body is minimum at the:

(a) Mean position (b) Extreme position

(c) Between mean and extreme position (d) None of the above

22. The acceleration of projection of a point P on the diameter moving on a circle is:

(a) $-\omega^2 x$ (b) ωx^2

(c) $-\omega x^2$ (d) $\omega^2 x$

23. The time period of simple pendulum depends upon:

(a) Thickness of the thread (b) Mass of the pendulum

(c) Length of the pendulum (d) Amplitude

24. The time period of simple pendulum is:

(a) 1 second (b) 1.5 second

(c) 2 second (d) None of these

25. The phase angle $\theta = \omega t$ of a body performing SHM indicates:

(a) Only the magnitude of displacement (b) Only the direction of the displacement

(c) Both magnitude and direction (d) None of these

26. A body performing SHM has a displacement X given by the equation X = 30 sin 50 t, what is the frequency of oscillation:

(a) 0.020 Hz (b) 0.13 Hz

(c) 8.0 Hz (d) 50 Hz

27. In vibratory motion:

(a) P.E remains constant (b) K.E remains constant

(c) Total energy remains constant (d) None of these

28. When a particle is moving along a circular path, its projection along the diameter executes:

(a) S.H.M (b) Angular motion

(c) Linear motion (d) Rotatory motion

29. The instantaneous speed of the projection on the diameter for a particle moving in a circle is:

(a) $\omega^2\sqrt{x_o^2 - x^2}$ **(b)** $\omega^2\sqrt{x_o - x}$

(c) $\omega\sqrt{x_o^2 - x^2}$ **(d)** None of these

30. The maximum K.E of the mass attached with spring is given by:

(a) $(K.E)_{max} = \frac{1}{2}kx_0^2$ **(b)** $(K.E)_{max} = \frac{1}{2}Kx_0$

(c) $(K.E)_{max} = \frac{1}{2}Kx^2$ **(d)** $(K.E)_{max} = \frac{1}{2}Kx$

31. The maximum velocity V_0 of the mass attached to the end of an elastic spring is:

(a) $v_0 = x_0\sqrt{\frac{m}{k}}$ **(b)** $v_0 = x\sqrt{\frac{k}{m}}$

(c) $v_0 = x \,.\sqrt{\frac{m}{k}}$ **(d)** $v_0 = x_0\sqrt{\frac{k}{m}}$

32. The total energy of a body executing S.H.M is directly proportional to:

(a) The amplitude **(b)** Square of amplitude

(c) Square root of amplitude **(d)** None of these

33. The total energy of a mass attached with spring is:

(a) Remain constant **(b)** Increased

(c) Decreased **(d)** None of these

34. The force which is responsible for the motion of simple pendulum is:

(a) $-mg\sin\theta$ **(b)** $-mg\cos\theta$

(c) mg **(d)** $mg\tan\theta$

35. The time period of simple pendulum is given as:

(a) $T = 2\pi\sqrt{\frac{l}{g}}$ **(b)** $T = 2\pi\sqrt{\frac{g}{l}}$

(c) $T = \frac{1}{2\pi}\sqrt{\frac{l}{g}}$ **(d)** $T = \frac{1}{\pi}\sqrt{\frac{l}{g}}$

36. The time period of a simple pendulum is directly proportional to the:

(a) $\sqrt{\frac{1}{l}}$ **(b)** $\sqrt{l}$

(c) $\sqrt{g}$ **(d)** $\sqrt{\frac{1}{g}}$

37. If the mass of the bob of simple pendulum is doubled, its time period is:

(a) One half **(b)** Double

(c) Remains constant **(d)** One fourth

38. The time period of a simple pendulum is independent of its:

(a) Mass **(b)** Length
(c) Acceleration due to gravity **(d)** Restoring force

39. The frequency of the second pendulum is:

(a) 0.5 Hz **(b)** 15 Hz
(c) 2 Hz **(d)** 1 Hz

40. The frequency of second pendulum is given by:

(a) $f = \frac{1}{2\pi}\sqrt{\frac{g}{l}}$ **(b)** $f = 2\pi\sqrt{\frac{l}{g}}$
(c) $T = \frac{1}{2\pi}\sqrt{\frac{l}{g}}$ **(d)** None of these

41. The length of second's pendulum is:

(a) 0.99 m **(b)** 0.6 m
(c) 3 m **(d)** 2 m

42. When the bob of simple pendulum is at extreme position, it has:

(a) Potential energy **(b)** Kinetic energy
(c) Both P.E and K.E **(d)** None of these

