QB365 Question Bank Software Study Materials

Waves 50 Important 1 Marks Questions With Answers (Book Back and Creative)

11th Standard

Physics

Total Marks : 50

Multiple Choice Question

50 x 1 = 50

1) A student tunes his guitar by striking a 120 Hertz with a tuning fork, and simultaneously plays the 4^{th} string on his guitar. By keen observation, he hears the amplitude of the combined sound oscillating thrice per second. Which of the following frequencies is the most likely the frequency of the 4^{th} string on his guitar?

(a) 130 **(b) 117** (c) 110 (d) 120

2) A transverse wave moves from a medium A to a medium B. In medium A, the velocity of the transverse wave is 500 ms^{-1} and the wavelength is 5 m. The frequency and the wavelength of the wave in medium B when its velocity is 600 ms^{-1}, respectively are

(a) 120 Hz and 5 m (b) 100 Hz and 5 m (c) 120 Hz and 6 m **(d) 100 Hz and 6 m**

3) For a particular tube, among six harmonic frequencies below 1000 Hz, only four harmonic frequencies are given: 300 Hz, 600 Hz, 750 Hz and 900 Hz. What are the two other frequencies missing from this list?

(a) 100 Hz, 150 Hz **(b) 150 Hz, 450 Hz** (c) 450 Hz, 700 Hz (d) 700 Hz, 800 Hz

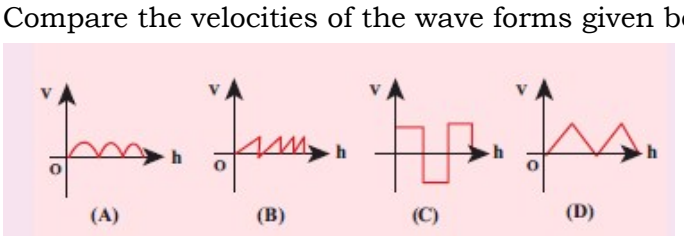
4) Which of the following options is correct?.

A	B
(1) Quality	(A) Intensity
(2) Pitch	(B) Waveform
(3) Loudness	(C) Frequency

Options for (1), (2) and (3), respectively are

(a) (B), (C) and (A) (b) (C), (A) and (B) (c) (A), (B) and (C) (d) (B), (A) and (C)

5) Compare the velocities of the wave forms given below, and choose the correct option.



where, v_A, v_B, v_C and v_D are velocities given in (A), (B), (C) and (D), respectively.

(a) $v_A > v_B > v_D > v_C$ (b) $v_A < v_B < v_D < v_C$ **(c) $v_A = v_B = v_D = v_C$** (d) $v_A > v_B = v_D > v_C$

6) A sound wave whose frequency is 5000 Hz travels in air and then hits the water surface. The ratio of its wavelengths in water and air is

(a) 4.30 (b) 0.23 (c) 5.30 (d) 1.23

7) A person standing between two parallel hills fires a gun and hears the first echo after t_1 sec and the second echo after t_2 sec. The distance between the two hills is

(a) $\frac{v(t_1-t_2)}{2}$ (b) $\frac{v(t_1t_2)}{2(t_1+t_2)}$ (c) v (t_1 + t_2) **(d)** $\frac{v(t_1+t_2)}{2}$

8) An air column in a pipe which is closed at one end, will be in resonance with the vibrating body of frequency 83Hz. Then the length of the air column is

(a) 1.5 m (b) 0.5 m **(c) 1.0 m** (d) 2.0 m

9) The displacement y of a wave travelling in the x direction is given by y = (2×10^{-3}) sin (300t - 2x + $\frac{\pi}{4}$), where x and y are measured in metres and t in second. The speed of the wave is

