DPP
DAILY PRACTICE PROBLEMS

CLASS : XITH   SUBJECT : PHYSICS
DATE :   DPP NO. :9

Topic :- WAVES

1. Given that $y = A \sin\left[\left(\frac{2\pi}{\lambda}(ct - x)\right)\right]$, where y and x are measured in metres. Which of the following statements is true
   a) The unit of λ^{-1} is same as that of $\frac{2\pi}{\lambda}$ b) The unit of λ is same as that of x but not of A
   c) The unit of c is same as that of $\frac{2\pi}{\lambda}$ d) The unit of $(ct - x)$ is same as that of $\frac{2\pi}{\lambda}$

2. A plane progressive wave is given by y=2cos 6.284 (30t-x).what is period of the wave?
   a) $\frac{1}{330}s$ b) $2\pi \times 330s$ c) $(2\pi \times 330)^{-2}s$ d) $\frac{6.284}{330}s$

3. The amplitude of a wave is given by $A = \frac{c}{a+b+c}$. Resonance will occur when
   a) $b = -\frac{c}{2}$ b) $b = -\frac{a}{2}$ c) $b = 0, a = c$ d) None of these

4. An observer standing near the sea shore observes 54 waves per minute. If the wavelength of the water wave is $10m$ then the velocity of water wave is
   a) $540\ ms^{-1}$ b) $5.4\ ms^{-1}$ c) $0.184\ ms^{-1}$ d) $9\ ms^{-1}$

5. A plane wave is described by the equation $y = 3\cos\left(\frac{x}{4} - 10t - \frac{\pi}{2}\right)$. The maximum velocity of the particles of the medium due to this wave is
   a) 30 b) $\frac{3\pi}{2}$ c) $3/4$ d) 40

6. Equation of motion in the same direction are given by
   $y_1 = 2a \sin(\omega t - kx)$ and $y_2 = 2a \sin(\omega t - kx - \theta)$
   The amplitude of the medium particle will be
   a) $2a \cos\theta$ b) $\sqrt{2}a \cos\theta$ c) $4a \cos\theta/2$ d) $\sqrt{2}a \cos\theta/2$

7. The equation $\vec{\phi}(x, t) = \vec{j}\sin\left(\frac{2\pi}{\lambda}vt\right)\cos\left(\frac{2\pi}{\lambda}x\right)$ represents
   a) Transverse progressive wave   b) Longitudinal progressive wave
   c) Longitudinal stationary wave   d) Transverse stationary wave

8. What is the base frequency if a pipe gives notes of frequencies 425, 255 and 595 and decide whether it is closed at one end or open at both ends
   a) 17, closed   b) 85, closed   c) 17, open   d) 85, open

9. The phase difference between two waves represented by
   $y_1 = 10^{-6} \sin[100t + (x/50) + 0.5]m$
   $y_2 = 10^{-6} \cos[100t + (x/50)]m$
   Where x is expressed in metres and t is expressed in second, is approximately
   a) 1.5 rad b) 1.07 rad c) 2.07 rad d) 0.5 rad

10. Apparatus used to find out the velocity of sound in gas is
    a) Melde's apparatus   b) Kundt's tube   c) Quincke's tube   d) None of these

11. Ten tuning fork are arranged in increasing order of frequency in such a way that any two nearest tuning forks produce 4 beats s^{-1}. The highest frequency is twice that of the lowest. Possible highest and lowest frequencies are
    a) 80 and 40   b) 100 and 50   c) 44 and 32   d) 72 and 36

12. If the phase difference between the two wave is 2π during superposition, then the resultant amplitude is
    a) Maximum   b) Minimum
    c) Maximum or minimum   d) None of the above

13. In stationary wave
    a) Strain is maximum at nodes   b) Strain is maximum at antinodes
    c) Strain is minimum at nodes   d) Amplitude is zero at all the points

14. The ratio of the sound in oxygen to that in hydrogen at same temperature and pressure is approximately
    a) 16:1   b) 1:16   c) 4:1   d) 1:4

15. A source of sound S is moving with a velocity of 50ms^{-1} towards a stationary observer. The observer measures the frequency of the source as 1000 Hz. What will be the apparent frequency of the source when it is moving away from the observer after crossing him? The velocity of the sound in medium is 350m^{-1}.
    a) 750 Hz   b) 857 Hz   c) 1143 Hz   d) 1333 Hz

16. At what speed should a source of sound move so that stationary observer finds the apparent frequency equal to half of the original frequency
    a) $v/2$ b) $2v$ c) $v/4$ d) v

17. n waves are produced on a string in one second. When the radius of the string is doubled and the tension is maintained the same, the number of waves produced in one second for the same harmonic will be

a) $\frac{n}{2}$ b) $\frac{n}{3}$ c) $2n$ d) $\frac{n}{\sqrt{2}}$

18. Two sound waves travel in the same direction in a medium. The amplitude of each wave is A and the phase difference between the two waves is $120°$. The resultant amplitude will

a) $\sqrt{2}A$ b) $2A$ c) $3A$ d) A

19. 25 tuning forks arranged in series in the order of decreasing frequency. Any two successive forks produce 3 beats/sec. If the frequency of the first tuning fork is the octave of the last fork, then the frequency of the 21st fork is

a) $72\ Hz$ b) $288\ Hz$ c) $84\ Hz$ d) $87\ Hz$

20. The ratio of intensities between two coherent sound sources is $4:1$. The difference of loudness in decibels (dB) between maximum and minimum intensities, on their interference in space is

a) $20\ \log 2$ b) $10\ \log 2$ c) $20\ \log 3$ d) $10\ \log 3$