PHYSICS

BOOKS - NIKITA PHYSICS (HINGLISH)

WAVE MOTION

Multiple Choice Questions

1. Velocity of sound is maximum in

A. water

B. vacuum

C. air

D. metal

Answer: D

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2. The velocity of sound in air at $20^\circ C$ is $340 ms^{-1}$. Keeping the temperature constant, what will be the velocity of sound in air when the pressure of the gas is doubled?

A. doubled

B. remain constant

C. halved

D. four times

Answer: B

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3. Velocity of sound is maximum at NTP in

A. hydrogen

B. cabondioxide

C. oxygen

D. nitrogen

Answer: A

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4. The velocity of sound in a gas is directly proportional to the square root of the temperature of the gas taken in degree celsius .

A. directly proportional to square root of temperature

B. directly proportional to the temperature

C. inversely proportional to the square root of temperature

D. directly proportional to the square of temperature

Answer: A

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5. Laplace's correction in the formula for the speed of sound given by Newton was needed because sound waves

A. are longitudinal

B. propagate isothermally

C. propagate adiabatically

D. are long wavelength

Answer: C

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6. The velocity of sound is generally greater in solids than in gases because

A. the density of solids is high and the elasticity

B. the density of solids is high but the elasticity of solids is very high

C. both the density and elasticity of solids are low

D. the density of solids is low, but the elasticity is high

Answer: B

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7. When a sound wave goes from one medium to another, the quantity that remains unchanged is :

A. wavelength

B. velocity

C. frequency

D. propagation constant

Answer: C

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8. The ratio of intensity of wave and energy density gives

A. momentum

B. total energy

C. propagation constant

D. velocity

Answer: D

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9. Statement-1 : Sound travels faster in moist air

Statement-2 : The density of moist air is less then density of dry air.

A. moist air is heavier than dry air

B. the value of γ for moist air is greater than that for dry air

C. the pressure of moist air is greater than that of dry air

D. the density of moist air is less than that of dry air

Answer: D

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10. Velocity of sound in air depends on

A. temperature and pressure

B. prure and humidity

C. temperature and humidity

D. temperature, pressure and humidity

Answer: C

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11. If c_0 and c denote the sound velocity and the rms velocity of the molecules in a gas, then

A. $v = C_{rms}(\gamma/3)^{1/2}$

B. $C_{rms} = v(2/3)^{1/2}$

C. $v = C_{rms}$

D. $v = C_{rms}(3/\gamma)^{1/3}$

Answer: A

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12. What will be the speed of sound in a perfectly rigid rod?

A. zero

B. infinity

C. negative

D. 1400 m/s

Answer: B

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13. What name is given to sound waves of frequencies higher than 20 kHz?

A. Infrasonic waves

B. Ultrasonic waves

C. Audible waves

D. Supersonic waves

Answer: B

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14. Which of the following voice have and greater pitch ?

A. male

B. female

C. mosquito

D. tiger

Answer: C

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15. Which of the following have the maximum intensity of sound ?

A. male

B. tiger

C. female

D. man

Answer: B

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16. Intensity and loudness of sound depends on

A. frequency

B. velocity

C. amplitude

D. wavelength

Answer: C

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17. Which of the following have low pitch ?

A. males voice

B. second's pendulum

C. females voice

D. tigers

Answer: B

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18. Which of the following is th emusical note ?

A. hamming of a bee

B. thunder

C. roaring of a lion

D. beats of a second's pendulum

Answer: D

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19. Pitch of a musical note depends upon

A. amplitude of sound

B. the frequency of sound

C. the instrument

D. none of these

Answer: B

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20. The quality of a note changes when change occurs in

A. pitch

B. loudness

C. nature of overtone

D. waveforms

Answer: D

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21. The speed of a periodic wave is the product of its

A. wavelength and period

B. wavelength and frequency

C. period and frequency

D. amplitude and frequency

Answer: B

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22. The equation of a wave is, $y = 1.5 \sin(314t - 12.56x)m$.

The phase difference between two points 7.5 m apart is

A. 100π rad

B. 4π rad

C. 10π rad

D. 30π rad

Answer: D

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23. Loudness of a note of sound is

A. directly proportional to the amplitude of wave

B. directly proportional to the square of amplitude of the wave

C. inversely proportional to the square root amplitude of wave

D. directly proportional to the cube of intensity

Answer: B

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24. Ultrasonic, infrasonic and audio waves travel though a medium with speeds V_u, V_i and V_a respectively then :-

A. $v_a = v_i = a_a$

B. $v_u > v_a > v_i$

C. $v_u < v_a < v_i$

D. $v_a < v_u \text{ and } v_u = v_i$

Answer: A

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25. The relationship between velocity, wavelength and frequency is

A. $v = n\lambda$

B. $n = v\lambda$

C. $\lambda = vn$

D. $v = n / \lambda$

Answer: A

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26. The relation between wave velocity and maximum particle velocity is

(Where V_p = Particle velocity, V = Wave velocity)

A. $v_p = v$

B. $v_p = \frac{\lambda}{2\pi} v$

C. $v_p = \frac{2\pi A}{\lambda} v$

D. $v = \frac{\lambda}{2\pi} v_p$

Answer: C

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27. The bells of a college or a temple are made of large size.

It is for :

A. producing sound of high-pitch

B. producing loud sound

C. producing sound of high-quality

D. show

Answer: B

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28. The voice of a lion is different from that of a mosquito because

A. the two animals have different size

B. the two voice travel with different velocities

C. the sounds have different pitch

D. the sound have different phases

Answer: C

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29. The velocity of sound in a gas is proportional to

A. square root of isothermal elasticity

B. adiabatic elasticity

C. square root of adiabatic elasticity

D. isothermal elasticity

Answer: C

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30. The change in speed of sound in a gas is independent of change is

A. density of gas

B. temperature of gas

C. moisture content of the gas

D. wavelength of the sound wave

Answer: D

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31. Velocity of sound in air is not affected by change in

A. moisture content of air

B. temperature of air

C. atmospheric pressure

D. composition of air

Answer: C

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32. Velocity of sound in a gas..... With increase of pressure

A. increase

B. does not vary

C. decrease

D. either 'a' or 'c' depending on the gas

Answer: B

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33. Velocity of sound is maximum in

A. water

B. air

C. vaccum

D. metal

Answer: D

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34. The r.m.s velocity of the molecules of a gas is C and velocity of sound in the gas is V. The relation between V and C is

A. $\frac{V}{C} = \frac{\gamma}{3}$

B. $\frac{V}{C} = 3\gamma$

C. $\frac{V}{C} = \sqrt{3\gamma}$

D. $\frac{V}{C} = \sqrt{\frac{\gamma}{3}}$

Answer: D

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35. Velocity of sound in air..... With increases of moisture

A. increases

B. decreases

C. does not vary

D. either 'a' or 'b' depending on the gas

Answer: A

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36. If the volume elasticity of fresh water and sea water are assumed to be the same, it is necessary that for the velocity of sound to be the same

A. fresh water must be a hihger temperature

B. sea water must be at a higher temperautre

C. both must be at same temperature

D. fresh water must have higher refractive index

Answer: B

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37. If the velocity of sound in air at $0^{\circ} C$ is $332 m s^{-1}$, its velocity at $30^{\circ} C$ is

A. $200 m s^{-1}$

B. $300 m s^{-1}$

C. $350 m s^{-1}$

D. $996 m s^{-1}$

Answer: C

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38. The speed of sound in air and water is 340 m/s and 1420 m/s respectively. If sound waves have a wavelength of 2m in air, then the frequency of the same sound waves in water will be

A. 100 Hz

B. 125 Hz

C. 340 Hz

D. 170 Hz

Answer: D

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39. If a sound wave of frequency 500 Hz and velocity 350 m/s. Then the distance between the two particles of a phase difference of 60° will be nearly

A. 0.7 cm

B. 70 cm

C. 12 cm

D. 120 cm

Answer: C

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40. At room temperature the ratio of velocity of sound in air at 10 atmospheric pressure to the at 1 atmospheric pressure will be

A. $\sqrt{10} : 1$

B. $1 : \sqrt{10}$

C. $1:1$

D. $3:2$

Answer: C

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41. If a thunder clap is heard 5.5 s later than the lighting flash observed from the earth, then the distance of the flash will be

(Velocity of sound in air 330 m/s)

A. 780 m

B. 3560 m

C. 1815 m

D. 300 m

Answer: C

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42. The molecular weighs of oxygen and hydrogen are 32 and 2 respectively. The root mean square velocities of oxygen and hydrogen at NTP are in the ratio

A. $4:1$

B. $1:4$

C. $1:1$

D. $2:1$

Answer: B

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43. The temperature at which the speed of sound in air becomes double of its value at $0^\circ C$ is

A. $546^\circ C$

B. $819^\circ C$

C. $273^\circ C$

D. $1092^\circ C$

Answer: B

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44. The velocity of sound in air when temperature is halved and pressure doubled will be

(The velocity of sound in air at NTP is 330 m/s)

A. 234.2 m/s

B. 466.62 m/s

C. 165 m/s

D. 330 m/s

Answer: A

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45. The temperature at which the speed of sound in air becomes double of its value at $27^{\circ} C$ is

A. $273^{\circ}C$

B. $1200^{\circ}C$

C. $927^{\circ}C$

D. $1027^{\circ}C$

Answer: C

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46. If the young's modulus of the material of the rod is $2 \times 10^{11} N/m^2$ and its density is $8000 kg/m^3$ then the time taken by a sound wave to traverse 1m of the rod will be

A. $10^{-4}s$

B. $2 \times 10^{-4}s$

C. $10^{-2}s$

D. $2 \times 10^{-2}s$

Answer: B

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47. The velocity of sound in air at NTP is 330 m/s, What will be its value when temperature is tripled and pressure is halved ?

A. 330 m/s

B. 165 m/s

C. $330\sqrt{3}m/s$

D. $330/\sqrt{3}m/s$

Answer: C

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48. The velocity of sound in a gas is 300 m/s . The root mean square velocity of the molecules is $(\gamma = 1.4)$

A. 471.4 m/s

B. 400 m/s

C. 231 m/s

D. 462 m/s

Answer: A

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49. Every $1^{\circ} F$ rise in temperature, the speed of sound increases by

A. 0.61 m/s

B. 1.22 m/s

C. 1.19 m/s

D. 0.34 m/s

Answer: D

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50. Every $\hat{} \, (\circ) C$ rise in temperature, the speed of sound increases by

A. 0.61 m/s

B. 1.22 m/s

C. 0.34 m/s

D. 1.19 m/s

Answer: A

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51. If wavelength of a sound wave in a medium is reduced by 50% , then the percentage change in its frequency is

A. 0.5

B. 1

C. 0.25

D. 0.75

Answer: B

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52. Calculate the speed of sound in hydrogen at N.T.P., if density of hydrogen at N.T.P. is $1/16^{th}$ of air. Given that the speed of sound in air is 332 m/s.

