MULTIPLE CHOICE QUESTIONS (MCQs):

(1) **The to and fro motion or up and down motion of a body about its mean position is called:**

* Translatory motion
* Vibratory motion
* Rotatory motion
* Angular motion

(2) **A vibratory motion is always under:**

* An applied force
* A restoring force
* A magnetic force
* A periodic force

(3) **Number of vibrations in one second is called:**

* Frequency
* Time period
* Amplitude
* Revolution

(4) **Time to complete one vibration is called:**

* Frequency
* Time period
* Amplitude
* Revolution

(5) **The maximum distance covered by a vibrating body from mean the position is called:**

* Frequency
* Time Period
* Amplitude
* Revolution

(6) **The value of elastic restoring force in case of a sprig:**

* kx
* $-kx$
* $\frac{1}{2}kx$
* $\frac{1}{2}kx^2$

(7) **In S.H.M the acceleration is:**

* Directly proportional to the displacement from mean position
* Inversely proportional to the displacement from mean position
* Directly proportional to the square of displacement from mean position
* Inversely proportional to the square of displacement from mean position

(8) **Simple harmonic motion is a type of:**

* Rotational motion
* Rectilinear motion
* Circular motion
* Elliptical motion

(9) **The acceleration of a projection on the diameter for a body moving along a circle is:**

* $-\omega^2 x$
* $-\omega x^2$
* $-\omega x^2$
* ωx^2

(10) **The acceleration of vibrating mass attached to the end of as elastic spring is:**

* $a = -\frac{k}{m}x$
* $a = \frac{k}{m}x$
* $a = -\omega^2 x$
* $a = \omega^2 x$

(11) **The velocity of a vibrating mass attached to the end of an elastic spring is:**

* $\sqrt{\frac{k}{m}(x_o^2 - x^2)}$
* $\sqrt{\frac{m}{k}(x_o^2 - x^2)}$
* $\sqrt{\frac{k}{m}(x^2 - x_o^2)}$
* $\sqrt{\frac{m}{k}(x^2 - x_o^2)}$

(12) **The maximum velocity of vibrating mass attached to the end of as elastic spring:**

* $x_o\sqrt{\frac{m}{k}}$
* $x_o\sqrt{\frac{k}{m}}$
* $x_o\sqrt{\frac{2k}{m}}$
* $x_o\sqrt{\frac{m}{2k}}$

(13) The unit of spring constant k are:

* Joule-sec
* Newton-sec
* Newton per meter
* Newton-metre

(14) The magnitude of the restoring force is the same as that of the applied force but its direction is:

* Same as that of the applied force
* Opposite to the applied force
* Perpendicular to the applied force
* Parallel to the applied force

(15) The instantaneous K·E of a mass attached to the end of an elastic spring is:

* $\frac{1}{2}k(x_o^2 - x^2)$
* $\frac{1}{2}k(x_o^2 + x^2)$
* $\frac{1}{2}k(x^2 - x_o^2)$
* $\frac{1}{2}k(x + x_o)$

(16) The maximum K·E of a mass attached to the end of an elastic spring is:

* $\frac{1}{2}kx^2$
* $\frac{1}{2}kx_o^2$
* $\frac{1}{4}kx_o^2$
* kx_o^2

(17) The instantaneous P·E of a mass attached to the end of an elastic spring is:

* $\frac{1}{2}kx_o^2$
* kx_o^2
* $\frac{1}{2}kx^2$
* kx^2

(18) In S.H.M the velocity of a particle is maximum at:

* Extreme positions
* Mean position
* Between mean and extreme position on the left side
* None of these

(19) In S.H.M the velocity of a particle is minimum at:

* Extreme positions
* Mean position
* Between mean and extreme position on the left side
* None of these

(20) For S.H.M. it is necessary that:

* $\chi \propto \chi$
* $\chi \propto -\chi$
* $a \propto \chi$
* $a \propto -\chi$

(21) An object is executing SHM. Its Kinetic energy is maximum at its:

* Mean position
* Extreme position
* At any point along the path
* Non of these

(22) A spring mass system is performing SHM with the period "T" .If we double the mass of its bob, the time period will be:

* T
* 2 T
* 1.414 T
* 0.707 T

(23) The projection of a particle moving in a circle has:

* Rectilinear motion
* Circular motion
* S. H. M
* None of these

(24) The product of time period and frequency of vibration of a particle is equal to:

* 0.5
* 1.0
* 2.0
* π

(25) The quantity which is conserved in simple harmonic motion is:

* Kinetic Energy
* Total energy
* Potential Energy
* Electrical Energy

(26) While passing through its equilibrium position the speed of a body executing simple Harmonic motion becomes:

* Zero
* Maximum
* One third
* Double

(27) The motion of simple pendulum is:

* Always simple harmonic * May be simple harmonic
* Can never be simple harmonic * Circular

(28) If the bob of a vibrating simple pendulum is suddenly detached from the string at its mean position path will be:

* a straight line * a circle * a parabola * a hyperbola

(29) The time period of a simple pendulum is:

* $T = \frac{1}{2\pi}\sqrt{\frac{l}{g}}$ * $T = 2\pi\sqrt{l/g}$ * $T = \frac{1}{2\pi}\sqrt{\frac{g}{l}}$ * $T = 2\pi\sqrt{g/l}$

(30) The time period of simple pendulum is directly proportional to:

* $\sqrt{L}$ * $\sqrt{g}$ * L * $\sqrt{1/L}$

(31) The time period of a simple pendulum depends upon:

* Length * Amplitude * Mass of the bob * Temperature

(32) The time period of a simple pendulums increases if its length:

* Decreases * Increases * Remain content * None of these

(33) If the mass of the bob of a simple pendulum is doubled, its time period will be:

* Double * Be half * Remain constant * None of these

(34) The frequency of oscillation of simple pendulum depends upon:

* The mass of bob * The amplitude of vibration
* The length of pendulum * None of these

(35) The time period of a second's pendulum on the moon will be:

* 4.9 Sec. * 12 Sec. * 2 Sec. * 0.33 Sec.

(36) The frequency of a second's pendulum:

* 1 Hz * 2 Hz * 0.5 Hz * 4 Hz

(37) A unit suitable for frequency is:

* Hertz * Cycle/Sec^2 * Vib./Sec^2 * m/Sec.

(38) The length of second pendulum on earth is:

* 98cm * 98.2cm * 99.2cm * 100cm

(39) The frequency of simple pendulum is:

* $f = 2\pi\sqrt{l/g}$ * $f = \frac{1}{2\pi}\sqrt{l/g}$ * $f = 2\pi\sqrt{g/l}$ * $f = \frac{1}{2\pi}\sqrt{\frac{g}{l}}$

(40) At what place motion of a simple pendulum becomes fastest:

* Lahore * Murree * Karachi * Multan

(41) This of the following does not exhibit simple harmonic motion:

* A hanging spring supporting a weight * The balance wheel of a watch
* The wheel of an automobile * The spring of violins

(42) The time period of a simple pendulum depend upon:

* Mass * Length
* Value of g * Both length and value of g

ANSWER KEY

(1) Vibratory motion	(2) A restoring force
(3) Frequency	(4) Time period
(5) Amplitude	(6) $-k\chi$
(7) Directly proportional to the displacement from mean position	(8) Rectilinear motion
(9) $-\omega^2 x$	(10) $a = -\frac{k}{m}x$
(11) $\sqrt{\frac{k}{m}(x_o^2 - x^2)}$	(12) $x_o\sqrt{\frac{k}{m}}$
(13) Newton per metre	(14) Opposite to the applied force
(15) $\frac{1}{2}k(x_o^2 - x^2)$	(16) $\frac{1}{2}kx_o^2$
(17) $\frac{1}{2}Kx^2$	(18) Mean position
(19) Extreme positions	(20) $a \propto -\chi$
(21) Mean position	(22) 1.414T
(23) S.H.M.	(24) 1.0
(25) Total energy	(26) Maximum
(27) Maybe simple harmonic	(28) A straight line
(29) $T = 2\pi\sqrt{l/g}$	(30) $\sqrt{L}$
(31) Length	(32) Increase
(33) Remain constant	(34) The length of pendulum
(35) 2 Sec	(36) 0.5 Hz
(37) Hertz	(38) 100cm
(39) $f = \frac{1}{2\pi}\sqrt{g/l}$	(40) Karachi
(41) The wheel of an auto mobile	(42) Both length and value of g

MULTIPLE CHOICE QUESTIONS (MCQs):

(1) **Wave transports:**

✓ Energy * Matter * Mass * None of these

(2) **The waves which do not require any medium for their propagation are called:**

* Matter waves * Sound waves

✓ Electromagnetic waves * Water waves

(3) **The waves which require a medium for their propagation are called:**

✓ Mechanical waves * Matter waves

* Carrier waves * Electromagnetic waves

(4) **In transverse waves:**

* The particles of the medium are vibrating along the direction of wave motion

✓ The particles of the medium are vibrating at right angle to the direction of wave motion

* The particles of the medium do not vibrate at all

* The particles of the medium are vibrating in the opposite direction of wave motion

(5) **In longitudinal waves:**

✓ The particles of the medium are vibrating along the direction of wave motion

* The particles of the medium are vibrating at right angle to the direction of wave motion

* The particles of the medium do not vibrate at all

* The particles of the medium are vibrating in the opposite direction of wave motion

(6) **Water waves are:**

* Longitudinal wave * Complex wave

✓ Transverse wave * Both longitudinal wave and transverse wave

(7) **When stationary waves are set up in a stretched string it has fundamental frequency 1000 Hz.**
What would in the new fundamental frequency if the tension in the string is increased four times.

