DPP
DAILY PRACTICE PROBLEMS

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CLASS : XITH	**SUBJECT : PHYSICS**
DATE :	**DPP NO. :6**

Topic :- WAVES

1. The transverse displacement $y(x,t)$ of a wave on a string is given by
   $y(x,t) = e^{-(ax^2 + bt^2 + 2\sqrt{ab}xt)}$ This represent a

   a) Wave moving in x- direction with speed $\sqrt{\frac{b}{a}}$ b) Standing wave of frequency $\sqrt{b}$

   c) Standing wave of frequency $\frac{1}{\sqrt{b}}$ d) Wave moving in +x direction with speed $\sqrt{\frac{a}{b}}$

2. 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 energy and potential energy
   d) Difference between kinetic energy and potential energy

3. Which of the following equation represent a progressive wave?
   a) y=A cos ax sin bt   b) y=A sin bt   c) y=A cos (ax+bt)   d) y=A tan (ax+bt)

4. The equation of a simple harmonic wave is given by $y = 5 \sin \frac{\pi}{2}(100t - x)$ where x and y are in meter and time is in second. The period of the wave in second will be
   a) 0.04   b) 0.01   c) 1   d) 5

5. A tuning fork gives 4 beats with 50 cm length of a sonometer wire. If the length of the wire is shortened by 1 cm, the number of beats is still the same. The frequency of the fork is
   a) 396   b) 400   c) 404   d) 384

6. Choose the correct statement
   a) Beats are due to destructive interference
   b) Maximum beat frequency audible to a human being is 20
   c) Beats are as a result of Doppler's effect
   d) Beats are due to superposition of two waves of nearly equal frequencies

7. In stationary waves, antinodes are the points where there is
   a) Minimum displacement and minimum pressure change
   b) Minimum displacement and maximum pressure change
   c) Maximum displacement and maximum pressure change
   d) Maximum displacement and minimum pressure change

8. Two sound waves of wavelengths $5m$ and $6m$ formed 30 beats in 3 seconds. The velocity of sound is
   a) $300\ ms^{-1}$ b) $310\ ms^{-1}$ c) $320\ ms^{-1}$ d) $330\ ms^{-1}$

9. What is the phase difference between two successive crests in the wave?
   a) π b) $\pi/2$ c) 2π d) 4π

10. Velocity of sound waves in air is 330ms^{-1}. For a particular sound in air, a path difference of 40cm is equivalent to a phase difference of 1.6π. The frequency of the wave is
    a) 165 Hz   b) 150 Hz   c) 660 Hz   d) 330 Hz

11. Velocity of sound in air
    I. increases with temperature
    II. Decreases with temperature
    III. Increase with pressure
    IV. Is independent of pressure
    V. Is independent of temperature
    Choose the correct answer
    a) Only I and II are true   b) Only I and III are true
    c) Only II and III are true   d) Only I and IV are true

12. An open pipe resonates with a tuning fork of frequency 500 Hz. It is observed that two successive nodes are formed at distance 16 and 46 cm from the open end. The speed of sound in air in the pipe is
    a) 260 ms^{-1} b) 300 ms^{-1} c) 320 ms^{-1} d) 360 ms^{-1}

13. Each of the two strings of length $51.6\ cm$ and $49.1\ cm$ are tensioned separately by $20\ N$ force. Mass per unit length of both the strings is same and equal to $1\ g/m$. When both the string vibrate simultaneously the number of beats is
    a) 5   b) 7   c) 8   d) 3

14. A source of sound of frequency n is moving towards a stationary observer with a speed S. If the speed of sound in air is V and the frequency heard by the observer is n_1, the value of n_1/n is
    a) $(V+S)/V$ b) $V/(V+S)$ c) $(V-S)/V$ d) $V/(V-S)$

15. Sounds wave transfer
    a) Only energy not momentum
    b) Energy
    c) Momentum
    d) Both (a) and (b)

16. Which of the following is the example of transverse wave
    a) Sound waves
    b) Compressional waves in a spring
    c) Vibration of string
    d) All of these

17. A string vibrates according to the equation $y = 5 \sin\left(\frac{2\pi x}{3}\right) \cos 20\pi t$ where x and y are in cm and t in second. The distance between two adjacent nodes is
    a) 3 cm
    b) 4.5 cm
    c) 6 cm
    d) 1.5 cm

18. Source and observer, both start moving simultaneously from origin, one along *X*-axis and the other along *Y*-axis with speed of source equal to twice the speed of observer. The graph between the apparent frequency (*n'*) observed by observer and time *t* in figure would be

a)

b)

c)

d)
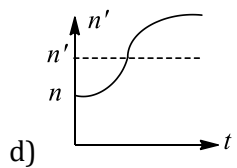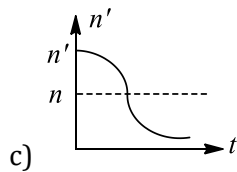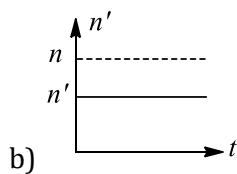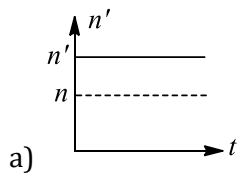
19. Two wires are fixed in a sonometer. Their tensions are in the ratio 8:1. The lengths are in the ratio 36:35. The diameters are in the ratio 4:1. Densities of the materials are in the ratio 1:2. If the higher frequency in the setting is 360 Hz, the beat frequency when the two wires are sounded together, is
    a) 8
    b) 5
    c) 10
    d) 6

20. Equation of a progressive wave is given by $y = a \sin \pi \left[\frac{t}{2} - \frac{x}{4}\right]$, where t is in seconds and x is in meters. The distance through which the wave moves in $8\ sec$ is (in meter)

a) 8   b) 16   c) 2   d) 4