CHAPTER = 12 ACOUSTICS

MULTIPLE CHOICE QUESTIONS (BOOK XI)

1. The speed v of a wave represented by $y = A\cos(\omega t - k x)$ is:

a) $\frac{k}{\omega}$ b) $\frac{\omega}{k}$

c) $\omega\ k$ d) $\frac{1}{\omega\ k}$

2. Two sound waves are $y = A\sin(\omega t - k x)$ and $y = A\cos(\omega t - k x)$. The phase difference between the two waves is:

a) $\frac{\pi}{2}$ b) $\frac{\pi}{4}$

c) π d) 0^0

3. If v_a , v_h *and* v_m the speeds of sound in air, hydrogen gas, and a metal at the same temperature, then:

a) $v_a > v_h > v_m$ **b) $v_m > v_h > v_a$**

c)) $v_h > v_m > v_a$ d)) $v_h > v_a > v_m$

4. The speed of sound in air at STP is 332 mis. If the air pressure becomes double at the same temperature, the speed of sound becomes:

a) 1382 m/s **b) 664m/s**

c) 332 m/s d) 166 m/s

5. How does the speed of sound v in the air depend on the atmospheric pressure P:

a) $v\ \alpha\ P^0$ **b) $v\ \alpha\ P^{-1}$**

c) $v\ \alpha\ P^2$ d) $v\ \alpha\ P^1$

6. The speed of sound in a gas is proportional to:

a) square root of isothermal elasticity b) isothermal elasticity

c) square root of adiabatic elasticity d) adiabatic elasticity

7. The length of a pipe closed at one end is L. In the standing wave whose frequency is 7 times the fundamental frequency, what is the closest distance between nodes?

a) $\frac{1}{14}$ L b) $\frac{1}{7}$ **L**

c) $\frac{2}{7}$ L d) $\frac{4}{7}$ L

8. A 620 Hz frequency song of an ice cream trolley approaches with speed v to a boy standing at the door of his house is heard with frequency Ji. If the trolley is stopped and the boy approaches the ice cream trolley with the same speed v; the boy now hears the sound with frequency /2 choose the correct statement:

a) $f_1 = f_2$; *both are greater than 620Hz*

b) $f_2 > f_1 > 620Hz$

c) $f_1 = f_2$; *both are less than* $620Hz$

d) $f_1 > f_2 > 620Hz$

9. The speed of sound in a gas in which two waves of wavelength 50 cm and 50.4 cm Produce 6 beats per second is:

a) 338 m/s b) 350 m/s

c) 378 m/s d) 400 m/s

10. The speed of a wave in a medium is 760 mis. If 3600 waves are passing through a point in the medium in 2 minutes, then its wavelength is:

a) 13.85 m **b) 25.3 m**

c) 41.5 m d) 57.2 m

CHAPTER = 10 ACOUSTICS
EXAM PRACTICE MULTIPLE CHOICE QUESTIONS

1. The loudness of sound depends upon:

a) Wavelength b) Frequency

a) Amplitude d) speed

2. When the temperature of air rises, the speed of sound waves increases because:

a) The frequency of the wave increases

b) Both frequency and wavelength increases

d) Only wave length increases

3. When a sound source moves towards a stationary listener there is:

a) An apparent increase in wavelength

b) An apparent increase in frequency

c) A decrease in pitch

4. The characteristics of a musical sound that distinguish between the notes of the same pitch and intensity are known as:

a) Quality b) Loudness

c) Intensity d) pitch

5. Sound wave travels fastest in:

a) Air b) Water

c) Iron d) vacuum

60. Sound waves are:

a) Longitudinal waves b) Transverse waves

c) string wave d) all of these

7. The velocity of the wave of wavelength λ and frequency v is:

a) v / λ b) λ / v **c) $v\lambda$** a) $1 / v\lambda$

8. In aerodynamics the ratio of the velocity of the source waves to the velocity of the sound is called:

a) Shock wave **b) Mach number**

c) Harmonics d) infrasonic wave

9. When the speed of a jet plane becomes greater than the speed of the sound then the loud sound is produced due to:

a) Shock wave b) Standing wave

b) infrasonic wave d) ultrasonic wave

10. Maximum beat frequency which a human ear can detect is:

a) 3 b) 5

c) 7 d) 9

11. Pitch of sound depends on:

a) Intensity b) Loudness

c) Frequency d) all of these

12. Which of the following represents compressional waves?

a) Sound waves b) Light waves

c) Radio waves d) micro waves

13. The distance between the node and anti-node in a loop is:

a) λ b) $\lambda / 2$

c) $\lambda / 4$ d) $\lambda/8$

14. A decibel is:

a) Musical instrument b) Musical node

c) Wavelength **d) Measure of intensity level**

15. Beats are the result of:

a) Diffraction

b) Constructive interference only

c) Destructive interference only

d) Both constructive and destructive interference

16. The speed of sound waves does not depend upon:

a) Wind speed b) Temperature

c) Pressure d) Density of medium

17. When sounded with another tuning fork of unknown frequency, A 252Hz tuning fork produces four beats per second.

a) 63 Hz **b) 256Hz**

c) 1008Hz d) 248Hz

18. The distance between two consecutive nodes of a stationary wave will be:

a) λ **b) λ / 2**

c) λ / 4 d) λ / 6

19. When stationary waves are set up in a stretched string, it has a fundamental frequency of 1000Hz. What would be the new fundamental frequency? If the tension in the wire is increased four times?

a) 980Hz b) 500Hz

c) 1010Hz **d) 2000Hz**

20. When the temperature of air rises, the speed of sound waves increases because:

a) Only frequency increases

b) Only wavelength increases

c) Both increases

d) Only wavelength decreases

21. Supersonic jets may produce a double sonic boom due to two shock waves within the time interval of:

a) 0.02 sec b) 0.2 sec

c) 0.001 sec d) 0.21 sec

22. As a source of sound moves away from a stationary listener, there is an apparent:

a) Decrease in wavelength b) Increase in pitch

c) Decrease in phase **d) Decrease in pitch**

23. If the tension in a string is made four times, the speed of the transverse wave will be:

a) Half **b) Doubled**

c) 4 times d) The same

24. Beats are produced due to:

a) Diffraction **b) Interference**

c) Polarization d) Refraction

25. Supersonic waves have the frequency of more than:

a) 20 Hz b) 2000 Hz

c) 5000 Hz **d) 20000 Hz**