43. When the bob of simple pendulum is at mean position then it has:

(a) Potential energy **(b)** Kinetic energy
(c) Both P.E and K.E **(d)** None of these

44. Total energy of a particle executing SHM at any displacement X is given by:

(a) $T.E = kx$ **(b)** $T.E = \frac{1}{2}kx_0^2$
(c) $T.E = \frac{1}{2}kx_0$ **(d)** $T.E = \frac{1}{2}kx^2$

45. At the centre of the earth, the simple pendulum will:

(a) Vibrate with double time period **(b)** Vibrate with half time period
(c) Not move **(d)** None of these

46. The value of g is calculated from:

(a) $g = \frac{\pi^2 l}{T^2}$ **(b)** $g = \frac{2\pi^2}{lT^2}$
(c) $g = \sqrt{\frac{4\pi^2 l}{T}}$ **(d)** $g = \frac{4\pi^2 l}{T^2}$

47. The length of simple pendulum is calculated from the expression:

(a) $l = \frac{Tg^2}{4\pi^2}$ **(b)** $l = \frac{T^2 g}{4\pi^2}$
(c) $l = \frac{T^2 g^2}{4\pi^2}$ **(d)** $l = \frac{4\pi^2}{T^2 g^2}$

48. The acceleration of the body having SHM depends upon its:

(a) Velocity **(b)** Mass

(c) Displacement from mean position **(d)** None of these

49. The time period of a simple pendulum depends upon:

(a) Mass of bob **(b)** Length of thread

(c) Height of bob **(d)** None of these

50. The time period of second's pendulum is:

(a) 4 seconds **(b)** 1 seconds

(c) 3 seconds **(d)** 2 seconds

51. The time period of the mass attached with spring executing S.H.M is:

(a) $T = 2\pi\sqrt{\frac{m}{k}}$ **(b)** $T = \pi\sqrt{\frac{k}{m}}$

(c) $T = 2\pi\sqrt{mk}$ **(d)** None of these

52. A heating and cooking of food evenly by Microwave oven is an example of:

(a) S.H.M **(b)** Damped oscillations

(c) Resonance **(d)** None of these

53. The angular velocity and angular frequency is related by the relation:

(a) $\omega = 2\pi f$ **(b)** $f = 2\pi\omega$

(c) $f = \frac{2\pi}{\omega}$ **(d)** $\omega = \frac{2\pi}{f}$

54. Work done during horizontal mass spring system by the average force is:

(a) $\frac{1}{2}kx$ **(b)** $\frac{1}{2}F_{avc}\,x$

(c) $\frac{F_{avc}}{x}$ **(d)** $\frac{1}{2}kx^2$

55. The direction of both acceleration and restoring force in SHM is:

(a) Same direction **(b)** Opposite direction

(c) Perpendicular to each other **(d)** None of these

56. If an oscillating body is subjected to an external force then it is said to be executing:

(a) Free oscillations **(b)** Forced oscillations

(c) Mixed oscillations **(d)** Damping

57. If a body vibrates with its natural frequency without the effect of an external force then it is said to be:

(a) Free oscillations **(b)** Forced oscillations

(c) Mixed oscillations **(d)** Oscillations

58. Loud music produced by sounding wooden boards of strings instruments is an example of:

(a) Free oscillations **(b)** Beats

(c) Forced oscillations **(d)** Damped oscillations

59. When damping is small, the amplitude of vibration in resonance will be:

(a) Unchanged **(b)** Large

(c) Small **(d)** None of these

60. How long must be the length of a simple pendulum in order to have a period of one second:

(a) 0.50 m **(b)** 0.25 m

(c) 1 m **(d)** 3 m

61. Shock absorber in automobiles is a practical form of:

(a) SHM **(b)** Damped oscillations

(c) Pascal's law **(d)** None of these

62. Damping effect applied on an aeroplane wing is:

(a) For more speed **(b)** To push upward

(c) To overcome resonance effect **(d)** To overcome gravity

63. The amplitude of the lead ball is much greater than that of the:

(a) Pitch ball **(b)** Iron ball

(c) Plastic ball **(d)** None of these

64. When potential energy of the mass is maximum, the kinetic energy of the spring is:

(a) Zero **(b)** Maximum

(c) Minimum **(d)** None of these

65. If the position of oscillating object is given by the equation $X = \sqrt{2}\cos\left(\frac{\pi}{8}t\right)$ then its displacement after 2 second is:

(a) 3 m **(b)** 2 m

(c) 1 m **(d)** 0 m

66. The projection of a particle moving along a circular path executes:

(a) Simple motion **(b)** Angular motion

(c) Translatory motion **(d)** S.H.M

67. In simple harmonic motion, the acceleration is always directed:

(a) Towards its mean position **(b)** Away from mean position

(c) Along the tangent **(d)** None of these

68. In oscillating motion:

(a) P.E remains constant **(b)** K.E remains constant

(c) Total energy remains constant **(d)** None of these

69. The body oscillates due to:
(a) Gravitational force (b) Frictional force
(c) Restoring force (d) Deforming force

70. The oscillatory motion which does not repeat after regular interval of time is called:
(a) Periodic motion (b) Circular motion
(c) Non-periodic motion (d) Orbital motion

71. Acceleration of spring mass system is:
(a) Uniform
(b) Variable due to both change in magnitude and direction
(c) Variation due to change in direction
(d) Variation due to change in magnitude

72. In an isolated spring mass system, total energy is:
(a) Variable (b) Constant
(c) Low (d) High

73. The formula $T = 2\pi\sqrt{\frac{l}{g}}$ of a simple pendulum holds only if:
(a) Amplitude of the motion should be small (b) Length of pendulum is small
(c) Length of pendulum is large (d) Mass of pendulum is small

74. Potential energy of spring mass system is stored in:
(a) Spring (b) Mass
(c) Length (d) None of these

75. A quantity which indicates the state and direction of motion of a vibrating body is known as:
(a) Amplitude (b) Displacement
(c) Phase angle (d) Time period

76. In microwave oven, heating is produced by phenomenon of:
(a) Harmonic vibration (b) Forced vibration
(c) Free vibration (d) Resonance

77. The frequency of waves produced in microwave oven is:
(a) 2450 MHz (b) 1435 MHz
(c) 1760 MHz (d) 2550 MHz

78. The wavelength of the waves produced in microwave oven is:
(a) 8 cm (b) 10 cm
(c) 14 cm (d) 12 cm

79. The sharpness of the resonance curve depends on:
(a) Loss of energy (b) Loss of potential energy
(c) Loss of kinetic energy (d) Frictional loss of energy

80. The amplitude of a vibrating body at resonance in vacuum is:

(a) Maximum **(b)** Infinite
(c) Minimum **(d)** None of these

81. If F = 0.4 N and x = 2 cm then k =

(a) 10 N/m **(b)** 20 N/m
(c) 3 N/n **(d)** 30 N/n

82. At what place motion of simple pendulum will be slowest at:

(a) Equator **(b)** Poles
(c) On the surface of earth **(d)** At the centre of the earth

83. If mass attached to spring increases, then its time period:

(a) Increases **(b)** Decreases
(c) No change **(d)** None of these

84. Frequency of a vibratory motion is:

(a) Less than time period **(b)** Equal to time period
(c) Reciprocal of time period **(d)** None of these

85. At which of the following places motion of a simple pendulum is fatest:

(a) Karachi **(b)** Rehim Yar Kan
(c) Lahore **(d)** Islamabad

86. A cheap pendulum clock will:

(a) Lose time in summer and gain time in winter
(b) Gain time in summer and lose time in winter
(c) Keep correct time
(d) None of these

87. A simple pendulum is vibrating in an evacuation chamber it will:

(a) Oscillate forever with the same amplitude frequency
(b) Come to rest eventually
(c) Oscillate with same amplitude with frequency decreasing with time
(d) None of these

88. Total energy of a particle performing S.H.M. is directly proportional to:

(a) Square root of the amplitude **(b)** Amplitude
(c) Reciprocal of amplitude **(d)** Square of amplitude

89. When the mass and speed of a body are doubled, the K.E becomes:

(a) 5 times **(b)** 4 times
(c) 8 times **(d)** 16 times

90. Solar cells are made up from the material called:

(a) Iron **(b)** Oxygen

(c) Carbon **(d)** Silicon

91. At present, the hydroelectric generating capacity in Pakistan amounts to about:

(a) 4000 mega watt **(b)** 3000 mega watt

(c) 5000 mega watt **(d)** None of these

92. The consumption of energy by a 60 watt bulb in 2s in:

(a) 120 J **(b)** 100 J

(c) 90 J **(d)** 0.02 J

93. In SHM, the restoring force is directly proportionate to:

(a) Velocity **(b)** Acceleration

(c) Displacement **(d)** Time period

94. A student made a simple pendulum of time period 1 sec. The string used is of length 1 m, in order to make a simple pendulum of time period 2 sec, he should use a string of length.

