DPP
DAILY PRACTICE PROBLEMS

CLASS : XITH **SUBJECT : PHYSICS**
DATE : **DPP NO. :8**

Topic :- WAVES

1. A wave equation which gives the displacement along y-direction is given by $y = 0.001\sin(100t + x)$ where x and y are in meter and t is time in second. This represented a wave
   a) Of frequency $100/\pi\ Hz$
   b) Of wavelength one metre
   c) Travelling with a velocity of $50/\pi\ ms^{-1}$ in the positive X-direction
   d) Travelling with a velocity of $100\ ms^{-1}$ in the negative X-direction

2. The speed of sound in a gas
   a) Does not depend upon density of the gas
   b) Does not depend upon charges in pressure
   c) Does not depend upon temperature
   d) Depends upon density of the gas

3. Two stretched strings of same material are vibrating under same tension in fundamental mode. The ratio of their frequencies is 1 : 2 and ratio of the length of the vibrating segments is 1 : 4. Then the ratio of the radii of the strings is
   a) 2 : 1 b) 4 : 1 c) 3 : 2 d) 8 : 1

4. A band playing music at a frequency f is moving towards a wall at a speed v_b. A motorist is following the band with a speed v_m. If v is speed of sound, the expression for the beat frequency heard by the motorist is
   a) $\frac{(v+v_m)f}{v+v_b}$ b) $\frac{(v+v_m)f}{v-v_b}$ c) $\frac{2v_b(v+v_m)f}{v^2-v_b^2}$ d) $\frac{2v_m(v+v_b)f}{v^2-v_b^2}$

5. An empty vessel is partially filled with water, then the frequency of vibration of air column in the vessel
   a) Remains same
   b) Decreases
   c) Increases
   d) First increases then decreases

6. The wavelength of infrasonics in air is of the order of
   a) 10^0m b) 10^1m c) 10^{-1}m d) 10^{-2}m

7. Two sound waves are represented by $y = a\sin(\omega t - kx)$ and $y = a\cos(\omega t - kx)$. The wavelength of wave I water are
a) $\pi/2$ b) $\pi/4$ c) π d) $3\pi/4$

8. The frequency of a whistle of an engine is 600 $cycles/sec$ is moving with the speed of 30 m/sec towards an observer. The apparent frequency will be (velocity of sound = 330 m/s)
a) 600 cps b) 660 cps c) 990 cps d) 330 cps

9. The tones that are separated by three octaves have a frequency ratio of
a) 3 b) 4 c) 8 d) 16

10. If the ratio of amplitude of two waves is 4 : 3. Then the ratio of maximum and minimum intensity will be
a) 16 : 18 b) 18 : 16 c) 49 : 1 d) 1 : 49

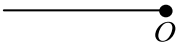
11. A source and an observer move away from each other with a velocity of 10 m/s with respect to ground. If the observer finds the frequency of sound coming from the source as 1950 Hz, then actual frequency of the source is (velocity of sound in air = 340 m/s)
a) 1950 Hz b) 2068 Hz c) 2132 Hz d) 2486 Hz

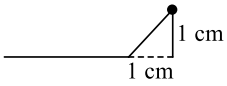
12. A wave is given by $y = 3\sin 2\pi\left(\frac{t}{0.04} - \frac{x}{0.01}\right)$, where y is in cm. Frequency of wave and maximum acceleration of particle will be
a) $100Hz, 4.7 \times 10^3 cm/s^2$ b) $500Hz, 7.5 \times 10^3 cm/s^2$
c) $25Hz, 4.7 \times 10^4 cm/s^2$ d) $25Hz, 7.4 \times 10^4 cm/s^2$

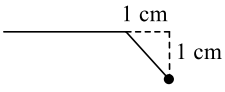
13. A sound wave of frequency v propagating through air with a velocity c, is reflected from a surface which is moving away from the source with a constant speed v. the frequency of the reflected wave, measured by the observed at the position of the source, is
a) $\frac{v(c-v)}{c+v}$ b) $\frac{v(C+v)}{c-v}$ c) $\frac{v(c+2v)}{c+v}$ d) $\frac{v(c-v)}{c-2v}$

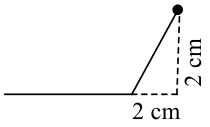
14. If $y = 5\sin\left(30\pi t - \frac{\pi}{7} + 30°\right)$ $y \to mm, t \to s, x \to m$.for given progressive wave equation, phase difference between two vibrating particle having path difference 3.5 m would be
a) $\pi/4$ b) π c) $\pi/3$ d) $\pi/2$

15. In question, the shape of the wave at time $t = 3s$,if O is a fixed end (not free) in is.

a) 

b) 

c) 

d) 

16. A man stands in front of a hillock and fires a gun. He hears an echo after 1.5 sec. The distance of the hillock from the man is (velocity of sound in air is 330 m/s)
a) 220 m b) 247.5 m c) 268.5 m d) 292.5 m

17. A cylindrical tube open at both the ends has a fundamental frequency of 390 Hz in air. If $\frac{1}{4}$of the tube is immersed vertically in water the fundamental frequency of air column is
a) 260 Hz b) 130 Hz c) 390 Hz d) 520 Hz

18. In a sinusoidal wave, the time required for a particular point to move from maximum displacement to zero displacement is 0.170 second. The frequency of the wave is
a) 1.47 Hz b) 0.36 Hz c) 0.73 Hz d) 2.94 Hz

19. A motor car is approaching towards a crossing with a velocity of 72 kmh^{-1}. The frequency of sound of its horn as heard by a policeman standing on the crossing is 260Hz. The frequency of horn is
a) 200 Hz b) 244 Hz c) 150 Hz d) 80 Hz

20. If V_m is the velocity of sound in moist air, $V_d$is the velocity of sound in dry air, under identical conditions of pressure and temperature
a) $V_m < V_d$ b) $V_m > V_d$ c) $V_m V_d = 1$ d) $V_m = V_d$