A. 664 m/s

B. 332 m/s

C. 1328 m/s

D. $332 \times \sqrt{2}m/s$

Answer: C

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53. A hospital uses an ultrasonic scanner of frequency 3.2 MHz to locate the tumours in a tissue. The wavelength of ultrasonic waves in tissue in which the speed of the wave is 1.6 km/s is

A. $25 \times 10^{-5} m$

B. $5 \times 10^{-4} m$

C. $75 \times 10^{-5} m$

D. $2 \times 10^{3} m$

Answer: B

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54. The speed of sound in a gas is v and the root mean square speed of gas molecules is v_{rms}. If the ratio of the specific heats of the gas is 1.5 then the ratio v/v_{rms} is

A. $1:2$

B. $1:\sqrt{3}$

C. $1:\sqrt{2}$

D. $1:3$

Answer: C

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55. If the speed of sound at $0^{\circ}C$ is 330 m/s, then the speed of sound at $20^{\circ}C$ will be

A. 330 m/s

B. 340 m/s

C. 342 m/s

D. 324 m/s

Answer: C

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56. The speed of soun in a gas is v and the root mean squre speed of gas molecules is v_{rms}. If the ratio of the specific heats of the gas is 1.8, then the ratio v/v_{rms} is

A. $1:2$

B. $0.77:1$

C. $1 : \sqrt{3}$

D. $1 : 3$

Answer: B

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57. Compare the velocities of sound in hydrogen (H_2) and carbon dioxide (CO_2). The ratio of specific heats of H_2 and CO_2 are respectively 1.4 and 1.3 (Molecular weight of H_2 and CO_2 are 2 and 44)

A. 0.485

B. 4.85

C. 4.5

D. 2.2

Answer: B

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58. An observer standing at the sea coast observes $54 waves$ reaching the coast per minute. If the wavelength of a wave is $10m$, find the wave velocity.

A. 54 m/s

B. 9 m/s

C. 10 m/s

D. 6 m/s

Answer: B

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59. A light pointer fixed to one prong of a tuning fork touches gnetly a smoked vertical plate. The fork is set vibrating and the plate is allowed to fall freely. 8 complete oscilllations are counted when the plate falls through 10cm.What is the frequency of the tuning fork?

A. 280 Hz

B. 56 Hz

C. 560 Hz

D. 360 Hz

Answer: B

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60. The relation between particle velocity (v), the wave velocity (c) and the slope of the wave (s) is

A. $v = -cs$

B. $c = -vs$

C. $v^2 = -c^2 s$

D. $c^2 = -v^2 s$

Answer: A

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61. At what temperature the velocity of sound in air is 1.5 times the velocity at $7^{\circ} C$?

A. $357^\circ C$

B. $476^\circ C$

C. $588^\circ C$

D. $819^\circ C$

Answer: A

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62. A sound wave $y = A\sin(\omega t - kx)$ is propagating through a medium of density $'\rho'$. Then the sound energy per unit volume is

A. $1/2\rho\omega^2A^2$

B. $\rho A^2\omega^2$

C. $2\rho A^2\omega^2$

D. $4\rho A^2\omega^2$

Answer: A

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63. A progressive sound wave of frequency 500 Hz is travelling through air with a speed of 350 m/z. If a compression appears at a place at a instant, hten the minimum time interval after which the rarefaction occurs at the same point will be

A. 250s

B. $\frac{1}{250}s$

C. $\frac{1}{500}s$

D. $\frac{1}{1000}s$

Answer: D

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64. If a source sound of frequency 500 Hz produces waves of wavelength 0.1 m. Then the waves travel a distance of 300 m in the time in the time interval will be

A. 0.6 s

B. 6 s

C. 1.67 s

D. 50 s

Answer: B

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65. When a compressible wave is sent towards bottom of sea from a stationary ship it is observed that its echo is hear after $2s$. If bulk modulus of elasticity of water is $2 \times 10^9 N/m^2$, mean temperature of water is 4° and mean density of water is $1000 kg/m^3$, then depth of sea will be

A. 707 m

B. 1414 m

C. 2828 m

D. $2000 \times 10^3 m$

Answer: B

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66. The velocity of sound in alcohol is 1300 m/s and the density of alcohol is 0.08 g/cm^3. The bulk modulus of alcohol is

A. $0.65 \times 10^{-3} N/M^2$

B. $1.35 \times 10^3 N/m^2$

C. $0.65 \times 10^6 N/m^2$

D. $1.35 \times 10^8 N/m^2$

Answer: D

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67. Which of the following is a mechanical wave?

A. radio wave

B. X-rays

C. light wave

D. sound wave

Answer: D

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68. The sound is a form of energy which propagates through the medium in the form of

A. transverse waves

B. both longitudinal and transverse waves

C. longitudinal waves

D. electromagnetic waves

Answer: C

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69. Why are sound waves called mechanical waves ?

A. it require material medium for its propagation

B. it may not require any material medium for its propagation

C. it can pass through vacuum

D. it possess the property of elasticity

Answer: A

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70. The propagation of wave through the medium is possible only when the medium has

A. properly of elasticity

B. inertial property

C. low frictional resistance

D. all of the above

Answer: D

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71. A mechanical wave propagastes in a medium along the X-axis. The particles of the medium

A. along X-axis

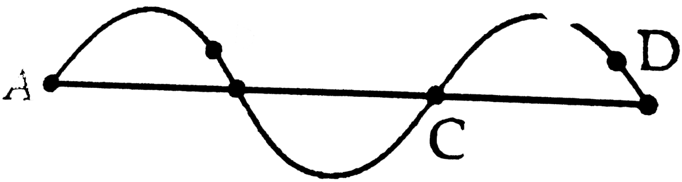
B. along X or Y axis

C. along Y - axis

D. along any direction

Answer: B

72. In the following figure the points are in the same phase are



A. A' and 'B'

B. A'

C. B', 'D' and 'A', 'C'

D. A' 'B' and 'C'

Answer: C

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73. A stone is dropped on the surface of water in pond. Name the type of waves produced.

A. transverse

B. stationary

C. longitudinal

D. electromagnetic waves

Answer: A

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74. Oscillatory disturbance travelling through the medium is

A. energy

B. momentum

C. wave

D. wave motion

Answer: C

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75. Which of the following properties of sound is affected by change in the temperature of air ?

A. amplitude

B. frequency

C. wavelength

D. intensity

Answer: B

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76. Wave motion is periodic in

A. space

B. space and time

C. time

D. direction

Answer: B

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77. The distance between two successive particles which differ in phase by

A. π radian is a wavelength

B. 2π radian is a wavelength

C. $\pi / 2$ radian is a wavelength

D. $2\pi / 3$ radian is wavelength

Answer: B

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78. The maximum displacement of any particles either sides of mean position when a progressive wave is propagating through a medium is

A. antinode

B. amplitude

C. node

D. wavelength

Answer: B

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79. During propagation of sound wave through air medium

A. the particles move forward

B. the particles do not vibrate

C. the particles vibrate about their mean position

D. there is no necessity of the medium

Answer: C

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80. The distance between two consecutive points which are in the same state of oscillation is

A. displacement

B. wavelength

C. amplitude

D. intensity

Answer: B

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81. Waves transport

A. energy only

B. momentum only

C. intensity

D. energy and momentum

Answer: A

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82. The sound is a form of

A. energy

B. disturbance

C. wave

D. all of the above

Answer: D

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83. Sound is produced due to

A. vibration of a body

B. collision of the body

C. passing current through a body

D. a' and 'b'

Answer: D

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84. Sound travels quickest in

A. air

B. vacuum

C. water

D. solids

Answer: D

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85. The state (or) condition of vibration of a vibrating body is known is

A. amplitude

B. displacement

C. phase

D. none of these

Answer: C

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86. Which of the following statements is wrong?

A. sound travels in a straight line

B. sound is a form of energy

C. sound travels as waves

D. sound travels faster in vaccum than in air

Answer: D

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87. Vibrations in a rod are

A. transverse

B. longitudinal

C. either 'a' or 'b'

D. both 'a' and 'b'

Answer: C

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88. The phase difference between particle velocity and wave velocity is

A. zero

B. $\frac{\pi}{4}$

C. $\frac{\pi}{2}$

D. $\frac{\pi}{6}$

Answer: C

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89. A big explosion on the moon cannot be heard on the earth because

A. the explosion produces high frequency sound waves which are inaudible

B. sound waves are require material medium for propagation

C. sound waves are absorbed in the atmosphere of moon

D. sound waves are absorbed in earth's atmosphere

Answer: B

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90. The sound carried by air from a sitar to a listener is a wave of the following type

A. longitudinal stationary

B. transverse propressive

C. transverse stationary

D. longitudinal progressive

Answer: D

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91. It is possible to distinguish between the transverse and longitudinal waves by studying the property of

A. interference

B. diffraction

C. reflection

D. polarisation

Answer: D

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92. The longitudinal wave propagates through the medium, the type of elasticity is

A. volume

B. shape

C. either volume or shape

D. volume and shape

Answer: A

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93. The window panes of houses some times get cracked due to some explosion at large distance. The wave responsible is

A. electromagnetic waves

B. longitudinal wave

C. shock waves

D. both longitudinal and treansverse waves

Answer: B

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94. A transverse wave passes through a medium, the maximum speed of the vibrating particle when the displacement of the particle from the mean position is

A. zero

B. equal to the amplitude

C. half of the amplitude

D. midway between mean and extreme position

Answer: A

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95. The angle between particle velocity and wave velocity in transverse wave is

A. zero rad

B. $\pi / 2$ rad

C. $\pi / 4$ rad

D. π rad

Answer: B

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96. The angle between particle displacement and its velocity in sound wave is

A. zero rad

B. $\pi / 2$ rad

C. $\pi / 4$ rad

D. $\pi / 3$ rad

Answer: A

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97. The sound wave propagates through

A. solids

B. gases

C. liquids

D. in all three states

Answer: D

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98. The velocity of sound in air is affected by change in the

(i) atmospheric pressure

(ii) moisture content of air

(iii) temperature of air

(iv) composition of air.

A. moisture content of air

B. atmospheric pressure

C. temperature of air

D. composition of air

Answer: B

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99. The sound energy can be transferred from one place to another place through the

A. bulk motion of matter

B. in the form of transverse waves

C. without bulk motion of the matter

D. without material medium

Answer: C

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100. If the direction of the vibration of particles is parallel to the direction of the propagation of a wave , then the wave is

A. transverse wave

B. stationary wave

C. longitudinal wave

D. electromagnetic waves

Answer: C

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101. If the direction of the vibration of particles is parallel to the direction of the propagation of a wave , then the wave is

A. transverse wave

B. stationary wave

C. longitudinal wave

D. none of these

Answer: A

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102. The compression is a region of medium where the particle are

A. widely separated

B. remains same

C. close together

D. none of these

Answer: C

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103. The rarefaction is a region of medium where the particles are

A. widely separated

B. remains same

C. close together

D. none of these

Answer: A

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104. A medium can carry a longitudinal wave because it has the property

A. Yong modulus

B. modulus of elasticity

C. Bulk modulus

D. all the modulus

Answer: C

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105. Transverse wave possesses the property of

A. Yong modulus

B. modulus of rigidity

C. Bulk modulus

D. volume elasticity

Answer: B

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106. Longitudinal waves cannot travel through

A. solids only

B. solid, liquid and gases

C. liquids only

D. liquid and gases only

Answer: B

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107. Transverse wave travels through

A. solids only

B. gases only

C. liquids only

D. solid and liquid

Answer: A

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108. Crest is a part of transverse wave which is called

A. concave

B. circular

C. convex

D. curved

Answer: C

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109. Trough is a part of transverse wave which is called

A. concave

B. circular

C. convex

D. curved

Answer: A

110. When a gun is fired on the moon the flash of light can be seen but sound can not be heard because

A. sound is not produced in vacuum

B. there is no atmosphere on the moon

C. moon is too far

D. moon absorbs sound

Answer: B

111. The velocity of a transverse wave in a string depends upon

A. length of the string

B. tension applied only

C. temperature

D. tension in the string and the linear density of the material

Answer: D

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112. Two identical wires of different materials are stretched by the same tesion. Velocity of transverse wave in both the string is

A. same

B. proportional to their densities

C. different

D. inversely proportional to their densities

Answer: D

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113. The transverse waves can propagate through

