Chapter no.8
MCQs

Wave Motion and Sound

1. Velocity of a body executing simple harmonic motion is maximum at the:
   (a) Mean position.
   (b) Extreme position on left side.
   (c) Extreme position on right side.
   (d) Between extreme and mean positions.
2. When a point moves along a circular path with constant speed motion of its projection along the diameter of the circular path is:
   (a) Linear.
   (b) Vibratory.
   (c) Circular.
   (d) Simple harmonic.
3. At any instant velocity of projection along the diameter is given by:
   (a) V = $\infty\sqrt{r}$- x.
   (b) V = $\infty\sqrt{r^2} - x$.
   (c) V =$\infty\sqrt{r^2} - x^2$.
   (d) V = $\infty\sqrt{r^2} + x^2$.
4. Angular velocity "∞" of a point moving along a circular path and time period "T" of its projection along the diameter of the path are related by:
   (a) T = 2 Л ∞
   (b) T = ∞/2Л
   (c) T = 2 Л/∞
   (d) T = ∞ = 2 Л
5. Frequency "f" and time period "T" of a vibrating body are related by:
   (a) F = 2 Л /T
   (b) T = 2 Л/f
   (c) F = l/T
   (d) T = 2 Л f
6. Time period of a body executing S.H.M under the action of elastic restoring force:
   (a) T = 2 Л ∞
   (b) T = 2 Л$^2\sqrt{m/k}$
   (c) T = 2 Л k/$\sqrt{m}$
   (d) T = 2 Л $\sqrt{m/k}$
7. **Motion that repeats itself in equal intervals of time is called:**
   (a) Repeated motion.
   (b) Periodic motion.
   (c) Linear motion.
   (d) Circular motion.
8. Motion of a vibrating body is simple harmonic when:
   (a) Its acceleration is directly proportional to its displacement.
   (b) Its acceleration is always directed towards the mean position.
   (c) A restoring force acts on the body.
   (d) All of these.
9. Motion of a vibrating body is:
   (a) Always simple harmonic.
   (b) Simple harmonic only when its acceleration is directly proportional to its displacement and directed towards the mean position.
   (c) Simple harmonic only when it is periodic.
   (d) Simple harmonic when there is no air resistance.
10. Motion of a simple pendulum is simple harmonic when:
    (a) There is no air resistance.
    (b) Its stand is rigid.
    (c) Its amplitude of vibration is small.
    (d) It does not rotate.
11. Amplitude of vibration is the:
    (a) Distance between extreme positions.
    (b) Distance covered at any instant from the mean position.
    (c) Maximum displacement from the men position on either side.
12. Frequency of vibration is:
    (a) Number of waves/second.
    (b) Number of vibration/ second.
    (c) Number of vibrations/minute.
    (d) Number of oscillations /minute.

13. Energy of a frictionless system executing S.H.M is:
    (a) Maximum at the mean position.
    (b) Maximum at the extreme position.
    (c) Changes its form.
    (d) Continuously changes its form from K.E to P.E and vice versa but the total energy always remains constant.
    (e) A and b.
    (f) A and d.
14. The amount of sound energy passing perpendicularly through unit area of a surface in one second is called:
    (a) Loudness.
    (b) Pitch.
    (c) Intensity.
    (d) Quality.
15. Characteristic of sound by which shrill sound can be distinguished from a grave one is called:
    (a) Intensity.
    (b) Loudness.
    (c) Pitch.
    (d) Quality.
16. Pitch of sound depends on:
    (a) Frequency of sound.
    (b) Quality of sound.
    (c) Intensity level.
17. Usually men's voice is of low pitch (grave) because its frequency is:
    (a) Low.
    (b) Zero.
    (c) High.
    (d) Very high.
18. Usually women's voice is of high pitch (shrill) because its frequency is:
    (a) Low.
    (b) Zero.
    (c) High.
    (d) Very high.
19. Velocity of sound is highest in:
    (a) Air.
    (b) Water.
    (c) Iron and glass.
    (d) Copper and nickel.
20. Time period of a simple pendulum executing simple harmonic motion is given by:
    (a) T = 2 Л $\sqrt{L/g}$
    (b) T = 2 Л $\sqrt{g/L}$
    (c) T = g $\sqrt{2}$ Л/L
21. If mass of a body executing S.H.M under the action of elastic restoring force is increased its time period:
    (a) Increases.
    (b) Decreases.
    (c) Remains constant.
22. If mass of the bob of a simple pendulum executing S.H.M is increased then its time period:
    (a) Increases.
    (b) Decreases.
    (c) Remains constant.
23. If length of a simple pendulum is increased its time period:
    (a) Increases.
    (b) Decreases.
    (c) Remains constant.
24. If length of a simple pendulum is doubled its time period:
    (a) Becomes double its initial value.
    (b) Increases by $\sqrt{2\ times}$.
    (c) Decreases by 2 times.
    (d) Decreases by $\sqrt{2\ times}$.
25. Spring constant "k" is the force required to produce unit elongation in it, hence of "k" is large the spring will be hard i.e. large force will be needed to elongate it. Time period of bodies of equal mass attached with springs of different spring constants, executing S.H.M,
    Will be:
    (a) Longer for spring having small value of "k".
    (b) Shorter for spring having small value of "k".
    (c) Longer for spring having large value of "k".
    (d) Shorter for spring having large value of "k".
    (e) A and c.
    (f) A and d.

