Important Numerical from Wave and Particles (Chapter-2)

1) An explosion in a factory is observed in a town 20 km away. If the temperature of the air is 30^0 C. How long the sound take to reach the town? (velocity of sound at 0^0C is 331 ms^{-1})
2) A source of sound has a frequency of 256 Hz and amplitude 0.5 cm. Calculate the energy flow cross a square cm per sec. The velocity of sound in air is 330 m/s and density of air is 1.29 kg/m^3. [TU 2074, 2072]
3) A room has dimension of 6x4x5 m. Find (a) the mean free path of the sound wave in the room. (b) the number of reflections per second made by the sound wave with the walls of the room. (Given velocity of sound in air is 330 m/s) [TU 2073]
4) A train of simple harmonic waves is travelling in a gas along the positive direction of x-axis with an amplitude of 2 cm, velocity 300 m/s and frequency 400 Hz. Calculate the maximum particle velocity. **[Ans: 16 π]**
5) The displacement of a transverse wave can be represented by the equation $y = 0.5 \sin sin (62.8\,t - 0.313\,x)$ where x and y are in cm t is in sec. Calculate amplitude, frequency, velocity of the wave, wavelength, wave number and maximum transverse speed of the particle. **[Ans : 05 cm, 10 Hz, 200.63 cm/sec, 20.06 cm, 0.049 /cm, 31.40 cm/sec]**
6) A wave of frequency 500 Hz has a velocity 360 m/s (a) How far apart are two points 60^0 out of phase? (b) What is the phase difference between two displacements at a certain point at time 10^{-3}sec apart? **[Ans : 0.12 m, π]**