A. gas and in a metal

B. in a metal but not in gas

C. gas but not in a metal

D. neither in a gas nor in a metal

Answer: B

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114. The sound is a form of energy which propagates through the medium in the form of

A. transverse waves

B. longitudinal wave

C. both, longitudinal and transverse

D. electromagnetic waves

Answer: B

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115. The waves on the surface of liquid are

A. transverse waves

B. longitudinal waves

C. both longitudinal and transverse waves

D. not mechanical waves

Answer: C

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116. Longitudinal waves do not exhibit

A. reflected

B. refracted

C. interference

D. polarised

Answer: D

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117. When simple harmonic progressive waves, travelling through a medium each succeeding particle

A. leading in phase than preceding particle

B. lagging behind in phase than the preceding particle

C. lagging in phase by 180°

D. leading in phase by 180°

Answer: B

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118. When a simple harmonic progressive wave is propogating the medium, all the particles of the medium vibrate with

A. different amplitude and frequency

B. the same amplitude and same frequency

C. the same amplitude and different frequency

D. the different amplitude and same frequency

Answer: B

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119. The equation of a simple harmonic progressive wave along the positive direction of X axis is given by

A. $y = a \sin 2\pi \left[\frac{t}{T} - \frac{x}{\lambda}\right]$

B. $y = a \sin(2\pi nt)$

C. $y = a \sin 2\pi \left[\frac{t}{T} + \frac{x}{\lambda}\right]$

D. $y = a \cos(2\pi nt)$

Answer: A

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120. The equation of a simple harmonic progressive wave along the negative direction of X-axis is

A. $y=a\sin 2\pi\left[\frac{t}{T}-\frac{x}{\lambda}\right]$

B. $y=a\sin(2\pi nt)$

C. $y=a\sin 2\pi\left[\frac{t}{T}+\frac{x}{\lambda}\right]$

D. $y=a\cos 2\pi[x]$

Answer: C

121. When a longitudinal wave propagates through a medium, the particles of the medium execute simple harmonic oscillations about their mean positions. These oscillations of a particle are characterised by an invariant

A. kinetic energy

B. potential energy

C. sum of kinetic and potential energy

D. difference between kinetic and potential energy

Answer: C

Watch Video Solution

122. The equation of a travelling wave is,

$$Y = A \sin 2\pi (pt - x/5)$$

Then the ratio of maximum particle velocity to wave velocity is,

A. $\frac{\pi A}{5}$

B. $2\sqrt{5\pi A}$

C. $\frac{2\pi A}{5}$

D. $\frac{2\pi A}{\sqrt{5}}$

Answer: C

Watch Video Solution

123. The dimensions of the propagation constant of the wave is

A. $[L^1M^0T^0]$

B. $[L^0M^1T^1]$

C. $[L^1M^1T^0]$

D. $[L^{-1}M^0T^0]$

Answer: D

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124. The ratio of angular velocity to the propagation constant of the medium is

A. particle velocity

B. wave velocity

C. group velocity

D. momentum

Answer: B

Watch Video Solution

125. When a wave of wavelength 3m travels through a medium then two particles separated by the distance of 9m are the particles in

A. same phase

B. opposite phase

C. phase $\pi/2$

D. difference of $6\pi/2$

Answer: A

Watch Video Solution

126. A transverse progressive wave is given by the equation $y = 2\cos\pi(0.5x - 200t)$, where x and y are in cm and 't' in second. The true following statement is

A. wavelength 2 cm and velocity 400 cm/s

B. wavelength 4 cm and amplitude 2 cm

C. wavelength 4 cm and frequency 100 Hz

D. b' and 'c'

Answer: D

Watch Video Solution

127. Two waves are given by $y_1 = a \sin(\omega t - kx)$ and $y_2 = a \cos(\omega t - kx)$. The phase difference between the two waves is

A. $\pi / 2$

B. $\pi / 8$

C. $\pi / 8$

D. 2π

Answer: A

Watch Video Solution

128. The equation of a transverse wave is given by

$y = 10 \sin \pi(0.01x - 2t)$

where x and y are in cm and t is in second. Its frequency is

A. $10^{-1} Hz$

B. 1Hz

C. 2Hz

D. 0.01 Hz

Answer: B

Watch Video Solution

129. When a simple harmonic progressive wave travels through the medium, the relation between phase difference and path difference is

A. path difference = $(2\pi / \lambda)$ phase difference

B. phse difference $= (2\pi / \lambda)$ path difference

C. path difference $= (\lambda / 2)$ path difference

D. none of above

Answer: B

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130. The equation of a simple harmonic progressive wave is given by

$$y = 5\cos\pi\left[200t - \frac{x}{150}\right]$$

where x and y are in cm and 't' is in seocnd. The the velocity of the wave is

A. 2 m/s

B. 200 m/s

C. 300 m/s

D. 150 m/s

Answer: C

Watch Video Solution

131. In the problem number 130, the wavelength of the wave is

A. 1.5 m

B. 2 m

C. 3 m

D. $2\pi m$

Answer: C

Watch Video Solution

132. The frequency and amplitude of the problem number 130 is

A. 5m, 100 Hz

B. 5 cm, 100 Hz

C. 3m, 150 Hz

D. 3m, $100\pi Hz$

Answer: B

Watch Video Solution

133. A wave along a string has the equation $y = 0.02 \sin(30t - 4x)$, where x and y are in m and t in second the amplitude of the wave is

A. 0.02 cm

B. 0.02 m

C. 4m

D. 0.4 cm

Answer: B

Watch Video Solution

134. In the problem No. 133, the wavelength of the wave is

A. $\pi/2m$

B. 5m

C. $4\pi m$

D. 4m

Answer: A

Watch Video Solution

135. In the problem No.133, the velocity of the wave is

A. 30 m/s

B. 7.5 m/s

C. 15π

D. $3\pi / 2m / s$

Answer: B

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136. In problem No. 133, the phase difference beteen two points septated by 0.785 m is

A. π

B. 2π

C. $\pi / 2$

D. $3\pi / 2$

Answer: A

Watch Video Solution

137. In problem No. 133, the phase difference between two points separated by time interval 0.2098 is

A. 2π

B. π

C. $\pi / 2$

D. $\pi / 4$

Answer: A

View Text Solution

View Text Solution

138. In problem No.133, the distance moved by the wave in 4s is,

A. 20 m

B. 7.5 m

C. 15 m

D. 60 m

Answer: A

Watch Video Solution

139. The phase of a particle at P_1 is 60° and the phase of a particle at P_2 is 780°. If the distance between P_1 and P_2 is 1m, then the wavelength of the wave, will be

A. 2m

B. 0.5 m

C. 1.5 m

D. 0.25 m

Answer: B

Watch Video Solution

140. The equation of a transverse wave travelling in a rope is given by $y = 5\sin(4t - 0.02x)$, where y and x are in cm and time t is in second. Then the maximum transverse speed of wave in the rope is

A. 125 cm/s

B. 200 cm/s

C. 250 cm/s

D. 100 cm/s

Answer: B

Watch Video Solution

141. If the frequencies of two notes in a medium are in the ratio $3:5$, then their propagation constant are in the ratio

A. $3:5$

B. $5:3$

C. $25:9$

D. $9:25$

Answer: A

Watch Video Solution

142. The distance between two consecutive crests in a wave train produced in string is 5 m. If two complete waves pass through any point per second, the velocity of wave is :-

A. 10 cm/s

B. 2.5 cm/s

C. 5 cm/s

D. 15 cm/s

Answer: A

Watch Video Solution

143. A wave train of a plane wave with wavelength 1.8 cm, travels from deep water into a shall water. Then the velocity of waves on surface shallow water, if its wavelength in shallow wave is 1 cm, is (The velocity of waves in surface deep water is 36 cm/s)

A. 35 cm/s

B. 20 cm/s

C. 64.8 cm/s

D. 37.4 cm/s

Answer: B

Watch Video Solution

144. Two waves of frequencies 20 Hz and 30 Hz travel out from a common point. How wil they different phase at the end of 0.75 s ?

A. π

B. 7π

C. 15π

D. 2π

Answer: C

Watch Video Solution

145. A small piece of cork in a ripple tank oscillates us and down as ripples pass it. If the ripples travelling at 0.3 m/s, have a wavelength of 1.5π cm and the cork vibrates with an amplitude of 5mm, then the maximum velocity of the cork will be

A. 20 cm/s

B. 0.02 cm/s

C. 20 m/s

D. 200 m/s

Answer: A

Watch Video Solution

146. A blast given a sound of intensity $0.8W/m^2$ at frequency 1kHz. If the denstiy of air is 1.3 kg/m^3 and speed of sound in air is 330 m/s, then the amplitude of the sound wave is approximately

A. $5 \times 10^{-6} m$

B. $15 \times 10^{-6} m$

C. $9.7 \times 10^{-6} m$

D. $20 \times 10^{-6} m$

Answer: C

Watch Video Solution

147. The minimum distance between two particles similar phase is 10 cm. The time after which given particle comes to same phase is 0.05 second. What is the velocity of progressive wave ?

A. 2000 cm/s

B. 200 cm/s

C. 100 cm/s

D. 50 cm/s

Answer: B

Watch Video Solution

148. What would be the wavelength of a sound wave in iron ? V = 4950 m/s. If its wavelength was 1.4 m in air in which its speed was 330 m/s

A. 0.29 m

B. 17 m

C. 21 m

D. 18 m

Answer: C

Watch Video Solution

149. A sound wave of frequency 500 Hz covers a distance of 1000 m is 5 sec between the points X and Y. Then the number of waves between X and Y is

A. 500

B. 2500

C. 1000

D. 5000

Answer: B

Watch Video Solution

150. The equation of progressive wave travelling a long positive direction of x axis having a amplitude of 0.04 m, frequency 440 Hz and wave velocity 330 m/s, is

A. $y = 0.04 \sin 2\pi \left(440t - \frac{4x}{3}\right)$

B. $y = 0.04 \cos 2\pi\left(440t - \frac{4x}{3}\right)$

C. $y = 0.04 \sin 2\pi\left(440t + \frac{4x}{3}\right)$

D. $y = 0.04 \cos 2\pi\left(440t + \frac{4x}{3}\right)$

Answer: A

Watch Video Solution

151. The maximum particle velocity in a progressive wave is 4 times of the wave, velocity. If the amplitude of the particle is 'A', then the proagation constant is

A. 4/A

B. A/4

C. 2/A

D. A/2

Answer: A

Watch Video Solution

152. The maximum particle velocity is 3 times the wave velocity of a progressive wave. If the amplitude of the particle is 'A', then the phase difference between the two particles separation by a dsitance of 'x' is

A. $\frac{x}{A}$

B. $\frac{3A}{x}$

C. $\frac{3x\pi}{A}$

D. $\frac{3x}{A}$

Answer: D

Watch Video Solution

153. The equation of a wave motion is given by $y = 7\sin\left(7\pi t - 0.4\pi x + \frac{\pi}{3}\right)$, where all quantities are measured in SI units. Then the ratio of wave velocity to the maximum particle velocity is

A. $5:44$

B. $44:5$

C. $22:7$

D. $22:5$

Answer: A

Watch Video Solution

154. The equation of a progressive wave is, $y = 0.4 \sin\left[\pi\left(\frac{t}{5} - \frac{x}{9}\right) + \frac{\pi}{6}\right]$, where all quantities are measured in SI units. Then which of the following is correct

A. time taken to propagate 1 wave across a point is 10 s

B. wavelength is 18 m

C. amplitude is 0.4 m

D. all the above

Answer: D

Watch Video Solution

155. Two particles separated by a distance 16.5 mm in a progressive wave has a phase difference of $3\pi/8$ rad. If the number of waves passing across a point in the medium in 1s is 3750, then the velocity of wave will be

A. 3300 m/s

B. 330 cm/s

C. 330 m/s

D. 1650 m/s

Answer: C

Watch Video Solution

156. A bomb explodes on moon. How long does the sound take to reach the earth coverage distance between earth and moon is $3.8 \times 10^8 m$?