26. Time period of a pendulum on the surface of earth is 2 second; it is taken to the planet Jupiter. The value "g" on the surface of Jupiter is about 25.8 m/s^2. Time period of the pendulum on the surface of Jupiter will be:
    (a) 2 second.
    (b) More than 2 second.
    (c) Less than 2 second.
27. Time period of a pendulum on the surface of earth is 2 second; it is taken to the moon. The value "g" on the surface of moon is about 1.62 m/s^2. Time period of the pendulum on the surface of the moon will be:
    (a) 2 second.
    (b) More than 2 second.
    (c) Less than 2 second.
28. Time period of a simple pendulum depends upon:
    (a) Mass of its bob.
    (b) Material of its bob.
    (c) Length of the pendulum.
    (d) Value of "g".
    (e) A and b.
    (f) C and d.
29. Sonic boom is heard when speed of a plane is:
    (a) Equal to the speed of wound.
    (b) Less than the speed of sound.
    (c) More than the speed of sound.
30. Ultra sonic waves are those longitudinal waves whose frequency is:
    (a) More than 20000 Hz.
    (b) Less than 20000 Hz.
    (c) Equal to 20000 Hz.
31. Decibel is the unit of:
    (a) Intensity of sound.
    (b) Pitch of sound.
    (c) Loudness of sound.
    (d) Intensity level.
32. Maximum number of beats/second that a normal human ear can hear clearly is:
    (a) 3 beats/sec.
    (b) 7 bets/sec.
    (c) 10 beats/second.
    (d) 15 beats/second.
33. According to Newton sound in air travels under:
    (a) Isobaric conditions.
    (b) Isochoric conditions.
    (c) Isothermal conditions.
    (d) Adiabatic conditions.
34. Speed of sound in a gaseous medium is …….. Its speed in a solid medium.
    (a) Less than.
    (b) More than.
    (c) Equal to.
35. The apparent change in pitch of sound due to the relative motion between its source and Listener is called.
    (a) Compton Effect.
    (b) Motional effect.
    (c) Doppler Effect.
    (d) Sonic boom.
36. When two exactly similar waves traveling along the same path in opposite direction superpose each other…… waves are produced.
    (a) Mechanical.
    (b) Electromagnetic.
    (c) Sound.
    (d) Standing or stationary.
37. Minimum frequency required to produce a stationary wave is called:
    (a) Fundamental frequency.
    (b) Harmonic.
    (c) Overtone.
38. A second's pendulum is that whose time period is:
    (a) 1 second.
    (b) 2 second.
    (c) 3 second.
    (d) 4 second.
39. Frequency of a seconds pendulum will be:
    (a) 0.5 Hz
    (b) 1 Hz
    (c) 2 Hz.
    (d) 4 Hz.