(a) 2 m **(b)** 3 m

(c) 4 m **(d)** 4 sec.

95. Time period of second pendulum at moon is:

(a) 1 sec. **(b)** 2 sec.

(c) 3 sec. **(d)** 4 sec.

96. If the period of oscillation of mass M suspended from a spring is 1 sec., then period of mass 4 M will be:

(a) $\frac{1}{4}$ sec. **(b)** $\frac{1}{2}$ sec.

(c) 2 sec. **(d)** 4 sec.

97. A girl is swinging on a swing in the sitting position. How will the period of swing be affected if she stands up?

(a) The period will now be shorter

(b) The period will now be longer

(c) The period will remain unchanged

(d) The period may become longer or shorter depending upon the height of girl

98. A simple harmonic oscillator has time period T. The time taken by it to travel from the extreme position to half the amplitude is:

(a) $\frac{T}{6}$ **(b)** $\frac{T}{4}$

(c) $\frac{T}{8}$ **(d)** $\frac{T}{2}$

99. The frequency of oscillation of a simple pendulum of length L mounted in a cabin that is falling freely under gravity is:

(a) Infinity **(b)** Zero

(c) $\sqrt{\frac{g}{2L}}$ **(d)** $\sqrt{\frac{g}{L}}$

100. A particle executes S.H.M with frequency 'f', the frequency with which its K.E oscillates is:

(a) f **(b)** 2f

(c) 3f **(d)** 4f

101. A body executes S.H.M with an amplitude x_o. Its energy is half kinetic and half potential when displacement is:

(a) $\frac{x_o}{2}$ **(b)** $\frac{x_o}{3}$

(c) $\frac{x_o}{\sqrt{2}}$ **(d)** $\frac{x_o}{2\sqrt{2}}$

102. Total energy of a particle executing S.H.M of amplitude A is proportional to:

(a) A^2 **(b)** A^{-2}

(c) A **(d)** A^{-1}

103. The velocity of a particle undergoing S.H.M is v at mean position. If its amplitude is doubled. The velocity at mean position will be:

(a) v **(b)** 2v

(c) $\sqrt{2}$ times **(d)** 4v

104. The maximum velocity of 1 kg mass attached to a spring constant of 1 Nm^{-1} upto the displacement of 5 cm is:

(a) 1 ms^{-1} **(b)** 0.01 ms^{-1}

(c) 5 ms^{-1} **(d)** 0.05 ms^{-1}

105. A simple pendulum is oscillating in a lift. If the lift starts moving upwards with a uniform acceleration, the period will:

(a) remains unaffected

(b) be shorter

(c) be longer

(d) may be shorter or longer depending on the magnitude of acceleration

106. A body of mass 5 kg in executing S.H.M with amplitude 10 cm. Its maximum velocity is 100 cms^{-1}. Its velocity will be 50 cms^{-1} at a displacement from the mean position equal to:

(a) 5 cm **(b)** $5\sqrt{3}$ cm

(c) 10 cm **(d)** $10\sqrt{3}$ cm

107. A particle of mass 200 g executes S.H.M. The restoring force is provided by a spring of force constant 80 Nm^{-1}. The time period of oscillation is:

(a) 0.31 sec. **(b)** 0.15 sec.

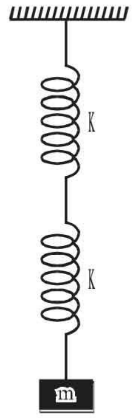
(c) 0.05 sec. **(d)** 0.02 sec.

