

Question FBQ1 :

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| When the motion of particles of the medium is perpendicular to the direction in which the wave propagates, it is called a ____ wave. |
|--|

Answer: Transverse

Question FBQ2 : Two identical inductively coupled circuits, each having a natural frequency of 600 Hz, have coupling coefficient 0.44. Calculate the two normal mode frequencies.

Answer: 500 Hz and 802 Hz

Question FBQ3 : When a wave travels through a medium, the resistance to wave motion in a medium is called ____.

Answer: Impedance

Question FBQ4 : In a____, the magnitude of restoring force is linearly proportional to the displacement

Answer: spring-mass system

Question FBQ5 : What is the phase angle of this equation
$$x = A \cos(\omega t + \phi)$$

Answer: $\omega t + \phi$

Question FBQ6 : The restoring force is always directed towards the____of an oscillating body.

Answer: equilibrium position

Question FBQ7 : ____ is a type of periodic motion where the restoring force is proportional to the displacement.

Answer: Harmonic vibration

Question FBQ8 : In the case of simple harmonic motion (SHM), if the particle is at the mean position, then the particle is in____.

Answer: Stable equilibrium

Question FBQ9 : The quantity $\frac{d^2x}{dt^2} + \frac{k}{m}x = 0$ has a dimension of ____.

Answer: T^{-2}

Question FBQ10 : The quantity $\frac{d^2x}{dt^2} + \frac{k}{m}x = 0$ has a dimension of ____.

The $\frac{k}{m}$ in the above equation is replaced by $\frac{1}{m} \frac{d^2x}{dt^2}$

ω angular frequency of the oscillatory motion, because
Answer: they have same unit

Question FBQ11 : When a system is said to be heavily damped, the motion of the system is said to be _____.
Answer: Dead beat

Question FBQ12 : When $\omega < \omega_0$, we refer to it as a case of _____ damping.
Answer: Weak

Question FBQ13 : $x = m \cos(\omega t + \phi)$, the amplitude of this equation is _____.
Answer: m

Question FBQ14 : Amplitude is defined as _____.
Answer: Maximum displacement of an oscillating body

Question FBQ15 : Calculate the characteristic impedance offered by a thin wire of steel stretched by a force of 80 N weighing 2g per metre.
Answer: 0.4 N/ms

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Question FBQ17 : What sound does our vocal cord create inside the throat when we talk?
Answer: Vibration

Question FBQ18 : When a progressive wave reaches the boundary of a finite medium or an interface between two media, waves undergo _____ or/and _____.
Answer: Reflection refraction

Question FBQ19 : _____ is the minimum displacement of wave.
Answer: Trough

Question FBQ20 : The locus of points in the same phase at a particular time is called _____.
Answer: wavefront

Question FBQ21 : Waves set up by a single, isolated disturbance are called _____.
Answer: Pulses

Question FBQ22 : The simplest type of a periodic wave is a _____ wave.
Answer: harmonic

Question FBQ23 : _____ are waves that occur at the boundary
Answer: Rayleigh waves

Question FBQ24 : The displacement of a particle executing simple harmonic motion is given by, $x = 0.25 \cos(4\pi t + 0.078)$ in metre. The amplitude is _____.

Answer: 0.25

Question FBQ25 :

Answer: - $\pi \sin 4\pi t + 0.078$

Question FBQ26 : The ____ waves govern the working of a radar for
detection of aircrafts.

Answer: Reflection of electromagnetic waves

Question FBQ27 : When a wave moves from a lighter to a denser medium,
its velocity ____

Answer: Decreases

Question FBQ28 : The _____ conditions are the conditions which must be satisfied at the interface where the two media meet

Answer: Boundary

Question FBQ29 : When $Z_2 > Z_1$, the second string (medium) is denser, R_2 is still _____, implying a phase change of π on reflection.

Answer: Negative

Question FBQ30 : When resistance to motion is very strong, the system is said to be _____ damped.

Answer: heavily

Question FBQ31 : If the source of a wave is so far from away from an aperture that the wavefront generating the diffraction pattern is regarded as plane wavefront, we have _____ diffraction

Answer: Fraunhofer

Question FBQ32 : The waves produced by a motor boat sailing in water are_____.

Answer: Transverse waves

Question FBQ33 : _____is the superposition of many waves of same amplitude and frequency, but differing slightly in phase.

Answer: Diffraction

Question FBQ34 : The statement that every point on an advancing wave front is a source of secondary wavelet is _____ principle.

Answer: Huygen's

Question FBQ35 : The intensity of a wave is the measure of its _____across a unit area perpendicular to the direction of motion.

Answer: power

Question MCQ1 : Which of the following is/are an example of a mechanical wave (I) Sound wave (II) Water waves (III) Light waves

Answer: I and II only

Question MCQ2 : Which of the following is not a property of a longitudinal wave?

Answer: Polarisation

Question MCQ3 : The frequency of wave is 0.002 Hz. Its time period is _____.

Answer: 500s

Question MCQ4 : A pendulum suspended from the roof of a train has a period T (When the train is at rest). When the train is accelerating with a uniform acceleration 'a', the time period of the pendulum will _____.