A. $1.16 \times 10^6 s$

B. 10s

C. $1.16 \times 10^6 h$

D. sound is not transmitted to earth

Answer: D

Watch Video Solution

157. The wavelength of a progressive wave moving with a velocity 200 m/s is 1m. The time lag between two particles separated by a distance of 10 m is

A. 0.5 s

B. 0.005 s

C. 0.05 s

D. 0.1 s

Answer: C

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158. The wave velocity of progressive wave is 480 m/s and the phase difference between the two particles separated by a distance of 12 m is 1080°. Then the number of waves passing across a point in 1 s is

A. 120

B. 60

C. 240

D. 360

Answer: A

Watch Video Solution

159. The displacement y (in cm) produced by a simple harmonic wave is

$y = \frac{10}{\pi}\sin\left(2000\pi t - \frac{\pi x}{17}\right)$. The periodic time and maximum velocity of the particles in the medium will respectively be

A. $10^{-3}s$ and $330m/s$

B. $10^{-3}s$ and 200 m/s

C. $10^{-4}s$ and 20 m/s

D. $10^{-2}s$ and 2000 m/s

Answer: B

Watch Video Solution

160. The equation of a progressive wave is $y = 0.4\sin 2\pi\left[\frac{t}{0.02} - \frac{x}{60}\right]$, where x is in cm. Thenn the phase difference between two points separated by 6 cm at any instant is

A. π

B. $\pi/3$

C. $\pi/2$

D. $\pi/5$

Answer: D

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161. In what time after its motion begins, will a particle oscillating according to the equation, $y = 7\sin 0.5\pi$ t move from the mean position to maximum displacement ?

A. 0.5 s

B. 1.5 s

C. 1s

D. 2s

Answer: C

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162. A transverse wave along a stretched string has a speed of 30 m/s and a frequency of 250 Hz. Then the phase difference between two points on the string 10 cm apart at the same instant is

A. 0

B. $\pi / 2$ rad

C. $5\pi / 3$

D. $8\pi / 3$

Answer: C

Watch Video Solution

163. A progressive wave is represented by $y = 12\sin(5t - 4x)$ cm. On this wave, how far away are the two points having phase difference of 90° ?

A. $\pi / 4$

B. $\pi / 8$

C. $\pi / 16$

D. $\pi / 32$

Answer: B

Watch Video Solution

164. A progressive wave is, $y = 12\sin(5t - 4x)$. On this wave how far away are the two points having a phase difference of 45°) ?

A. $\pi/4$

B. $\pi/8$

C. $\pi/16$

D. $\pi/32$

Answer: C

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165. If the two waves of the same frequency and same amplitude, on superposition produce a resultant disturbance of the same amplitude, then the phase difference between the two arriving wave will be

A. $\pi / 2$

B. $2\pi / 3$

C. π

D. 2π

Answer: B

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166. A simple harmoinc progressive wave of amplitude 0.05 m and frequency 5Hz is travelling along the positive direction of x-axis with a speed of 40 m/s, then the displacement of a particle at 30 m from origin in the time 1 second will be

A. 0.05 m

B. 0

C. 0.02 m

D. 0.025 m

Answer: A

Watch Video Solution

167. The frequency of transmission of a radio station is 30 MHz. Then the wavelengt of the waves transmitted by the centre will be $(v = 3 \times 10^8 m / s)$

A. 5m

B. 10m

C. 15 m

D. 20 m

Answer: B

Watch Video Solution

168. A sound wave of wavelength $90cm$ in glass is reflected into air. If the speed of sound in glass is $5400m / s$, the wavelength of wave in air (speed of sound in air $= 330 m/s$) is :

A. 55 cm

B. 5.5 cm

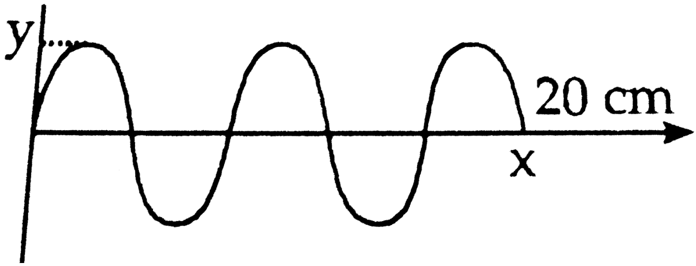
C. 55 m

D. 5.5 m

Answer: B

Watch Video Solution

169. For the wave shown in the figure, the frequency and wavelength if its speed is 320 m/s are



A. 8 cm, 400 Hz

B. 80 cm, 40 Hz

C. 8 cm, 4000 Hz

D. 40 cm, 8000 Hz

Answer: C

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170. The similarity between the sound waves and light waves is

A. both can pass through vacuum

B. both can show interference effect

C. both can travel with same speed in medium

D. both are transverse waves

Answer: B

Watch Video Solution

171. The distance between two particles on a string is 10 cm. If the frequency of wave propagating in it is 400 Hz and its speed is 100 m/s then the phase difference between the particles will be

A. 0.8π radian

B. 0.4π radian

C. 0.2π radian

D. π radian

Answer: A

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172. 56 tuning forks are so arranged in series that each fork gives 4 beats per second with the previous one.The frequency of the last fork is three times that of the first.The frequency of the fork is

A. 220 Hz

B. 110 Hz

C. 330 Hz

D. 440 Hz

Answer: B

Watch Video Solution

173. What is the audible range of the average human ear ?

A. $20Hz \quad \text{to} \quad 2 \times 10^3 Hz$

B. $20Hz \rightarrow '20 \times 10^3 Hz$

C. $10Hz \quad \text{to} \quad 10^3 Hz$

D. $10Hz \quad \text{to} \quad 10^4 Hz$

Answer: B

Watch Video Solution

174. The cause of beats is that the two waves undergo

A. diffraction

B. interference

C. reflection

D. refraction

Answer: B

Watch Video Solution

175. The equation of a transverse wave, out the following is

A. $X = a \sin(Kx - \omega t)$

B. $Y = a \sin(Ky - \omega t)$

C. $Y = a \sin(Kx - \omega t)$

D. $Z = a \cos(Kz - \omega t)$

Answer: C

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176. The relation between time and displacement for two particles is given by

$y = 0.06 \sin 2\pi(0.04t + \phi_1), y_2 = 0.03 \sin 2\pi(1.04t + \phi_2)$

The ratio of the intensities of the waves produced by the vibrations of the two particles will be

A. $1:2$

B. $2:1$

C. $1:4$

D. $4:1$

Answer: D

Watch Video Solution

177. The displacement of a particle executing S.H.M. is given by $y=10\sin\left[6t+\frac{\pi}{3}\right]$ where y is in metres and t is in seconds. Then the initial displacement and velocity of the particle is

A. $5\sqrt{3}m$ and $30ms^{-1}$

B. $15m$ and $5\sqrt{3}ms^{-1}$

C. $15\sqrt{3}$ and $30ms^{-1}$

D. $20\sqrt{3}$ and $30ms^{-1}$

Answer: A

Watch Video Solution

178. Two waves of frequencies 30 Hz and 40 Hz travel out from a common point. How they will differ in phase at the end of 0.95 s

A. 2π radian

B. 19π radian

C. 10 radian

D. 20π radian

Answer: B

Watch Video Solution

179. If the maximum particle velocity is 3 times the wave velocity of a transverse wave of displacement amplitude 'a'. Then the phase difference between two particles separated by $\frac{\pi a}{2}$ is

A. $2\pi/3$

B. $\pi/3$

C. $3\pi/2$

D. $3\pi/4$

Answer: C

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180. The sound wave require more reflecting surface than the light wave because of

A. longer wavelength

B. low speed

C. high speed

D. lower wavelength

Answer: A

Watch Video Solution

181. The production of echo is due to

A. rarefaction of sound waves

B. interference of sound waves

C. reflection of sound waves

D. reflection and refraction of sound waves

Answer: C

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182. If sound waves reflected from the denser medium, then there is

A. no change in phase

B. only there is reverse of particle velocity

C. change in phase by 180° between incident and reflected waves

D. reversion of wave velocity only

Answer: C

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183. The echo and the original sound differ in the following characteristics of a musical note

A. intensity

B. quality

C. pitch

D. all of the above

Answer: A

Watch Video Solution

184. When a wave is reflected at a rarer surface,the change in phase is

A. $\frac{\pi}{2}$ rad

B. π rad

C. $3\frac{\pi}{4}$ rad

D. 0

Answer: D

Watch Video Solution

Watch Video Solution

185. The sound waves reflected from denser medium.

(A) Particle velocity changes

(B) Wave velocity changes

(C) Compression is reflected as rarefaction

(D) Change of phase of 180° between incident and reflected waves

Which of the above statements are correct ?

A. all of the above

B. A, B and D

C. B and D only

D. B, C and D

Answer: B

Watch Video Solution

186. The sound waves reflected from denser medium.

(A) Particle velocity changes

(B) Wave velocity changes

(C) Compression is reflected as rarefaction

(D) Change of phase of 180° between incident and reflected waves

Which of the above statements are correct ?

A. all of the above

B. A, B and D

C. B and C

D. B, C and D

Answer: C

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187. The similarity between the sound waves and light waves is

A. travel at the same speed in air

B. can show interference phenomenon

C. can pass through any medium

D. are transverse waves

Answer: B

Watch Video Solution

188. Echo's arise from

A. reflection

B. refraction

C. diffraction

D. dispersion

Answer: A

Watch Video Solution

189. The echo and original sound will have same

A. frequency

B. amplitude

C. intensity

D. all of above

Answer: A

Watch Video Solution

190. When a transvers wave pulse is reflected from free end or yielding support, the phase change produced is

A. $\pi/2$

B. π

C. $3\pi/4$

D. zero

Answer: D

Watch Video Solution

191. A wave is reflected from a rigid support. The change in phase on reflection will be

A. $\pi / 2$

B. π

C. $3\pi / 2$

D. zero

Answer: B

Watch Video Solution

192. When a wave undergoes reflection at a denser medium, what happens to its phase ?

A. 0

B. $\pi / 2$ rad

C. π

D. $3\pi / 2$

Answer: C

Watch Video Solution

193. The minimum distance between source of sound and reflection surface for the clear hearing of sound is

A. 17 m

B. 1.7 m

C. 20 m

D. 19.2 m

Answer: A

Watch Video Solution

194. The human ear cannot distinguish sound notes of the time interval

A. greater than $(1/10)^{th}$ second

B. within $(1/100)^{th}$ second

C. within $(1/10)^{th}$ second

D. equal to 10 second

Answer: C

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195. A man standing unsymmetrical position between two mountains and fires a gun. He hears the first echo after 1.5 s and the second echo after 2.5 s. If the speed of sound in air is 340 m/s, then the distance between the mountains will be

A. 340 m

B. 410 m

C. 640 m

D. 680 m

Answer: D

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196. In the above problem, when will be the third echo heard.