108. A particle of mass 0.5 kg executes S.H.M its energy is 0.04 J. If time period is π-seconds its amplitude is:

(a) 10 cm **(b)** 15 cm

(c) 20 cm **(d)** 40 cm

109. The two spring mass system, shown in the figure oscillates with a period T. If one spring is used, the time period will be:



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

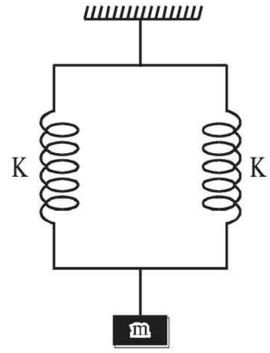
(c) $\sqrt{2}T$ **(d)** 2T

110. A particle executing S.H.M has an amplitude of 6 cm. Its acceleration at a distance of 2 cm from the mean position is 8 cms^{-2}. The maximum speed of the particle is:

(a) 8 cms^{-1} **(b)** 12 cms^{-1}

(c) 16 cms^{-1} **(d)** 24 cms^{-1}

111. The two spring mass system, shown in the figure, oscillates with a period T. If only one spring is used, the time period will be:



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

(c) $\sqrt{2}T$ **(d)** 2T

112. The equation of displacement of a body executing S.H.M is $x = x_o \cos \omega t$. What is initial phase?

(a) 0° **(b)** 90°

(c) 180° **(d)** 270°

113. Which of the following is an example of damped oscillations?

(a) Mass attached to a spring **(b)** Bob of pendulum

(c) Shock absorber of a car **(d)** All of them

114. The sharpness of the resonance curve of a resonating curve depends on:

(a) Loss of K.E. **(b)** Loss of P.E.

(c) Frictional loss of energy **(d)** Loss of mechanic energy

115. The displacement of vibrating body executing SHM at quarter of the time period is:

(a) Zero **(b)** Maximum

(c) Half of the maximum **(d)** Quarter of the maximum

116. A body moves with SHM and makes a complete oscillations in n second. What is angular frequency?

(a) n rad s^{-1} **(b)** 1/n rad s^{-1}

(c) $2\pi n$ rad s^{-1} **(d)** $2\pi/n$ rad s^{-1}

117. The product of time period and frequency is equal to:

(a) 3 **(b)** 2

(c) 1 **(d)** Zero

118. Waves transmit from one place to another:

(a) Wavelength **(b)** Amplitude

(c) Mass **(d)** Energy

119. If water is disturbed in a ripple tank periodically, waves one after the other passing through a point are known as:

(a) Matter waves **(b)** Longitudinal waves

(c) Transverse period waves **(d)** Mechanical waves

120. When two identical travelling waves are superposed, the velocity of the resultant waves:

(a) Decreases **(b)** Increases

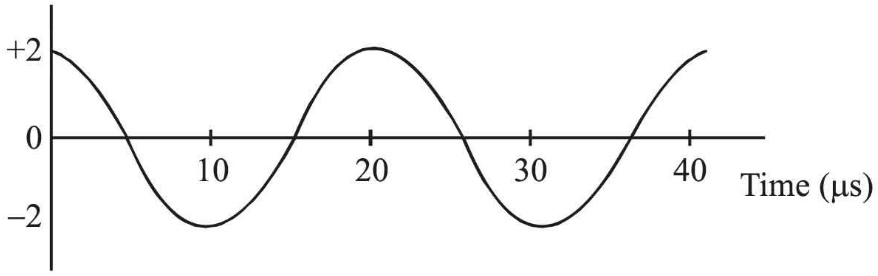
(c) Remains unchanged **(d)** Becomes zero

121. The distance between two consecutive nodes is:

(a) $\lambda/2$ **(b)** $\lambda/4$

(c) λ **(d)** 2λ

122. The diagram below represents the displacement of a particle caused by a progressive wave travelling at a speed 5.0 kms^{-1}.



When is the frequency of the vibration of the particle.