40. When a source of sound is in motion pitch of sound heard by a stationary listener changes. Since pitch of sound depends upon, frequency of sound. Hence sound heard by the listener is of different frequency as compared with the sound emitted by the source. This change in frequency if sound takes place due to a change in:
    (a) Speed of sound waves.
    (b) Wave length of sound waves.
    (c) Speed and wave length of sound waves.
    (d) None of these.
41. When a listener is in motion, pitch of sound heard by him changes. This change in pitch of sound is due to a change in:
    (a) Speed of sound waves.
    (b) Wave length of sound waves.
    (c) Speed and wave length of sound waves.
    (d) None of these.
42. When a listener and source both are in motion, pitch of sound heard by the listener changes. This change in pitch of sound is due to a change in:
    (a) Speed of sound waves.
    (b) Wave length of sound waves.
    (c) Speed and wave length of sound waves.
    (d) None of these.
43. When a source sound approaches a stationary listener, sound heard by the listener becomes shrill because:
    (a) Speed of sound increase.
    (b) Wave length of sound waves increases.
    (c) Pitch increases due to an increase in frequency.
44. Which of the following represents compression wave?
(a) Light waves.
(b) Radio waves.
(c) Ultraviolet waves.
(d) Sound waves.
45. Distance between a node and antinodes in a loop is:
(a) Л
(b) Л/2
(c) Л/3
(d) Л/ 4

46. Characteristic of musical sound with the help of which notes of same pitch and intensity can be distinguished is called:
(a) Intensity level.
(b) Loudness.
(c) Quality.
(d) Doppler Effect.
47. Velocity of sound in air at 0^{o}C is:
    (a) 300 m/s.
    (b) 332 m/s.
    (c) 380 m/s.
    (d) 400 m/s.
48. If tension in a string is doubled, the frequency "f" of transverse standing waves produced in it will be:
    (a) 2 f
    (b) 4 f
    (c) ½ f
    (d) $\sqrt{2f}$
49. Speed of sound in a gaseous medium:
    (a) Increases with temperature.
    (b) Decreases with temperature.
    (c) Does not change with temperature.
50. Sound waves in air are:
    (a) Electromagnetic
    (b) Longitudinal
    (c) Transverse
51. Two vibrating bodies of slightly different frequencies produce:
    (a) Echo
    (b) Resonance
    (c) Beats
    (d) Doppler effect

The characteristic of a musical sound which distinguishes between notes of same pitch and intensity is known as: (6ii-a, 1996, 5-b I, 1999)
    (a) Quality
    (b) Loudness
    (c) Intensity level

53. Sound waves travel faster in: (6ii-b, 1996, 5-b ii, 1998)
    (a) Air
    (b) Water
    (c) Iron
54. The speed of sound: (5-I a, 1997)
    (a) Increases with temperature.
    (b) Decreases with temperature.
    (c) Does not change with temperature.

55. Sound waves are: (5-ii a, 1997)

(a) Longitudinal waves.
(b) Transverse waves.
(c) Not made of material medium.

56. The velocity of a wave of wave length Л and frequency v is given by; (5-a iii, 1998)

(a) V /λ
(b) λ/v
(c) V λ
(d) 1 / v λ

57. In aerodynamics the ratio of the velocity of sound waves to the velocity of the source of sound is called: (6-a iii, 1998)

(a) Beats
(b) Mach number
(c) Harmonics

58. When speed of jet planes becomes greater than the speed of sound than the loud sound produced is due to: (5-a I, 2000)

(a) Shock wave
(b) Standing wave.

59. For good acoustic of a hall, reverberation should be: (5-a ii, 2000)

(a) Too small
(b) Too large

60. Maximum beat frequency which human ear can detect is: (5-a iii, 2000)

(a) 3
(b) 5
(c) 7

61. Pitch of sound depends on: (5-a iv, 2000)

(a) Intensity
(b) Loudness
(c) Frequency

62. Which of the following represents compression waves: (5-a I, 2001)

(a) Sound waves
(b) Light waves
(c) Radio waves
(d) X-rays.

63. The distance between node and antinodes in a loop is (5-a ii, 2001)

(a) λ
(b) λ/2
(c) λ/3
(d) λ/4

64. The frequency of the transverse stationary waves produced in the string of a sonometer is "f". If only the tension in the string of a sonometer is doubled, the new frequency will be: 5-a iii, 2001)

(a) 2 f
(b) $\sqrt{2f}$
(c) F / 2
(d) 0.707 f

65. Decibel is: (6-a I, 2001)

(a) Musical instrument.
(b) Measure of intensity level.
(c) Wave length of noise.
(d) Musical note.

66. Beats are the result of: 6-a ii, 2001)

(a) Diffraction.
(b) Constructive interference only.
(c) Destructive interference only.
(d) Constructive and interference both.