A. 4s

B. 1s

C. 5s

D. 3s

Answer: A

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197. In the above problem, when will be the fourth echo heard

A. 4s

B. 1.5 s

C. 5.5 s

D. 3.5 s

Answer: C

View Text Solution

198. A man standing unsymmetrical position between two mountains and fires a gun. He hears the first echo after 1.5 s and the second echo after 2.5 s. If the speed of sound is 340 m/s, then the nearest distance between the man and mountain will be

A. 340 m

B. 410 m

C. 425 m

D. 255 m

Answer: D

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199. A man standing unsymmetrical position between two mountains and fires a gun. He hears the first echo after 1.5 s and the second echo after 2.5 s. If the speed of sound is 340 m/s, then the largest distance between the man and mountain will be

A. 340 m

B. 410 m

C. 425 m

D. 255 m

Answer: C

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200. An engine approaches a hill with a constant speed. When it is at a distance of 0.9 km, it blows a whistle whose echo is heard by the driver after 5 seconds. If the speed of sound in air is 330 m/s, then the speed of the engine is :

A. 80 m/s

B. 30 m/s

C. 300 m/s

D. 360 m/s

Answer: B

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201. A person in front of a hill at a distance 337.5 m fires a bullet. If he hears an echo after 2.25 s, then the velocity of sound will be

A. 150 m/s

B. 600m/s

C. 300 m/s

D. 350 m/s

Answer: C

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202. A man standing at a certain distance blows a horn towards a big wall. He hears the echo after 2s, if the velocity of sound in air is 340 m/s, then the distance between the man and the wall is

A. 850 m

B. 340 m

C. 170 m

D. 680 m

Answer: B

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203. A man is driving a vechicle at 36 km/hr on a straight road towards a hill. He sounds the horn and hears its echo after 4s At what distance from the hill was the horn sounded ? (Velocity of sound = 340 ms)

A. 680 m

B. 700 m

C. 720 m

D. 350 m

Answer: B

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204. A man standing between two parallel cliffs fires a gun. If he hears the first echo after 2s and the next after 5s, the distance between the two cliffs is (Velocity of sound in air is 350 m/s)

A. 1225 m

B. 1050 m

C. 2100 m

D. 2450 m

Answer: A

205. A road runs midway between two parallel rows of buildings. A motorist moving with a speed of 36 km/hr sounds the horn. He hears the echo one second after he has sounded the horn. Then the distance between the two rows of buildings, will be (Velocity of sound is 330 m/s)

A. 300 m

B. 150 m

C. 165 m

D. 330 m

Answer: D

206. A man standing in front of mountain at a certain distance beats a drum at regular intervals. The drumming rate is gradually increased and finds that the echo is not heard distinctly when the rate becomes 40 per minute. If the velocity of sound in air is 340 m/s, then the distance between the man and mountain is

A. 133.3 m

B. 255 m

C. 510 m

D. none of these

Answer: B

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207. A soldier fires a bullet towards a fort-wall and hears the first echo after 2s. He moves a distance of 85m towards the wall, fires a bullet and hears the echo after 1.5 s. The velocity of sound is

A. 330 m/s

B. 340 m/s

C. 345 m/s

D. none

Answer: B

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208. A scooterist moving with a velocity of 36 kmph towards a fort wall and blows a horn. If he hears the echo after 3s, then the distance at which horn is blown from the wall is (Velocity of sound in air = 340 m/s)

A. 525 m

B. 510 m

C. 1050 m

D. 500 m

Answer: A

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209. A bat emits ultrasonic waves of frequency 39 kHz and receives and echo 0.2 s later. If the speed of sound in air is 300 m/s and the speed of electro magnetic waves $3 \times 10^8 m / s$ then the distance of the bat from the object producing the echo is

A. 60 m

B. 30 m

C. $3 \times 10^7 m$

D. $3 \times 10^6 m$

Answer: B

Watch Video Solution

210. An engine approaches a hill with constant speed and where it is at a distance of 1 km blows a whistle whose echo is heard by the driver 5s. If the speed of the sound is $340ms^{-1}$. The speed of the engine is

A. $60ms^{-1}$

B. $172ms^{-1}$

C. $340ms^{-1}$

D. $40ms^{-1}$

Answer: A

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211. A man is driving a car at a speed of 72 kmph towards a hill. He sounds the horn and hears its echo after 2 s. At what distance from the hill the horn was sounded. (Velocity of sound = $340ms^{-1}$)

A. 40 m

B. 340 m

C. 360 m

D. 380 m

Answer: C

Watch Video Solution

212. In a constructive intergerence of sound the resultant intensity of sound at a point of medium is

A. maximum

B. zero

C. minimum

D. can not be predicted

Answer: A

Watch Video Solution

213. In a destructive interference of sound the resultant intensity of sound at a point of medium is

A. maximum

B. zero

C. minimum

D. can not be predicted

Answer: C

Watch Video Solution

214. Intensity and loudness of sound depends on

A. amplitude of vibration only

B. frequency only

C. density of medium only

D. all of the above

Answer: D

Watch Video Solution

215. Intensity of sound wave is

A. equal to product of energy density and wave velocity

B. proportional to the square of the frequency

C. proportional to the wave velocity

D. all of the above

Answer: D

Watch Video Solution

216. Decibel is

A. musical instrument

B. musical note

C. measure of sould level

D. wavelength of noise

Answer: C

Watch Video Solution

217. A set of tones whose frequencies are integral multiples of the fundamental frequency are called

A. Harmonics

B. Overtones

C. Doppler frequency

D. Beat frequency

Answer: A

Watch Video Solution

218. For constructive intergerence of sound waves the mathematical path difference between the two arriving waves is

A. $n\lambda$

B. $(2n-1) \times \lambda / 2$

C. odd multiple of π

D. even multiple of π

Answer: A

Watch Video Solution

219. For destructive interference of sound waves the mathematical path difference between the two arriving waves is

A. $n\lambda$

B. $(2n-1) \times \lambda/2$

C. odd multiple of π

D. even multiple of π

Answer: B

Watch Video Solution

220. For constructive interference of sound waves the mathematical phase difference between the two arriving waves is

A. $n\lambda$

B. $(2n-1) \times \lambda / 2$

C. odd multiple of π

D. even multiple of π

Answer: D

Watch Video Solution

221. For destructive interference of sound waves the mathematical phase difference between the two arriving waves is

A. $n\lambda$

B. $(2n-1)\times\lambda/2$

C. odd multiple of π

D. even multiple of π

Answer: C

Watch Video Solution

222. Three waves producing displacement in the same direction of same frequency and of amplitudes

$10\eta m, 4\eta m$ and 7η m arrive at a point with successive phase difference of $\pi/2$. The amplitude of the resultant wave is :--

A. 7 mm

B. 6 mm

C. 5 mm

D. 4 mm

Answer: C

Watch Video Solution

223. If two sound waves of equal intensity I produce beats, then the maximum intensity of sound produced in beats will be

A. I

B. 4 I

C. 2 I

D. $I/2$

Answer: B

Watch Video Solution

224. The amplitude of sound is doubled and the frequency is reduced to one fourth. The intensity of sound at the same point will be

A. increases by a factor of 2

B. decreases by a factor of 2

C. decreases by a factor 4

D. remains unchanged

Answer: C

Watch Video Solution

225. If two waves of intensity I and 4 I are super impose, then the minimum and maximum intensities will be

A. 3I, 5I

B. 1, 9

C. I, 9I

D. I, 3I

Answer: C

Watch Video Solution

226. The intensity ratio of two waves is $1:16$. The ratio of their amplitudes is

A. $\frac{1}{4}$

B. $\frac{1}{2}$

C. $\frac{1}{10}$

D. $\frac{16}{17}$

Answer: A

Watch Video Solution

227. Beats are produced due to the superposition of two progressive notes. If the maximum loudness at the waxing is n times the loudness of either notes. Then the values of n will be

A. 1

B. $\sqrt{2}$

C. 2

D. 4

Answer: D

Watch Video Solution

228. Two sources of intensity I and 4 are used in an interference experiment. Find the intensity at point where the waves from two sources superimpose with a phase difference (i) zero (ii) $\pi / 2$ and (iii) π.

A. 9 I

B. 5 I

C. I

D. 0

Answer: B

Watch Video Solution

229. Beats are result of

A. destructive intergerence

B. diffraction of sound waves

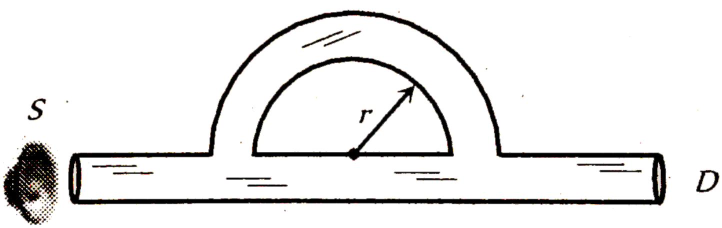
C. constructive and destructive interference

D. constructive interference

Answer: C

Watch Video Solution

230. A sound wave of wavelength 32 cm enters the tube at S as shown in the figure. Then the smallest radius r so that a minimum of sound is heard at detector D is



A. 7 cm

B. 14 cm

C. 21 cm

D. 28 cm

Answer: B

Watch Video Solution

231. When two progressive waves of nearly equal frequencies superimposed and give rise to beats then

A. frequency of beat changes with time

B. frequency of beat changes with location of observer.

C. all the particles of medium vibrates simple harmonically with frequency equal to the difference between the frequencies of component waves

D. amplitude variation of particles at any point changes simple harmonically with frequency difference between two component waves.

Answer: D

Watch Video Solution

232. Three sound waves of equal amplitudes have frequencies $(v-1), v, (v+1)$. They superpose to give beats. The number of beats produced per second will be :

A. n

B. $n/2$

C. 2

D. 1

Answer: D

Watch Video Solution

233. Two tuning forks have frequencies 380 and 384 Hz respectively. When they are sounded together they produce 4 beats. After hearing the maximum sound how long will it take to hear the minimum sound

A. $\frac{1}{2}s$

B. $\frac{1}{4}s$

C. $\frac{1}{8}s$

D. $\frac{1}{16}s$

Answer: C

Watch Video Solution

234. The maximum number of beats that can be heard per second is

A. 5

B. 20

C. 10

D. any number more than 20

Answer: C

Watch Video Solution

235. The prongs of the tuning fork are filed, then the frequency of the tuning fork after filing will be

A. increase

B. remain constant

C. decrease

D. can not be predicted

Answer: A

Watch Video Solution

236. When a little wax is put on the prongs of a tuning fork, then the frequency of vibration of a tuning fork will

A. increase

B. remain constant

C. decrease

D. both a and b

Answer: C

Watch Video Solution

237. The phenomenon of beat is due to

A. alternate production of waxing and waning

B. interference between two sound waves having same amplitude and same frequencies

C. interference between two sound waves having slightly different frequency and same amplitude

D. a' and 'c'

Answer: C

Watch Video Solution

238. When two tuning fork are sounded together produce x beats/s. The fequency of A is n_A. The fork B is loaded with little wax then x-1 number of beats per second are produced, then the frequency of fork B before loading will be

A. $2n_Ax$

B. $n_A + x$

C. $n_A + 2x$

D. $n_A - x$

Answer: B

Watch Video Solution

239. The prongs of the tuning fork are filled a little, the frequency of the tuning fork after filled

A. increases

B. remain constant

C. decreases

D. can not be predicted

Answer: A

Watch Video Solution

240. To hear beats, it is essential that the two sound waves in air should

A. be travelling in opposite directions

B. be travelling in the same direction

C. have slightly different wavelengths

D. have slightly different amplitude

Answer: C

Watch Video Solution

Watch Video Solution

241. Two sound waves of wavelengths 40 cm and 40.5 cm produce 10 beats per second. What will be the speed of sound in air ?