(a) 2.5 KHz **(b)** 5.0 KHz

(c) 25 KHz **(d)** 50 KHz

123. A particle performs simple harmonic motion of amplitude 0.020 m and frequency 2.5 Hz. What is its maximum speed?

(a) 0.008 ms^{-1} **(b)** 0.050 ms^{-1}

(c) 0.125 ms^{-1} **(d)** 0.314 ms^{-1}

124. Vibratory (or oscillatory) motion is always under:

(a) An applied force **(b)** An elastic restoring force and inertia

(c) Periodic force **(d)** Gravitational force

125. The maximum K.E. of the mass attached to an elastic spring is given by:

(a) $(K.E.)_{max} = \frac{kx_o}{2}$ **(b)** $(K.E.)_{max} = \frac{kx_o^2}{2}$

(c) $(K.E.)_{max} = \frac{kx}{2}$ **(d)** $(K.E.)_{max} = \frac{kx^2}{2}$

126. The length of second's pendulum is:

(a) 100 cm **(b)** 99 cm

(c) 99.2 cm **(d)** 98 cm

127. At what place motion of simple pendulum will be slowest:

(a) Poles **(b)** Equator

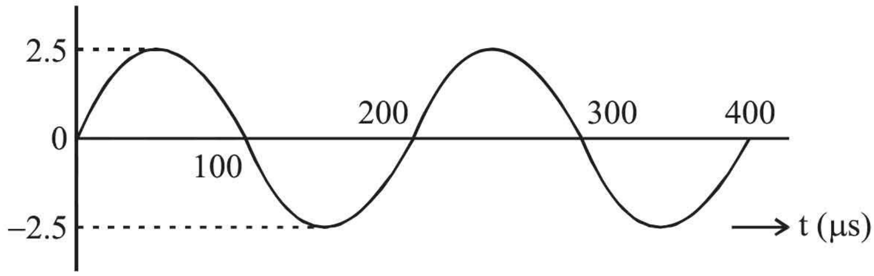
(c) On the surface of earth **(d)** At the centre of the earth

128. The frequency of the second pendulum is:

(a) 1 hertz **(b)** 0.5 hertz

(c) 1.5 hertz **(d)** 2 hertz

129. The diagram below represents the variation with time of pressure at a point in air through which a sound wave is travelling at 340 ms^{-1}.



What is the frequency of the wave?

(a) 1.7 Hz **(b)** 5.0×10^3 Hz

(c) 1.6×10^4 Hz **(d)** 3.1×10^4 Hz

130. A body performing simple harmonic motion has a displacement x given by the equation = 30 sin 50 t, where t is the time in seconds. What is the frequency of oscillations?

(a) 0.020 Hz **(b)** 0.13 Hz

(c) 8.0 Hz **(d)** 30 Hz

ANSWERS

1.	(d)	**2.**	(b)	**3.**	(a)	**4.**	(a)
5.	(b)	**6.**	(d)	**7.**	(b)	**8.**	(d)
9.	(b)	**10.**	(d)	**11.**	(b)	**12.**	(b)
13.	(d)	**14.**	(a)	**15.**	(b)	**16.**	(a)
17.	(a)	**18.**	(b)	**19.**	(a)	**20.**	(c)
21.	(b)	**22.**	(a)	**23.**	(c)	**24.**	(c)
25.	(c)	**26.**	(c)	**27.**	(c)	**28.**	(a)
29.	(c)	**30.**	(a)	**31.**	(d)	**32.**	(b)
33.	(a)	**34.**	(a)	**35.**	(b)	**36.**	(b)
37.	(c)	**38.**	(a)	**39.**	(a)	**40.**	(a)
41.	(a)	**42.**	(a)	**43.**	(b)	**44.**	(b)
45.	(a)	**46.**	(d)	**47.**	(b)	**48.**	(c)
49.	(b)	**50.**	(d)	**51.**	(a)	**52.**	(c)
53.	(a)	**54.**	(b)	**55.**	(b)	**56.**	(b)
57.	(a)	**58.**	(b)	**59.**	(b)	**60.**	(b)
61.	(b)	**62.**	(c)	**63.**	(b)	**64.**	(c)
65.	(c)	**66.**	(d)	**67.**	(a)	**68.**	(c)
69.	(c)	**70.**	(c)	**71.**	(b)	**72.**	(b)
73.	(a)	**74.**	(a)	**75.**	(c)	**76.**	(d)
77.	(a)	**78.**	(d)	**79.**	(d)	**80.**	(b)
81.	(b)	**82.**	(d)	**83.**	(a)	**84.**	(c)
85.	(a)	**86.**	(a)	**87.**	(a)	**88.**	(d)
89.	(c)	**90.**	(d)	**91.**	(b)	**92.**	(a)
93.	(c)	**94.**	(c)	**95.**	(b)	**96.**	(c)
97.	(a)	**98.**	(c)	**99.**	(b)	**100.**	(b)
101.	(c)	**102.**	(a)	**103.**	(b)	**104.**	(d)
105.	(a)	**106.**	(b)	**107.**	(a)	**108.**	(d)
109.	(c)	**110.**	(b)	**111.**	(a)	**112.**	(b)
113.	(d)	**114.**	(c)	**115.**	(b)	**116.**	(c)
117.	(c)	**118.**	(d)	**119.**	(d)	**120.**	(c)
121.	(a)	**122.**	(b)	**123.**	(d)	**124.**	(b)
125.	(b)	**126.**	(c)	**127.**	(d)	**128.**	(b)
129.	(b)	**130.**	(c)				