* 980Hz * 500Hz * 1010Hz. * 2000Hz

(8) **When two identical traveling wave are superposed the velocity of resultant wave.**

* Increases * Decreases * Becomes zero * Remains constant

(9) **Wave transmit from one place to another:**

* Mass * Weight * Momentum ✓ Energy

(10) **A uniform string of length L, mass m is fixed at both ends under tension T. It can vibrate with lowest frequency given be:**

* $\upsilon = \frac{1}{2L}\sqrt{T/\mu}$ * $\upsilon = \frac{1}{2}\sqrt{T/\mu}$ * $\upsilon = L\sqrt{\frac{T}{\mu}}$ * $\upsilon = 2L\sqrt{T/\mu}$

(11) **The speed of a transverse wave along a string of length L and stretched with tension T is given by:**

* $\sqrt{\frac{T}{m}}$ * $\sqrt{\mu/T}$ * $\sqrt{T/\mu}$ * $\sqrt{T\mu}$

(12) **The distance between two consecutive nodes of a stationary wave:**

* λ ✓ $\lambda/2$ * $\lambda/4$ * $\lambda/6$

(13) The distance between a node and its successive antinode is:

* 2λ * $\lambda/2$ * $\lambda/4$ * λ

(14) In a sonometer if the Linear density of the wire increased four times, the frequency of vibration:

* Remains the same * Increases four times
* Increases two times * Decreases half

(15) If a string of length 'L' vibrates in one loop, its wave length is given of:

* $\lambda = \frac{L}{2}$ * $\lambda = L$ * $\lambda = \frac{L}{4}$ * $\lambda = 2L$

(16) When two exactly similar waves travel in a medium is opposite direction the produce:

* Standing wave * Beats * Resonances * Diffraction

(17) One the following represents longitudinal wave:

* Light wave * Sound wave * Radio wave * X- rays

(18) If the period of wave motion is 4 sec. and speed 8 m/s. then its frequency is:

* 0.25 Hz * 0.5 Hz * 1 Hz * 2 Hz

(19) The wave which require a medium for their movement are called:

* Mechanical waves * Matter waves
* Carrier waves * Electromagnetic waves

(20) A wave generator produces 20 waves in 4 se. Its frequency is:

* 2Hz * 4Hz * 5Hz * 6Hz

(21) The wave speed of transverse wave in term of its wavelength λ and period T is:

* $V = \lambda T$ * $V = \lambda T^2$ * $V = \lambda^2 T$ * $V = \frac{\lambda}{T}$

(22) A transverse wave has a wavelength 1m and period of 2 sec. Its speed is:

* 0.5m/Sec * 0.5cm/Sec * 1.0m/Sec * 2.0m/Sec

(23) If a transverse wave has speed of 20m/Sec and a frequency of 20Hz, its wave length:

* 1cm * 1m * 10m * 10cm

(24) With increase in stretching force of a wire, its frequency:

* Decreases * Increases
* Does not change * Sometimes increases or decreases

(25) The waves which do not required any medium for their movement are called:

* Compressional waves * Mechanical waves
* Matter waves * Electromagnetic waves

(26) Frequency which are multiple of fundamental are called:

* Beat frequency * Nodal frequency * Harmonics * Doppler frequency

(27) When the tension in a string is increased four times, the speed of wave in the string is:

* Halved * Doubled
* Reduced to one fourth * Increased 4 time

(28) The frequency of wave produced in a stretched string depends upon:

* Length * Tension * Linear density * All of these

(29) When a wave enters from one medium to other, no change occurs in:

* Frequency * Wavelength * Amplitude * Speed

ANSWER KEY

(1) Energy	(2) Electromagnetic waves
(3) Mechanical waves	(4) The particles of the medium are vibrating at right angle to the direction of wave motion
(5) The particles of the medium are vibrating along the direction of wave motion	(6) Transverse waves
(7) 2000Hz	(8) Remains constant
(9) Energy	(10) $\upsilon = \frac{1}{2L}\sqrt{T/\mu}$
(11) $\sqrt{T/\mu}$	(12) $\lambda/2$
(13) $\lambda/4$	(14) Decreases half
(15) $\lambda = 2L$	(16) Standing waves
(17) Sound waves	(18) 0.25Hz
(19) Mechanical waves	(20) 5Hz
(21) $v = \frac{\lambda}{T}$	(22) 0.5m/sec
(23) 1m	(24) Increases
(25) Electromagnetic waves	(26) Harmonics
(27) Doubled	(28) All of these
(29) Frequency	