A. 324 m/s

B. 340 m/s

C. 330 m/s

D. 360 m/s

Answer: A

Watch Video Solution

242. A set of tuning forks is arranged in ascending order of frequency each tuning fork gives 5 beats s with the preceding one. If frequency of the firs tuning fork is 100 Hz and the last fork is 150 Hz then the number of tuning forks arranged will br

A. 9

B. 10

C. 11

D. 12

Answer: C

Watch Video Solution

243. Two sound waves of wavelengths 85/133 m and 85/137 m when sounded together produce 8 beats/s with a third note of fixed frequency then the frequency of third note will be

A. 532 Hz

B. 540 Hz

C. 680 Hz

D. 340 Hz

Answer: B

Watch Video Solution

244. Two tuning forks A and B give 4 beats/s when sounded together. If the fork B is loaded with wax 6 beats/s are heard.

If the frequency of fork A is 320 Hz, then the natural frequency of the tuning fork B will be

A. 320

B. 316

C. 312

D. 326

Answer: B

Watch Video Solution

245. Two tuning forks A and B produced 10 beats per second when sounded together. On slightly loading fork A with a little wax, it was observed that 15 beats are heard per second. If the frequency of fork B is 480 Hz, then the frequency of A before it was loaded would be

A. 465 Hz

B. 470 Hz

C. 490 Hz

D. 495 Hz

Answer: B

Watch Video Solution

246. Two sound waves of wavelength $1m$ and $1.01m$ in a gas produce 10 beats in 3s. The velocity of sound in the gas is

A. 332 m/s

B. 336.7 m/s

C. 83 m/s

D. 166 m/s

Answer: B

Watch Video Solution

247. A wave has SHM (simple harmonic motion) whose period is 4s while another periods 3 s. If both are combined, then the resultant wave will have the period equal to

A. 4s

B. 1 s

C. 12s

D. 3s

Answer: C

Watch Video Solution

248. Nine tuning forks are arranged in order of increasing frequency. Each tuning fork produces 4 beats per second when sounded with either of its neighbours. If the frequency of the 9^{th} tunning fork is twice that of the first, what is the frequency of the first tuning fork ?

A. 32 Hz

B. 40 Hz

C. 48 Hz

D. 56 Hz

Answer: A

Watch Video Solution

249. Two waves of wavelength 2 m and 2.02 m , with the same speed, superimpose to produce 2 beats per second ,The speed of each wave is

A. 400 m/s

B. 404 m/s

C. 402 m/s

D. 406 m/s

Answer: B

Watch Video Solution

250. A tuning fork A produces 4 beats/ s with tuning fork, B of fequency 256 Hz. When the fork A is filled beats are found to occurs at shorter intervals, then the original frequency will be

A. 252 Hz

B. 260 Hz

C. 256 Hz

D. 262 Hz

Answer: B

Watch Video Solution

251. The ends of the prongs of a tunning forks originally in unison with a fork B of frequency 512 are filled, and the forks produce 5 beat/s when sounded together. What is the pitch of A after filling ?

A. 512 Hz

B. 517 Hz

C. 507 Hz

D. 514.5 Hz

Answer: B

Watch Video Solution

252. If two tuning fork A and B are sounded together they produce 4 beats per second. A is then slightly loaded with wax, they produce 2 beats when sounded again. The frequency of A is 256. The frequency of B will be

A. 250

B. 252

C. 260

D. 262

Answer: C

Watch Video Solution

253. If two tuning fork A and B are sounded together they produce 4 beats per second. A is then slightly loaded with wax, they produce 2 beats when sounded again. The frequency of A is 256. The frequency of B will be

A. 259

B. 252

C. 260

D. 262

Answer: B

Watch Video Solution

254. Ten tuning forks are arranged in increasing order of frequency is such a way that any two nearest tuning forks produce $4be * / \sec$. The highest freqeuncy is twice of the lowest. Possible highest and the lowest frequencies are

A. 80 and 40

B. 100 and 50

C. 44 and 22

D. 36 and 72

Answer: D

Watch Video Solution

255. Beats are produced by two waves given by $y_1 = a \sin 2000\pi t$ and $y_2 = a \sin 2008\pi t$. The number of beats heard per second is

A. 0

B. 1

C. 4

D. 8

Answer: C

Watch Video Solution

256. Two sound waves of wavelength 92/157 m and 92/155 m produce 8 beats/s, when allowed to superimpose. Then the velocity of sound will be

A. 320 m/s

B. 332 m/s

C. 368 m/s

D. 312 m/s

Answer: C

Watch Video Solution

257. Beats are produced by two waves given by $y_1 = a \sin 2000\pi t$ and $y_2 = a \sin 2008\pi t$. The number of beats heard per second is

A. 8

B. 2

C. 4

D. zero

Answer: C

Watch Video Solution

258. Two tuning forks when sounded together produce 5 beats per second. The frequency of one of them is 250 Hz. When the other fork is slightly loaded, they produce 7 beats/s. Then the frequency of other tuning fork without loading is

A. 243 Hz

B. 255 Hz

C. 245 Hz

D. 257 Hz

Answer: C

Watch Video Solution

259. Two forks produce 4 beats/s. When wax is attached to one fork, the beats cease. Now the forks have frequencies in the ratio

A. $1:2$

B. $1:1$

C. $2:1$

D. $1:4$

Answer: B

Watch Video Solution

260. Two waves $y = 0.25 \sin 316t$ and $y = 0.25 \sin 310t$ are travelling in same direction. The number of beats produced per second will be

A. 6

B. $3/\pi$

C. `3

D. 3π

Answer: B

Watch Video Solution

261. If the frequency of two sources of sound are 512 Hz and 516 Hz then the time interval between two consecutive beats produced by sounding them together will be

A. 0.5 s

B. 0.125 s

C. 0.25 s

D. 4s

Answer: C

Watch Video Solution

262. Two sound waves of wavelength 10 m and 10.1 m produces 0.33 beats/s. Then the velocity of sound is

A. 330 m/s

B. 320 m/s

C. 310 m/s

D. 333.3 m/s

Answer: D

Watch Video Solution

263. A set 65 tuning forks is arranged so that each gives 3 beats per second with the previous one and the frequency of last fork is an octave of first. Then the frequencies of first and last tuning forks are

A. 192 Hz, 384 Hz

B. 64 Hz, 26 Hz

C. 384 Hz, 576 Hz

D. 64 Hz, 64 Hz

Answer: A

Watch Video Solution

264. Two tuning forks A and B of frequency 512 Hz are sounded together produce 5 beats/s. If the fork A is thin loaded with a piece of wax and found that beats occur at shorter intervals. Then the natural frequency of A will be

A. 517

B. 507

C. 512

D. 510

Answer: B

Watch Video Solution

265. Two tuning forks when sounded together produce one beat per 0.4 s. Then the difference of their frequencies is

A. 1 Hz

B. 1.5 Hz

C. 2 Hz

D. 2.5 Hz

Answer: D

Watch Video Solution

266. The two interfering waves have intensities in the ratio $9:4$. The ratio of intensities of maxima and minima in the interference pattern will be

A. $1:25$

B. $9:4$

C. $25:1$

D. $4:9$

Answer: C

Watch Video Solution

267. When plane progressive waves travelling in the same direction superpose over each other then the velocity of resultant wave

A. decrease

B. increase

C. becomes zero

D. remains unchanged

Answer: D

Watch Video Solution

268. Which of the following statements is correct ?

A. sound is a form of energy

B. sound propagates in straight lines

C. sound travels in the form of transverse waves

D. sound travels faster in vaccum than in air

Answer: A

Watch Video Solution

269. The superposing waves are represented by the following equations :

$y_1 5 \sin 2\pi(10t - 0.1x)$, $y_2 = 10 \sin 2\pi(20t - 0.2x)$ Ratio of intensities $\frac{I_{\max}}{I_{\min}}$ will be

A. 1

B. 4

C. 9

D. 16

Answer: C

Watch Video Solution

270. Four beats are produced on vibrating an unknown tuning fork with another fork of frequency 252 Hz. On loading the unknown fork with little wax and vibrating with another fork 2 beats/s are produced. The frequency of unknown fork before loaded will be

A. 256 Hz

B. 254 Hz

C. 250 Hz

D. 248 Hz

Answer: A

Watch Video Solution

271. Two sources A and B are sounding notes of frequency 680 Hz. A listener moves from A to B with a constant velocity u. If the speed of sound is 340 m/s, What must be the value of u so that he hears 10 beats per second?

A. 2.0 m/s

B. 2.5 m/s

C. 3.0 m/s

D. 3.5 m/s

Answer: B

Watch Video Solution

272. If two sound waves $y_1 = 0.3 \sin 596\pi \left(t - \frac{x}{330}\right)$ and $y_2 = 0.5 \sin 604\pi \left(t - \frac{x}{330}\right)$. The frequency at which beats are produced and the ratio of maximum and minimum intensities of beats are

A. 4 and 16

B. 2 and 4

C. 4 and 8

D. 2 and 16

Answer: A

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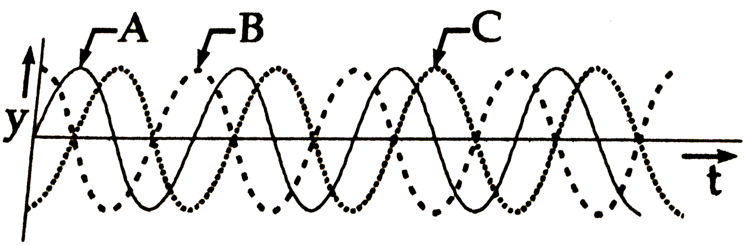
273. In the figure three progressive waves are shown. The phases of all are shown with respect to A. From this it is inferred that



A. the wave C is leading by $\pi/2$ and wave B is lagging being by $\pi/2$

B. the wave C is leading by π and wave B is also leading by π

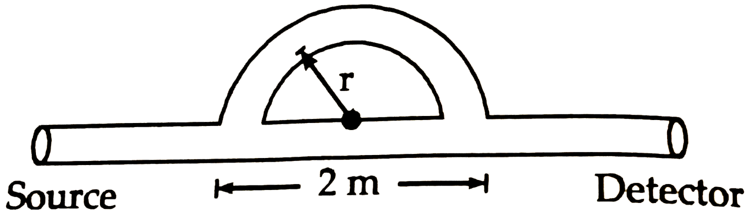
C. the wave C is lagging by π and wave B is leading by π

D. the wave C is lagging by $\pi/2$ and wave B is leading by $\pi/2$

Answer: D

Watch Video Solution

274. A tuning fork of frequency 250 Hz is vibrating at one end of a tube as shown in the figure. If maximum sound is heard at the other end, then the velocity of the waves will be



A. 336 m/s

B. 672 m/s

C. 168 m/s

D. 285 m/s

Answer: D

Watch Video Solution

275. Two sources S_1 and S_2 of sound having frequencies 338, 342 Hz are separated by a large distance. The speed of sound is 340 m/s. The velocity of the observer who is moving from S_2 to S_1 so that he does not hear any beats is

A. 1 m/s

B. 2 m/s

C. 3 m/s

D. 4 m/s

Answer: B

Watch Video Solution

276. Fifty-six tuning forks are arranged in order of increasing frequencies so that each fork gives 4 beats per second with the next one. The last fork gives the octave of the first. Find the frequency of the first.

A. 110 Hz

B. 220 Hz

C. 320 Hz

D. 420 Hz

Answer: B

Watch Video Solution

277. Two tuning forks A and B give 6 beats/s. The frequency of B is 432 Hz. When B is filed 4 beats/s are produced. The natural frequency of fork A is

A. 438 Hz

B. 426 Hz

C. 483 Hz

D. 462 Hz

Answer: B

Watch Video Solution

278. The displacement of a particle is given by $x = 3\sin(5\pi t) + 4\cos(5\pi t)$. The amplitude of particle is

A. 4

B. 5

C. 3

D. 7

Answer: B

Watch Video Solution

279. A tonometer consists of 16 forks, each fork produces 4 beats/s with the next. If the lowest frequency is 60 Hz, then highest frequency is

A. 60 Hz

B. 120 Hz

C. 240 Hz

D. 480 Hz

Answer: B

Watch Video Solution

280. A set of 25 tuning forks is arranged in order of decreasing frequency. Each fork gives 3 beats with succeeding one. The first fork is octave of the last. Calculate the frequency of the first and 16th fork.