(a) 150 ms^{-1} (b) 300 ms^{-1} (c) 450 ms^{-1} (d) 600 ms^{-1}

10) Consider two uniform wires vibrating simultaneously in their fundamental notes. The tensions, densities, lengths and diameter of the two wires are in the ratio 8 : 1, 1 : 2, x : y and 4 : 1 respectively. If the note of the higher pitch has a frequency of 360 Hz and the number of beats produced per second is 10, then the value of x : y is

(a) 36 : 35 (b) 35 : 36 (c) 1 : 1 (d) 1 : 2

11) Which of the following represents a wave

(a) $(x - vt)^3$ (b) x(x+vt) (c) $\frac{1}{x+vt}$ **(d) sin(x+vt)**

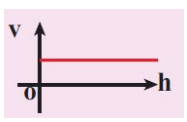
12) A man sitting on a swing which is moving to an angle of 60° from the vertical is blowing a whistle which has a frequency of 2.0 k Hz. The whistle is 2.0 m from the fixed support point of the swing. A sound detector which detects the whistle sound is kept in front of the swing. The maximum frequency the sound detector detected is

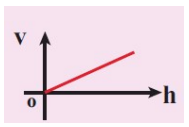
(a) 2.027 kHz (b) 1.974 kHz (c) 9.74 kHz (d) 1.011 kHz

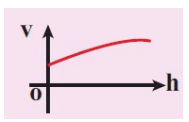
13) Let y = $\frac{1}{1+x^2}$ at t = 0 s be the amplitude of the wave propagating in the positive x-direction. At t = 2 s, the amplitude of the wave propagating becomes $y = \frac{1}{1+(x-2)^2}$. Assume that the shape of the wave does not change during propagation. The velocity of the wave is

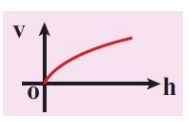
(a) 0.5m s^{-1} **(b) 1.0m s^{-1}** (c) 1.5m s^{-1} (d) 2.0m s^{-1}

14) A uniform rope having mass m hangs vertically from a rigid support. A transverse wave pulse is produced at the lower end. Which of the following plots shows the correct variation of speed v with height h from the lower end?

(a) 

(b) 

(c) 

(d) 

15) An organ pipe A closed at one end is allowed to vibrate in its first harmonic and another pipe B open at both ends is allowed to vibrate in its third harmonic. Both A and B are in resonance with a given tuning fork. The ratio of the length of A and B is

(a) $\frac{8}{3}$ (b) $\frac{3}{8}$ **(c) $\frac{1}{6}$** (d) $\frac{1}{3}$

16) Speed of sound wave in air _____.

(a) independent of temperature (b) increase with pressure **(c) increase with increase in humidity**

(d) decreases with increase in humidity

17) The displacement y of a wave travelling in the x-direction is given by y = 10^{-4} sin (600t - 2x + $\pi\sqrt{3}$) Where is expressed in metres t is seconds, the speed of the wave motion(in ms^{-1}) is _____.

(a) 300 (b) 600 (c) 1200 (d) 200

18) Length of a string tied to two rigid supports is 40 cm maximum length of a stationary wave produced on it is _____.

(a) 20 **(b) 80** (c) 40 (d) 120

19) Tube A has both ends open, while tube B has one and closed, otherwise they are identical the ratio of fundamental frequency of tubes A & B is _____.

(a) 1: 2 (b) 1: 4 **(c) 2: 1** (d) 4: 1

20) A sound absorber attenuates the sound level by 20dB the intensity decreases by a factor of _____.

(a) 100 (b) 1000 (c) 10000 (d) 10

21) A wave equation is y = 0.01 sin ($100\pi t$ - kx) of wave velocity is l00m/s, its number is equal to _____.

(a) 1 m^{-1} (b) 2 m^{-1} **(c) πm^{-1}** (d) $2\pi m^{-1}$

22) If an experment with sonometer, a tuning fork of frequency 256 Hz resonates with a length of 25cm and another tuning fork resonates with constants the frequency of the second tuning fork is _____.

