Name: _____

Question No. 1 Encircle the correct option.   (20)

i.   The louder the sound, greater will be its
       a. amplitude   b. wavelength   c. speed   d. frequency
ii.   The distance between the two consecutive nodes
       a. 2λ b. λ c. $\lambda/2$ d. $\lambda/4$
iii.   The speed of sound in vacuum is
       a. Zero   b. 300 m/s   c. 332m/s   d. 340 m/s
iv.   Which is the application of Doppler effect?
       a. radar system   b. tuning of the radio   c. microwave oven   d. oscillator
v.   If the tension is made four times, the speed of the transverse waves will become
       a. double   b. three times   c. four times   d. remains constant
vi.   If the density of the gas becomes half, the velocity of sound in it will
       a. be halved   b. be doubled   c. become four times   d. remains constant
vii.   Red shift indicates that the stars
       a. is moving towards earth b. is moving away from earth   c. is stationary   d. none of these
viii. The speed of sound travelling through oxygen -----times greater than when they travel through hydrogen
       a. two   b. three   c. four   d. eight
ix.   The fixed ends of the vibrating string are called
       a. nodes   b. antinodes   c. crests   d. trough
x.   The speed of sound wave is independent of
       a. temperature   b. density   c. pressure   d. medium
xi.   The transverse waves propagate --------------- to the vibrations of medium particles.
       a. parallel   b. along   c. perpendicular   d. at 60 degree
xii.   At open end of the organ pipe
       a. nodes are formed   b. antinodes are formed   c. both a&b   d. none of these
xiii. The frequencies of two tuning forks are 256 Hz and 252 Hz respectively. Their beat frequency is equal to
       a. 64512 Hz   b. 508 Hz   c. 4 Hz   d. 1 Hz
xiv.   Whenever path difference b/w two waves is integral multiple of λ, then their interference is called
       a. Constructive interference   b. destructive interference   c. stationary waves   d. both a&b
xv.   Two waves of equal frequency travelling in opposite direction give rise to phenomena, called
       a. interference   b. beats   c. travelling waves   d. stationary waves
xvi.   Water waves are
       a. transverse   b. longitudinal   c. stationary   d. not produced
xvii. Types of wave used in "Sonar" are
       a. electromagnetic waves b. matter waves   c. water waves   d. sound waves
xviii. If 20 waves pass through a medium in 1s with a speed of 20 m/s, then the wavelength is equal to
       a. 20 m   b. 40 m   c. 400 m   d. 1 m
xix.   In transverse wave, the individual particles of the medium move
       a. in circle   b. in ellipse   c. parallel to direction of wave   d. perpendicular to direction of wave
xx.   Sound waves cannot be
       a. reflected   b. refracted   c. diffracted   d. polarized

Question No. 2 Write short answers to any six of the following: 2x6=12

i.   What features do longitudinal waves have in common with teraservers waves?
ii.   Explain the term crest, trough, node and antinodes.
iii.   Why does sound wave travel faster in solids than in gases?
iv.   How are beats useful in tuning musical instrument?
v.   As a result of a distant explosion, an observer senses a ground tremor and then hears explosion. Explain time diff.
vi.   How should a sound source move with respect to an observer so that the frequency of its sound does not change?
vii.   List three characteristics of stationary waves.
viii. State principle of superposition.

Q.No. 3 a. Calculate the Newton's formula for speed of sound at 0°C. How it was corrected by Laplace.   **(5)**
   b.   A church organ consists of pipes, each open at one end, of different lengths. The minimum length is 30 mm and the longest is 4 m. calculate the frequency range of the fundamental notes. (v = 340 m/s)   **(3)**   **OR**
Q. No. 4. a. Define Doppler effect. Calculate apparent frequency when observer is moving towards stationary source and vice versa.   **(5)**
   b.   Two cars P and Q are travelling along motorway in same direction. Leading car P travels at steady speed of 12 m/s; the other car Q, travelling at a steady sped of 20 m/s, sound it horn to emit it a steady note which P's driver estimates, has a frequency of 830 Hz. What frequency does Q's own driver hear? (speed of sound = 340 m/s) (3)