A. 144 Hz

B. 99 Hz

C. 95 Hz

D. 85 Hz

Answer: B

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281. The Doppler's effect is not applicable

A. when the relative motion between sources and observer

B. when source and observer are at rest

C. both are moving in opposite direction

D. both are moving in same direction with different velocity

Answer: B

Watch Video Solution

282. Two trains are moving towards each other and cross each other. The apparent pitch

A. first decreases and after crossing it increases

B. first increases and after crossing it decreases

C. continuously increases

D. continuously decrease

Answer: B

Watch Video Solution

283. The Doppler's effect is not applicable

A. when the source and observer are oppositely moving

B. when there is relative motion between source and observer

C. when source is at rest and observer is moving

D. when source and observer are moving in the same direction with the same speed

Answer: D

Watch Video Solution

284. Doppler's effect is due to

A. the source and observer are at rest

B. the relative motion between the source and observer

C. the circular motion of a observer when the source is at rest

D. source and observer are moving with the same speed in the same direction

Answer: B

Watch Video Solution

285. When a source of sound moves towards a stationary observer the pitch of sound will appear to

A. increase

B. become zero

C. decrease

D. remain the same

Answer: A

Watch Video Solution

286. When an observer moves towards a stationary source, then the apparent pitch will

A. become zero

B. increase

C. decrease

D. remain constant

Answer: B

Watch Video Solution

Watch Video Solution

287. When an observer moves away from a stationary source of sound, the apparent pitch will

A. decrease

B. remain constant

C. increase

D. become infinite

Answer: A

Watch Video Solution

288. Two aeroplanes are moving towards each other. One of them blows a horn the person in the other plane hears the sound. The apparent pitch will

A. become infinite

B. decrease

C. become zero

D. increase

Answer: D

Watch Video Solution

289. Two aeroplanes are moving towards each other and cross each other. Then the apparent pitch

A. first decreases and after crossing it increases

B. first increases and after crossing it decreases

C. first remains constant and then decreases

D. continuously increases

Answer: B

Watch Video Solution

290. An observer is standing on a railway platform. He hears the whistle of railway engine moving towards him and then passing. He fells that

A. the pitch appears to increase and then decrease

B. the pitch appears to decrease continuously

C. the pitch does not change

D. the pitch appears to increase continuously

Answer: A

Watch Video Solution

291. If apparent change in frequency of sound heard by a listener is less than, the actual frequency of sound emitted by source. Then it means that

A. listener moves towards source

B. source moves towards listener

C. the listener moves away from source

D. source and listener move towards each other

Answer: C

Watch Video Solution

292. If the star approaches the earth. The Doppler lines are shifted

A. towards the red colour of spectrum

B. towards the violet colour of spectrum

C. infrared region of spectrum

D. ultraviolet region of spectrum

Answer: B

Watch Video Solution

293. Doppler shift in frequency does not depend upon

A. the actual frequency

B. distance of the source from the listener

C. the velocity of the source

D. velocity of the observe

Answer: B

Watch Video Solution

294. When a source of sound is in motion towards a stationary observer, the effect observed is

A. increase in velocity of sound only

B. decrease in velocity of sound only

C. increase in frequency of sound only

D. decrease in frequency of sound only

Answer: C

Watch Video Solution

295. The Doppler's effect is applicable for

A. sound waves

B. light waves

C. radio waves

D. all the above

Answer: D

Watch Video Solution

296. During the Doppler principle, as apparent frequency increases louder is heard because

A. the loudness is proportional to the frequency of sound

B. the loudness depends on the intensity of sound the intensity is proportioanl to the square of frequency

C. both 'b' and 'c'

D.

Answer: D

View Text Solution

297. Radar waves are sent towards a moving aeroplane and the reflected waves are recived by radar . When aero

A. decreases

B. increases

C. remain same

D. may increase and decrease

Answer: A

Watch Video Solution

298. If an observer moves towards a stationary source of sound with a velocity of one tenth the velocity of sound, then the apparent increase in frequency will be

A. 0.01

B. 0.05

C. 0.1

D. 0.1%

Answer: C

Watch Video Solution

299. The difference between the apparent frequency of a source of sound as perceived by an observer during its approach and recession is 2% of the natural frequency of the source. Then the speed of the source will be

A. 1.5 m/s

B. 6.0 m/s

C. 3 m/s

D. 12.0 m/s

Answer: C

Watch Video Solution

300. The velocity of source of sound when the frequency appears to be double the actual frequency of stationary observer will be

A. $v_s = v$

B. $v_s = v/2$

C. $v_s = 2v$

D. $v_s = 1.5v$

Answer: B

Watch Video Solution

301. An engine is moving on a circular path of radius 100 m with a speed of 20 m/s. What will be frequency noted by an observer standing stationary at the centre of the circular path when the engine blows a whistle of frequency 500 Hz ?

A. more than 500 Hz

B. less than 500 Hz

C. 500 Hz

D. no sound

Answer: C

Watch Video Solution

302. An object producing a pitch of 400 Hz flies past a stationary person. The object was moving in a straight line with a velocity of 220 m/s. The velocity of sound in air is 330 m/s. Then the frequency of sound heard by stationary person when the object is approaching him is equal to

A. 240 Hz

B. 96 Hz

C. 1200 Hz

D. 960 Hz

Answer: C

Watch Video Solution

303. A train moving at 40 m/s, passes by a stationary observer, emitting a whistle of frequency 300 Hz. If the velocity of sound wave is 340 m/s, then the change in the apparent frequency of the sound, just before and after the train passes by the observer will be nearly

A. 32 Hz

B. 72 Hz

C. 40 Hz

D. 8 Hz

Answer: B

Watch Video Solution

304. An ambulance blowing a siren of frequency 700 Hz is moving with a speed of 2m/s towards a vertical wall. The speed of sound is 352 m/s. Then the frequency of the reflected sound as heard by the driver of ambulance would be

A. 692 Hz

B. 695 Hz

C. 700 Hz

D. 708 Hz

Answer: D

Watch Video Solution

305. A source of sound is moving with a constant speed of 20 m/s emitting a note of a fixed frequency. The ratio of the frequencies observed by a stationary observer when the source is approaching him and after it has crossed him is (V = 340 m/s)

A. $9:8$

B. $8:9$

C. $10:9$

D. $9:10$

Answer: A

Watch Video Solution

306. An automobile moving at 30 m/s is approaching a factory whistle that has a frequency of 500 Hz. If the speed of the sound in air is 340 m/s, then the apparent frequency of the whistle as heard by the driver is

A. 456 Hz

B. 544 Hz

C. 500 Hz

D. 597 Hz

Answer: B

Watch Video Solution

307. A car, sounding a horn of frequency 1000 Hz, is moving directly towards a huge wall at a speed of 15 m/s. If speed of sound is 340 m/s, then the frequency of the echo heard by the driver is

A. 1046 Hz

B. 954 Hz

C. 1092 Hz

D. 908 Hz

Answer: C

Watch Video Solution

308. Two factories are sounding their sirens at 800 Hz. A man goes from one factory to the other at a speed of 2 m/s. The velocity of sound is 320 m/s. The number of beats heard by the person is 1 s will be

A. 2

B. 8

C. 4

D. 10

Answer: D

Watch Video Solution

309. A source of sound is moving towards a high wall with a speed of 20 m/s. The frequency of the sound produced by the source is 400 Hz. If the speed of the sound is 340 m/s, then the beat frequency heard by a person standing near the wall will be

A. zero

B. 5

C. 10

D. 2

Answer: A

Watch Video Solution

310. A man is running with a fork of frequency 340 Hz towards a huge wall with a velocity 2m/s, then the number of beats heard per second is (Velocity of sound in air is 342 m/s)

A. 2

B. 6

C. 4

D. 8

Answer: C

Watch Video Solution

311. An engine standing at the platform blows a whistle of frequency 305 Hz. If the velocity of sound be 1220 km/h, the frequency of the whistle as heard by a man running towards the engine with a speed of 20 km/s is

A. 300 Hz

B. 305 Hz

C. 310 Hz

D. 325 Hz

Answer: C

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312. The speed of sound in air is 340 m/s. The speed with which a source of sound should move towards a stationary observer so that the apparent frequency becomes twice of the original

A. 170 m/s

B. 340 m/s

C. 640 m/s

D. 85 m/s

Answer: A

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313. The apparent frequency of the whistle of an engine changes in the ratio $9:5$ as the engine passes the stationary observer. If the velocity of sound is $350ms^{-1}$, then the speed of the engine is

A. $90ms^{-1}$

B. $50ms^{-1}$

C. $100ms^{-1}$

D. $70ms^{-1}$

Answer: C

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314. A source producing sound of frequency 340 Hz is moving away from a stationary observer with a velocity of $34ms^{-1}$. The apparent change in wavelength of sound heard by the observer is $(V = 340ms^{-1})$

A. 0.4 m

B. 0.25 m

C. 0.2 m

D. 0.1 m

Answer: D

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315. The velocity of sound in air is $330ms^{-1}$. To increase the apparent frequency of the sound by 50%, the source should move towards the stationary observer with a velocity equal to

A. $330ms^{-1}$

B. $220ms^{-1}$

C. $165ms^{-1}$

D. $110ms^{-1}$

Answer: D

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316. A car sounding its horn at $480 Hz$ moves towards a high wall at a speed of $20 ms^{-1}$, the frequency of the reflected sound heard by the man sitting in the car will be nearest to , (speed of sound $= 330 m / s$)

A. 480 Hz

B. 510 Hz

C. 540 Hz

D. 570 Hz

Answer: C

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317. The apparent frequency of the whistle of an engine changes in the ratio $13 : 12$ as the engine passes a stationary observer. If the velocity of sound is 350 m/s. The velocity of engine is

A. 14 m/s

B. 16 m/s

C. 18 m/s

D. 20 m/s

Answer: A

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318. A car is travelling at $\frac{V}{10}ms^{-1}$ and sounds horn of frequency 990 Hz. The apparent frequency heard by a police chasing the car at $\frac{V}{9}ms^{-1}$ where V is velocity of sound

A. 990 Hz

B. 800 Hz

C. 950 Hz

D. 1020 Hz

Answer: B

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319. With what velocity should you approach tuning fork of frequency 256 Hz so that the apparent frequency is 512 Hz.