67. Speed of sound waves does not depend upon: (6-a iii, 2001)

(a) Wind speed.
(b) Temperature.
(c) Pressure.
(d) Density of medium.

68. The relative intensity ($1/1_o$) of the sound of a jet engine is 10^{13}. The intensity level in decibel will be: (5-a I, Pre.med.2002)

(a) 13
(b) 130
(c) 1300
(d) 1.3

69. A spring mass system is performing simple harmonic motion with the time period "T". If we double the mass of its bob, the never time period will be: (5-a ii, Pre.med. 2002)

(a) T
(b) 2 T
(c) 1.414 T
(d) 0.707 T

70. Which of the frequencies of the sound waves is audible: (5-a iii, Pre-med.2002)

(a) 5 Hz
(b) 5000 Hz
(c) 25000 Hz
(d) 50 kHz.

71. If a spring is vibrating in its fundamental mode, then to excite to the next higher mode, the tension must be: (6-a I, Pre-med. 2002)

(a) Halved
(b) Doubled
(c) Tripled
(d) Quadrupled

72. Supersonic jets may produce a double sonic boom due to two shock waves within the time interval of: (6-a ii, Pre-med. 2002)

(a) 0.02 sec.
(b) 0.2sec
(c) 0.001 sec
(d) 0.21 sec.

73. as a source of sound moves away from a stationary listener. There is an apparent: (6-a iii, pre-med.2002)

(a) Decrease in wavelength.
(b) Increase in pitch.
(c) Decrease in phase.
(d) Decrease in pitch.

74. A 252 Hz. Tuning fork produces four beats per second when sounded with another tuning fork of unknown frequency. What are the two possible values for the unknown frequency? (5-a I, Pre-Eng.2002)

(a) 63 Hz
(b) 256 Hz
(c) 1008 Hz
(d) 248 Hz

75. We recognize the voice of a friend over the telephone by the……of sound. (5-a ii, Pre-Eng.2002)

(a) Quality.
(b) Intensity.
(c) Loudness.
(d) Pitch.

76. The acceleration of free fall on the moon is 1/6 of that on the earth. What would be the period on the moon of a simple pendulum which has a period of 1 second on the earth? (5-a iii, Pre-Eng. 2002)

(a) 1/6 second.
(b) 6 second.
(c) $\sqrt{6\ second}$.
(d) $1/\sqrt{6}$ Second.

77. When stationary waves are set up in a stretched string it has fundamental frequency of 1,000 Hz. What would be the new fundamental frequency if the tension in the wire is increased four times? (6-a I, pre-Eng. 2002)

(a) 080 Hz
(b) 500 Hz
(c) 1010 Hz
(d) 2000 Hz

78. When the temperature of air rises, the speed of sound waves increases because: (6-a ii, Pre-Eng.2002)

(a) Only frequency increases.
(b) Only wavelength increases.
(c) Both frequency and wavelength increases.
(d) Only wavelength decreases.

79. Frequency of oscillation of a simple pendulum depends upon: (6-a iii, Pre-Eng.2002)

(a) The mass of the bob.
(b) The amplitude of vibration.
(c) The length of the pendulum.
(d) None of them.

80. The time period of a simple pendulum depends upon: (5-a I, Pre-med. 2003)

(a) Length.
(b) Amplitude.
(c) Mass of the bob.
(d) Temperature.

81. The physical quantity which is related to loudness of sound is: (5-a ii, Pre-med.2003)

(a) Frequency.
(b) Intensity.
(c) Quality.
(d) Wavelength.

82. An object is executing simple harmonic motion. Its kinetic energy is maximum at: (5-a iii, Pre-med.2003)

(a) Mean position.
(b) Extreme position.
(c) At any point along the path.
(d) None of these.

83. When two bodies have slightly different frequencies, they produce: 6-a I, Pre-Eng.2003)

(a) Echo.
(b) Beats.
(c) Resonance.
(d) Polarization.

84. Which of the following properties of sound is affected by a change in temperature: (6-a ii, Pre-Eng.2003)

(a) Amplitude.
(b) Wavelength.
(c) Frequency.
(d) Intensity.

85. If the tension, in a string is made four times, the speed of transverse wave will be: (6-a iii,Pre-med.2003)

(a) Half.
(b) Double.
(c) Four times.
(d) The same.