MULTIPLE CHOICE QUESTIONS (MCQs):

(1) **A decibel is a:**
* Musical instrument * Musical note & wavelength ✓ Measure of intensity level

(2) **Beat are the result of:**
* Diffraction * Constructive interference only
* Destructive interference only * Constructive and destruction interference both

(3) **Speed of sound waves does not depend upon:**
✓ Wind speed * Temperature * Pressure * Density

(4) **A 252Hz timing fork produces four beats per second when sounded with another tuning fork of unknown frequency:**
* 63Hz * 256Hz * 1008Hz * 252Hz

(5) **We recognize the voice of friend over the telephone by virtue of:**
✓ Quality * Intensity * Loudness * Pitch

(6) **When the temperature of air rises, the speed of sound wave increases because:**
* Only frequency increases * Only wavelength increases
* Both frequency and wavelength increases * Only wavelength decreases

(7) **The relative intensity I/I_o of the sound of a jet engine is 10^{13}. The intensity level in dB will be:**
* 30 * 130 * 1300 * 1.3

(8) **Which of the following frequency of the sound wave is audible:**
* 5Hz ✓ 5000Hz * 2500KHz * 50KHz

(9) **As a source of sound moves away from a stationer listener, there is an apparent frequency:**
* Decreases in wave length * Increase in pitch * Decrease in phase ✓ Decrease in pitch

(10) **The Physical quantity which is related to loudness of sound is:**
* Frequency * Intensity * Quality * Wavelength

(11) **When two vibrating bodies have slightly different frequency, they produce:**
* Echo * Beats * Resonance * Polarization

(12) **Which one of the following properties of sound is effected by the change in temperature:**
* Amplitude * Wavelength * Frequency * Intensity

(13) **The unit of intensity level of sound is:** * Watt * Joule ✓ Decibel * Diopter

(14) **The intensity level of sound of intensity 10^{-12} watt/m^2 is a bell is:**
* Zero * One * Two * Three

(15) **The pitch of sound depends upon:**
* Velocity * Intensity * Frequency * Amplitude

(16) **Which of the following is compressional waves:**
* Light wave * Sound wave * x – rays * y – rays

(17) **Sone is the unit of:**
* Intensity level * Intensity of sound * Pitch of sound * Loudness of sound

(18) **The maximum number of beats / second that a human can dect is:**
* 5 ✓ 7 * 3 * 4

(19) **One sone at 1000 Hz is equal to:** * 60d B * 40d B * 30d B * 100d B

(20) **The earthquake waves are the example of:**
* Audible waves ✓ Infrasonic waves * Shock waves * Ultra sonic waves

(21) **When the temperature is increased by 10°C the speed of sound is:**
* Increased by 610 cm/s * Decreased by 610 m/s
* Increased by 283 cm/s * Decreased by 283 cm/s

(22) **The wave length of sound is increased when:**
* The source moves toward the listener * The listener moves toward the sources
* The source moves away from the listener * The listener moves away from the source

(23) **According to Weber Fechner law:**
* $L \propto \text{Log } L/I_o$ * $L \propto \text{Log } I$ * $L \propto I$ * $L = I_o$

(24) **In aerodynamics the Mach number is equal to:**
* $V\ V_s$ * $\frac{V}{V_s}$ * V^2 / V_s * $\frac{V_s}{V}$

(25) **The velocity of sound in vacuum at 0°C:**
* 332m/sec * 344m/s * 330m/s * 0

(26) **Power Law determines:** * Power * Work * Intensity * Loudness of sound

ANSWER KEY

1. Measure of intensity level	2. Constructive and destructive interference both.
3. Wind speed	4. 256Hz
5. Quality	6. Only waveength increases
7. 30	8. 5000Hz
9. Decrease in pitch	10. Intensity
11. Beats	12. Wavelength
13. Decibel	14. Zero
15. Frequency	16. Sound wave
17. Loudness of sound	18. 7
19. 40 dB	20. Infrasonic waves
21. Increased by 610 cm /s	22. The source moves away from the listener
23. $L \propto \text{Log } I$	24. $\frac{V}{Vs}$
25. 0	26. Loudness of sound