(a) 163.84 Hz **(b) 400 Hz** (c) 320 Hz (d) 204.8 Hz

23) The fractional change in wavelength of light coming from a star is 0.014%. What is its velocity?

(a) 4.2×10^3 m/s (b) 3.8×10^8 m/s (c) 3.5×10^3 m/s **(d) 4.2×10^4 m/s**

24) Sound whose frequency is 50 Hz?

(a) has a relatively short wavelength (b) has a relatively long wavelength (c) is very loud (d) is very intense

25) Choose the correct statement _____

(a) sound waves are transverse waves (b) sound travels fastest through vaouum

(c) sound travels faster in solids than in gases (d) sound travels faster in gases than in liquids

26) Transverse waves can propagate _____.

(a) both in a gas and in a metal (b) in a gas but not in a metal (c) not in a gas but in a metal

(d) neither in a gas nor in a metal

27) The equation of a wave travelling in a string can be written as y = 3 cos {π(100t-x)} where y and x are in cm and t is in seconds. Then the value of wavelength is _____

(a) 100 cm **(b) 2 cm** (c) 50 cm (d) 4 cm

28) A wave of frequency 500 Hz has a velocity 300 m/s. The distance between two nearest points which are 60° out of phase, is _____

(a) 0.2 m (b) 0.1 m (c) 0.4 m (d) 0.5 m

29) The velocity of sound in are is not affected by change in the _____.

(a) atmospheric pressure (b) moisture content of air (c) temperature of air (d) composition of air

30) A longitudinal wave is described by the equation $y = Y_0 \sin 2\pi (ft-x/\lambda)$. The maximum particle velocity is equal to four times the wave velocity if _____

(a) $\lambda = \pi y_o/4$ **(b) $\lambda = \pi y_o/2$** (c) $\lambda = 4\pi y_o$ (d) $\lambda = 2\pi y_o$

31) If v_o and v denote the sound velocity and the rms velocity of the molecules in a gas, then _____

(a) $V_o = v(3\backslash\gamma)^{1/2}$ (b) $v_o = 0$ **(c) $V_o = v(\gamma/3)^{1/2}$** (d) v_0 and v are not related

32) The frequency of a radar is 780 MHz. When it is reflected from an approaching aeroplane the opponent frequency is more than the actual frequency by 2.6 kHz. The speed of the aeroplane is _____

(a) 0.25 km/s **(b) 0.5 km/s** (c) 1.0 km/s (d) 2.0 km/s

33) The equation of a transverse wave is given by y = 10 sin{n(0.01x - 2t)} where y and x are in cm and t is in seconds. Its frequency is _____.

(a) $10s^{-1}$ (b) $2s^{-1}$ **(c) $1s^{-1}$** (d) $0.01s^{-1}$

34) When sound waves travel from air to water, which of the following remains constant?

(a) velocity **(b) frequency** (c) wave length (d) all of these

35) Ultrasonic waves can be detected by _____.

(a) telephone (b) Hebb's method **(c) Kundt's tube** (d) Quincke's tube

36) Red shift is an illustration of _____.

(a) low temperature emission (b) high frequency absorption **(c) Doppler effect** (d) Same unknown Phenomenon

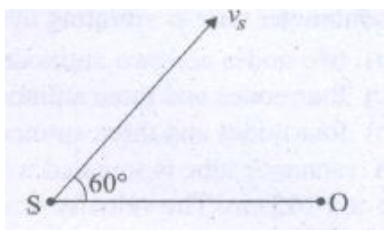
37) The Doppler effect is applicable for _____.

(a) light waves (b) sound waves (c) space waves **(d) both (a) and (b)**

38) A source of sound and a listener are approaching each other with a speed of 40 ms^{-1}. The apparent frequency of a note produced by the source is 400 Hz. Then its true frequency is (velocity of sound in air = 360 ms^{-1})_____

(a) 320 Hz (b) 400 Hz (c) 360 Hz (d) 420 Hz

39) A source of sounds emiting waves of frequency 100 Hz and an observer 0 are located at same distance from each other The source is moving with a speed of 19.4 ms^{-1} at an angle of 60° with the source-observer line as shown in the figure. The observer is at rest. The apparent frequency observed by the observer (velocity of sound in air 330 ms^{-1}) is _____.