Answer: Decrease

Question MCQ5 : In simple harmonic motion, velocity at equilibrium position is _____.

Answer: Maximum

Question MCQ6 : Over-damping results to _____.

Answer: slower return to equilibrium

Question MCQ7 : In simple harmonic motion (SHM), the particle is:

Answer: Alternately accelerated and retarded

Question MCQ8 : A damped system is characterised by all of the

following except _____.

Answer: critical damping

Question MCQ9 : The total energy of a particle executing SHM is proportional to _____.

Answer: square of amplitude of motion

Question MCQ10 : Which of the following options is incorrect of damping motion?

Answer: Enthalpy change

Question MCQ11 : Which of the following represent stokes law?

Answer: $6\pi\eta r v$

Question MCQ12 : In the equation $F_d = -\gamma v$, the negative sign indicates that _____.

Answer: the damping force opposes motion

Question MCQ13 : A vibration of a pendulum in a viscous medium such as thick oil is an example of _____.

Answer: Heavily damped system

Question MCQ14 : For a simple harmonic oscillator, the number of vibrations executed per second is called _____.

Answer: Frequency

Question MCQ15 : The intensity of a wave is the measure of its _____.

Answer: power across a unit area perpendicular to the direction of motion

Question MCQ16 : A student tunes a guitar by comparing the sound of the string with that of a standard tuning fork. He notices a beat frequency of 5 Hz when both sounds are superposed. He tightens the guitar string and finds the beat frequency rises to 8 Hz. What should he do to match the frequency of the string to that of the tuning fork?

Answer: He must loosen the guitar string

Question MCQ17 : A note of frequency 1200 vibrations/s has an intensity of $2.0 \mu\text{W/m}^2$. What is the amplitude of the air vibrations caused by this sound?

Answer: $1.28 \times 10^{-4} \text{ m}$

Question MCQ18 : When the motion of particles of the medium is along the direction in which wave propagates, it is called a _____.

Answer: Longitudinal wave

Question MCQ19 : Oscillations become damped due to _____.

Answer: Frictional force

Question MCQ20 : The time period of a pendulum on Earth is 1.0 s. What would be the period of a pendulum of the same length on a planet with half the density but twice the radius of Earth?

Answer: 1.0s

Question MCQ21 : Two sound waves have intensities 0.4 and 10 W/m^2 , respectively. How many decibels is one louder than the other?

Answer: 14 Db

Question MCQ22 : A simple pendulum has a period of 2 s and an amplitude of 50. After 20 complete oscillations, its amplitude is reduced to 40. Find the damping constant and the time constant.

Answer: 179.5 s^{-1}

Question MCQ23 : The quality factor of a sonometer wire is 4,000. The wire vibrates at a frequency of 300 Hz. Find the time in which the amplitude decreases to half of its original value.

Answer: 2.94s

Question MCQ24 : What is the ratio of the wavelength to the period of a wave?

Answer: velocity

Question MCQ25 : A box of mass 0.2 kg is attached to one end of a spring whose other end is fixed to a rigid support. When a mass of 0.8 kg is placed inside the box, the system performs 4 oscillations per second and the amplitude falls from 2 cm to 1 cm in 30 sec. Calculate the relaxation time.

Answer: 43.5s

Question MCQ26 : A box of mass 0.2 kg is attached to one end of a spring whose other end is fixed to a rigid support. When a mass of 0.8 kg is placed inside the box, the system performs 4 oscillations per second and the amplitude falls from 2 cm to 1 cm in 30 sec. Calculate the quality factor.

Answer: 250

Question MCQ27 : The quality factor of a tuning fork of frequency 512Hz is 6×10^4 . Calculate the time in which its energy is reduced to e^{-1} of its energy in the absence of damping.

Answer: 18.7s

Question MCQ28 : The quality factor of a tuning fork of frequency 512Hz is 6×10^4 . How many oscillations will the tuning fork make in this time?

Answer: 95.71×10^2

Question MCQ29 : As amplitude of resonant vibrations decreases, degree of damping _____.

Answer: Decreases

Question MCQ30 : An electric bell has a frequency 100Hz. If its time constant is 2s, determine the Q factor for the bell.

Answer: 1256

Question MCQ31 : The dot or scalar product of a force and a displacement vectors defines_____.

Answer: Work

Question MCQ32 : In cars, springs are damped by _____.

Answer: Shock absorbers

Question MCQ33 : The distance between successive particles vibrating in phase is known as _____.

Answer: Wavelength

Question MCQ34 : At a distance of 1m from a bursting cracker, the intensity of sound is $8.5 \times 10^{-5} \text{ W m}^{-2}$ and the threshold of human hearing is about $10^{-12} \text{ W m}^{-2}$. If sound waves spread out evenly in all directions, how far from the source could such a sound be heard?

Answer: 9 km

Question MCQ35 : A 1 m long string having mass 1 g is stretched with a force of 10 N. Calculate the speed of transverse waves.

Answer: 5000 m/s