Velocity of sound in air is 340 m/s

A. 340 m/s

B. 320 m/s

C. 260 m/s

D. 540 m/s

Answer: A

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320. A tuning fork of frequency $90Hz$ is sounded and moved towards an observer with a speed equal to one - tenth the speed of sound. The note heard by the observer will have a frequency

A. 100

B. 90

C. 450

D. 900

Answer: A

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321. The frequency of waves emitted from a radar is 750 MHz. The frequency of reflected wave from the aeroplane as observed at the radar station is increased by 2.5 KHz. What is the speed of aeroplane

A. $4Kms^{-1}$

B. $2Kms^{-1}$

C. $1Kms^{-1}$

D. $0.5Kms^{-1}$

Answer: D

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322. The apparent wavelength of light from a star moving away from the earth is 0.02% more than the actual wave length. What is the velocity of star

A. $30Kms^{-1}$

B. $60Kms^{-1}$

C. $90Kms^{-1}$

D. none of these

Answer: A

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323. A source is moving towards a stationary observer, so that the apparent frequency increases by 50%. If velocity of sound is 330 m/s, then velocity of source is

A. 180 m/s

B. 220 m/s

C. 110 m/s

D. 150 m/s

Answer: C

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324. A police car with a siren of frequency $8KHz$ is moving with uniform velocity $36Km/hr$ towards a ball building which reflects the sound waves. The speed of sound in air is $320m/s$. The frequency of the siren heard by the car driver is

A. 8.25 kHz

B. 8.50 kHz

C. 7.75 kHz

D. 7.50 kHz

Answer: B

Watch Video Solution

325. A source of sound is approaching an observer with speed of 30 m/s and the observer is approaching the source with a speed 60 m/s. Then the fractional change in the frequency of sound in air (330 m/s) is

A. $\frac{1}{3}$

B. $\frac{2}{5}$

C. $\frac{2}{2}$

D. $\frac{3}{10}$

Answer: D

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326. When a transverse wave pulse is reflected from free end, the phase change produced is

A. $\pi / 2$

B. π

C. zero

D. $3\pi / 4$

Answer: C

Watch Video Solution

327. A set of tuning forks is arranged in ascending order of frequency. Each tuning fork gives 5 beats per second with the preceding one. If the frequency of the first tuning fork is

100 Hz and that of last fork is 150 Hz, then the total number of tuning forks arranged are

A. 9

B. 10

C. 11

D. 12

Answer: C

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328. If the equation of transverse wave is $y = 5 \sin 2\pi \left[\frac{t}{0.04} - \frac{x}{40}\right]$, where distance is in cm and time in second, then the wavelength of the wave is

A. 10 cm

B. 25 cm

C. 40 cm

D. 60 cm

Answer: C

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329. Two sound waves of wavelength $\frac{92}{147}m$ and $\frac{92}{149}m$ produce 8 beats per second, when allowed to surperimpose/ The velocity of sound is

A. 320 m/s

B. 332 m/s

C. 368 m/s

D. 312 m/s

Answer: C

Watch Video Solution

330. Two tuning forks A and B produce 8 beat/s when sounded together. When B is slightly loaded with a wax the beats are reduced to 4 per sec. If the frequency of A is 512 Hz, the frequency of B is

A. 508 Hz

B. 516 Hz

C. 504 Hz

D. 520 Hz

Answer: D

Watch Video Solution

331. Ten tuning forks are arranged in increasing order of frequency is such a way that any two nearest tuning forks produce $4be * / \sec$. The highest freqeuncy is twice of the lowest. Possible highest and the lowest frequencies are

A. 72, 144

B. 36, 72

C. 18, 36

D. 9, 18

Answer: B

Watch Video Solution

332. The equation of a progressive wave is $y = 8\sin\left[\pi\left(\frac{t}{10} - \frac{x}{4}\right) + \frac{\pi}{3}\right]$. The wavelength of the wave is

A. 8 m

B. 4 m

C. 2 m

D. 10 m

Answer: A

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333. When a sound wave gets reflected from denser medium phase changes by

A. 2π

B. $\pi/2$

C. π

D. no phase change

Answer: C

Watch Video Solution

334. If two waves of frequencies $n_1 = 200Hz$ and $n_2 = 205Hz$ are superimposed, then the value of beat frequency will be

A. 6

B. 5

C. 4

D. 3

Answer: B

Watch Video Solution

335. The equation of a progressive wave is given by, $y = 3\sin\pi\left(\frac{t}{0.02} - \frac{x}{20}\right)m$. Then the frequency of the wave is

A. 100 Hz

B. 25 Hz

C. 50 Hz

D. 20 Hz

Answer: B

Watch Video Solution

336. The amplitude of two waves are in ratio 5 : 2. If all other conditions for the two waves are same, then what is the ratio of their energy densities

A. $5 : 2$

B. $10 : 4$

C. $2.5 : 1$

D. $25:4$

Answer: D

Watch Video Solution

337. Doppler effect is due to

A. apparent change in frequency

B. actual change in wavelength

C. apparent change in wavelength

D. actual change in frequency

Answer: A

Watch Video Solution

338. What is the phase difference between two successive crests in the wave

A. π

B. $\pi / 2$

C. 2π

D. 4π

Answer: C

Watch Video Solution

339. Two waves of wavelengths 52.5 cm and 52 cm produces 5 beats per second.their frequencies are

A. 490 HZ, 495 Hz

B. 500Hz, 505 Hz

C. 525 Hz, 520 Hz

D. 500 Hz, 495 Hz

Answer: C

Watch Video Solution

340. Wavelength of wave is a distance between two particles in phase differing by

A. π

B. $2\pi / 3$

C. 2π

D. $\pi / 3$

Answer: C

Watch Video Solution

341. Turning fork A of frequency 305 Hz produces 5 beats s^{-1} with another turing fork B. After filling tuning fork B, it produces 3 beats s^{-1} with A. The frequency of B before filling was

A. 300 Hz

B. 310 Hz

C. 313 hz

D. 308 Hz

Answer: A

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342. When a longitudinal wave is incident on a rigid wall.

A. compression is reflected as rarefaction with phase change of 0°

B. compression is reflected as rarefaction with phase change of 180°

C. compression is reflected as compression with no phase change

D. compression is reflected as compression with phase change of 180°

Answer: D

Watch Video Solution

343. When a tuning fork A and B are sounded together,the number of beats heard are 4 per second.When tuning fork A is field,the number of beats heard per second with B is changed to 3.If the frequency of tuning fork B is 384 Hz,the original frequency of A is

A. 388 Hz

B. 387 Hz

C. 381 Hz

D. 380 Hz

Answer: D

Watch Video Solution

344. A sonometer wire is in unison with a tuning fork . When its length increases by 4% , it gives 8 beats/with the same fork. What is the frequency of the fork ?

A. 196 Hz

B. 200 Hz

C. 204 Hz

D. 208 Hz

Answer: B

Watch Video Solution

345. When sound is reflected from a denser medium

A. crest is reflected as a trough

B. crest is reflected as a crest

C. compression is reflected as a rarefaction

D. compression is reflected as a compression

Answer: D

Watch Video Solution

346. The phase difference between two particles in a medium separated by a distance x is $\pi / 6$ .If the frequency of the oscillation is 50 Hz and the velocity of propagation of the wave is 100 m/s then x =

A. 1/3 m

B. 1/4 m

C. 1/6 m

D. 1/12m

Answer: C

Watch Video Solution

347. In a string under tension T, the velocity of transverse wave travelling along it is

A. $\propto T$

B. $\propto \sqrt{T}$

C. $\propto T^2$

D. $\propto T^{-1}$

Answer: B

Watch Video Solution

348. If the maximum particle velocity is 4 times of the wave velocity then relation between wavelength and amplitude is

A. $\lambda = A/2\pi$

B. $\lambda = \pi A/2$

C. $\lambda = \pi/2A$

D. $\pi = \lambda A/2$

Answer: B

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349. A vibrating tuning fork emits sound waves of period 2×10^{-3} second and wavelength 0.7 m in air. The velocity of sound in air is

A. 175 m/s

B. 330 m/s

C. 340 m/s

D. 350 m/s

Answer: D

Watch Video Solution

350. In the equation of a simple harmonic progressive wave of wavelength $'\lambda'$, the propagation constant is given by

A. $2\pi / \lambda$

B. $\pi\lambda$

C. π / λ

D. $\lambda / 2\pi$

Answer: A

Watch Video Solution

351. $y = 3\cos 100\pi(2t - x)$, the value of λ is

A. 4 cm

B. 6 cm

C. 2 cm

D. 1 cm

Answer: C

Watch Video Solution

352. A progressive wave is represented by $y = 12 \sin(5t - 4x)$ cm. On this wave, how far away are the two points having phase difference of 90° ?

A. $\pi / 4$

B. $\pi / 8$

C. $\pi / 16$

D. $\pi / 32$

Answer: B

Watch Video Solution

353. 10 beats/s are produced by the super position of two sound waves. If equation of the first wave is $y_1 = 5 \sin 20\pi(30t)$, then the equation of second wave is

A. $y_2 = 5 \sin 20\pi(31t)$

B. $y_2 = 5 \sin 20\pi(30t)$

C. $y_2 = 5 \sin 20\pi(32t)$

D. $y_2 = 5 \sin 21\pi(31t)$

Answer: A

Watch Video Solution

354. The maximum particle velocity in a progressive wave is 4 times of the wave velocity. If the amplitude of the particle is 'A', then the wavelength of the wave is

A. $4\pi / A$

B. $\pi A / 2$

C. $2\pi / A$

D. $A / 2\pi$

Answer: B

Watch Video Solution

355. When a transverse wave pulse is reflected from free end, the phase change produced is

A. zero rad

B. $\pi / 2$ rad

C. $3\pi / 4$ rad

D. π rad

Answer: A

Watch Video Solution

356. The apparent frequency of the sound, heard by a listener is less than the actual frequency of sound emitted by a source. In ths case

A. listener moves towards source

B. source moves towards listener

C. listener moves away from the source

D. source and listener move towards each other

Answer: C

Watch Video Solution

357. Let n_1 and n_2 be the two slightly different frequencies of two sound waves. The time interval between waxing and immediate next waning is

A. $\frac{1}{n_1 - n_2}$

B. $\dfrac{2}{n_1 - n_2}$

C. $\dfrac{n_1 - n_2}{2}$

D. $\dfrac{1}{2(n_1 - n_2)}$

Answer: D

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358. Let velocity of a sound wave be 'v' and $'\omega'$ be angular velocity. The propagation constant of the wave is

A. $\sqrt{\dfrac{\omega}{v}}$

B. $\sqrt{\dfrac{v}{\omega}}$

C. $\dfrac{\omega}{v}$

D. $\dfrac{v}{\omega}$

Answer: C

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359. When a wave travels in a medium, the particle displacement is given by the equation $y = a \sin 2\pi(bt - cx)$, where a, b and c are constants. The maximum particle velocity will be twice the wave velocity. If

A. $b = ac$

B. $b = \frac{1}{ac}$

C. $c = \pi a$

D. $c = \frac{1}{\pi a}$

Answer: D

Watch Video Solution

360. When a longistudinal wave is incident at the bondary of a denser medium, then

A. compression reflects as a compression

B. compression reflects as a rarefaction

C. rarefaction reflects as a compression

D. longitudinal wave reflects as transverse wave

Answer: A

Watch Video Solution

361. A progressive wave is represented by y = 5 $\sin(100\pi t - 2\pi x)$ where x and y are in m and t is in s. The maximum particle velocity is

A. 28 cm/s

B. 32 cm/s

C. 49 cm/s

D. 112 cm/s

Answer: A

Watch Video Solution

362. The Pitch of the whistle of an engine appears to drop to $\frac{5}{6}$ th of original value when it passes a stationary observer if the speed of sound in air is 350 m/s then the speed of engine is

A. 35 m/s

B. 70 m/s

C. 105 m/s

D. 140 m/s

Answer: B

Watch Video Solution

363. The equation of the progressive wave is y =a $\sin \pi\left(nt - \frac{x}{5}\right)$ the ratio maximum paritcle velocity to wave velocity is

A. $\frac{\pi a}{5}$

B. $\frac{2\pi a}{5}$

C. $\frac{3\pi a}{5}$

D. $\frac{4\pi a}{5}$

Answer: B

Watch Video Solution

364. A wave is reflected from a rigid support. The change in phase on reflection will be

A. 0 rad

B. $\pi / 4$ rad

C. $\pi / 2$ rad

D. π rad

Answer: D

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