(a) 97 Hz (b) 100 Hz **(c) 103 Hz** (d) 106 Hz

40) A vibrating stretched string resonates with a tuning fork of frequency 512 Hz when the length of the string is 0.5 m. The length of the string required to vibrate resonantly with a tuning fork of frequency 256 Hz would be _____.

(a) 0.25 m (b) 0.75 m (c) 1.0 m (d) 2.0 m

41) A wave of frequency 100 Hz is sent along a string towards a fixed end when this wave travels back after reflection, a node is formed at a distance of 10 cm from the fixed end of the string. The speed of the incident wave is _____

(a) 40 m/s **(b) 20 m/s** (c) 10 m/s (d) 5 m/s

42) Two open organ pipes of lengths 50 em and 50.5 em produce 3 beats/so Then the velocity of sound is _____.

(a) 300 m/s (b) 30 m/s **(c) 303 m/s** (d) 30.3 m/s

43) Two sound waves with wavelengths 5.0 cm and 5.5 cm, respectively each propagate in a gas with velocity 330 m/s. The number of beats per second will be _____

(a) 0 (b) 1 **(c) 6** (d) 12

44) A closes organ pipe of length 20 cm is sounded with a tuning fork in resonance. What is the frequency of the tuning fork? (v = 332 m/s)_____

(a) 300 Hz (b) 350 Hz (c) 375 Hz (d) 415 Hz

45) If we study the vibration of a pipe open at both ends, then which of the following statement is not true?

(a) open end will be antinode (b) odd harmonics of the fundamental frequency will be generated

(c) all harmonics of the fundamental **(d) pressure change will be maximum at both ends**

46) Which of the following statements is an incorrect statement?

(a) For wave propagation, the necessary properties of the medium are elasticity and inertia

(b) The waves which do not require a medium for their propagation is known as mechanical waves

(c) In a transverse wave, the vibrations of particles in a medium is perpendicular to the direction of propagation of the wave

(d) In a longitudinal wave, the vibrations of particles in a medium is parallel to the direction of propagation of the waves

47) An open organ pipe is in resonance with second harmonic with frequency f_1. Now one end of the tube is closed and frequency is increased to f_2 such that the resonance again occurs in n^{th} harmonic. Select the correct option _____.

(a) $n = 3, f_2 = \frac{5}{4} f_1$ **(b)** $n = 5, f_2 = \frac{5}{4} f_1$ (c) $n = 3, f_2 = \frac{3}{4} f_1$ (d) $n = 5, f_2 = \frac{3}{4} f_1$

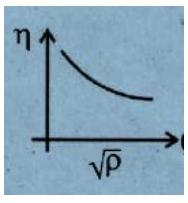
48) In a resonance tube the first resonance with a tuning fork occurs at 16 cm and second at 49 m. If the velocity of sound is 330 m/s then the frequency of tuning fork is _____Hz.

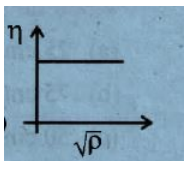
(a) 1000 (b) 250 **(c) 500** (d) 2000

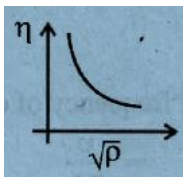
49) Reverberation time cannot be controlled by _____

(a) temperature **(b) changing carpet** (c) volume of room (d) size of window

50) Let I be length of a wire that generates a frequency η and its density be ρ. Which of the following graphs represents the variation between frequency (η) and square root of density $\sqrt{\rho}$ of the wire ?

(a) 

(b) 

(c) 

(d)