Chapter 17

Q#1: Pipe A, which is 1.8 m long and open at both ends, oscillates at its third lowest harmonic frequency. Pipe B, which is closed at one end, oscillates at its second lowest harmonic frequency. The frequencies of pipes A and B match. They are both filled with air for which the speed of sound is 344 m/s. How long is pipe B? **(Ans: 0.9 m)**

Q#2: A stationary observer hears a frequency of 760 Hz of a whistle of a train moving at a speed of 40 m/s towards him. If the train is moving away with the same speed, then the frequency detected by the observer will be: [Take the speed of sound in air = 340 m/s]. **(Ans: 600 Hz.)**

Q#3: An ambulance emits sound with a frequency of 2600 Hz. After passing a motorist driving (in the same direction of the ambulance) with a speed of 5 m/s, the motorist receives the sound with frequency of 2424 Hz. Calculate the speed of the ambulance. [speed of sound in air is 340 m/s] **(Ans: 30.0 m/s.)**

Chapter 18

Q#1. How much heat is required to melt ice of mass 500 g at -10 deg C to water at 0 deg C? (specific heat of ice, c, = 2220 J/(kg.K); heat of fusion of ice, Lf, = 333*10*3 J/kg) **(Ans: 1.78*10**5 J)**

Q#2 In a P-V diagram, a system of an ideal gas goes through the process shown in figure 2. How much heat is absorbed after the system goes 100 times through the cycle? **(Ans: 300 J)**
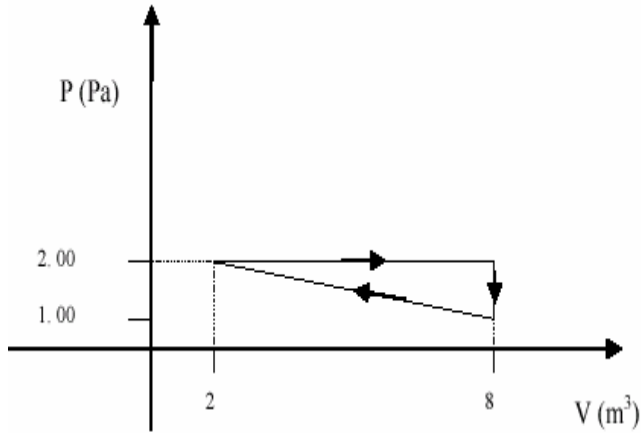
P (Pa)

2.00

1.00

2

8

V (m³)

Figure (2)

Q3. How much ice at -10.0 °C must be added to 4.0 kg of water at 20.0 °C to cause the resulting mixture to be liquid water at 0 °C ? (c_{ice} = 2220 J/kg.K) (Ans: 0.94 kg)

Q#4. Fifty grams of ice at zero degrees Celsius is placed in a thermos bottle containing 100 grams of water at 6.0 degrees Celsius. How many grams of ice will melt? **(Ans: 7.5 grams)**

Q5. A steel rod is 4.000 cm in diameter at 35 °C. A brass ring has an inner diameter of 3.992 cm at 35 °C. At what common temperature will the brass ring slide onto steal rod? α_{steel}= 11 x 10⁻⁶ / K⁻¹ ; α_{brassl}= 19 x 10⁻⁶ / K⁻¹ (Ans 286 °C)