86. Beats are produced due to (5-a I, Pre-Eng. 2003)

(a) Diffraction.
(b) Interference.
(c) Polarization.
(d) Resonance.

87. The unit of intensity level of sound is: (5-a ii, Pre-Eng. 2003)

(a) Watt.
(b) Joule.
(c) Decibel.
(d) Diopter.

88. If the bob of a simple pendulum is replaced by another bob of double mass but of the same size, its time period: (5-a iii, Pre-Eng. 2003)

(a) Increases.
(b) Decreases.
(c) Remains the same.
(d) Becomes infinity.

89. Supersonic waves have frequency of more than: (6-a I, Pre-Eng.2003)

(a) 20 Hz.
(b) 2000 Hz.
(c) 5000 Hz.
(d) 20000 Hz

90. When two exactly similar waves travel in a medium in opposite direction they produce: (6-a ii, Pre-Eng. 2003)

(a) Standing waves.
(b) Beats.
(c) Resonance.
(d) Diffraction.

91. The intensity level of sound of intensity 10^{-12} watt/m^2 in bel is: 6-a iii, Pre-Eng. 2003)

(a) Zero.
(b) One.
(c) Two.
(d) Three.

92. If the mass of the bob of a simple pendulum is doubled, its time period will: (5a I 04)

(a) Double.
(b) Be half.
(c) Remain constant

93. The value of elastic restoring force in case of a spring is

(a) K x.
(b) - K x.
(c) ½ K x.

94. The frequency of second's pendulum is: (5a iii 04)

(a) 1 Hz.
(b) 2 Hz.
(c) 0.5 Hz.

95. The pitch of sound depends upon: (6a I 04)

(a) Velocity.
(b) Intensity.
(c) Frequency.

96. Which of the following is compressional waves? (6a ii 04)

(a) Light waves.
(b) Sound waves.
(c) Radio waves.

.If two tuning forks of frequencies 256 Hz and 260 Hz are sounded together, the number of beats per second will be: (6a iii 04)

(a) 3.
(b) 4.
(c) 5.

98. If the bob of a vibrating simple pendulum is suddenly detached from the string at its mean position, it's path will be: (5a i 05)

(a) A straight line.
(b) A circle.
(c) A parabola.
(d) A hyperbola.

99. Human beings can hear sound of frequency: (5a ii 05)

(a) 5 Hz.
(b) 5000Hz.
(c) 25000 Hz.
(d) 50000 Hz.

100. The velocity of sound in a gas increases with: (5a iii 05)

(a) Temperature.
(b) Pressure.
(c) Loudness.
(d) Frequency.

101. Frequencies which are multiples of fundamental frequency are called: (6a I 05)

(a) Beat frequency.
(b) Nodal frequency.
(c) Harmonics.
(d) Doppler Effect.

102. Which of the following is not the property of sound waves? (6a ii 05)

(a) Interference.
(b) Diffraction.
(c) Polarization.
(d) Refraction.

103.'Sone' is the unit of. (6a iii 05)

(a) Intensity level.
(b) Intensity of sound.
(c) Pitch of sound.
(d) Quality of sound.

104. Beats are produced due to: 5a I 06)

(a) Diffraction.
(b) Interference.
(c) Polarization.
(d) Refraction.

105. Which of the following represents longitudinal waves: 5a ii 06)

(a) Light waves.
(b) Sound waves.
(c) Radio waves.
(d) X-rays.

106. The distance between two consecutive nodes of a stationary wave is: (5a iii 06)

(a) λ
(b) $\lambda/2$
(c) $\lambda/4$
(d) $\lambda/6$

107. The maximum number of beats per second that a human ear can detect is: (5a iii 06,07)

(a) 5
(b) 7
(c) 3
(d) 4

108. One sone at 1000 Hz. Is equal to (6a I 06)

(a) 60 dB.
(b) 40 dB.
(c) 30 sB.
(d) 100 dB.

109. The earth quack waves are the example of. (5a iii 06)

(a) Audible waves.
(b) Infrasonic waves.
(c) Shock waves.
(d) Ultrasonic waves.

110. Decibel is the unit of: (5a I 07)

(a) Wave length.
(b) Speed of waves.
(c) Intensity level.
(d) Frequency.

111. The speed of sound is highest in: (5a ii 07)

(a) Solid.
(b) Liquid.
(c) Gas.
(d) Vacuum.