國立東華大學
Department of Physics
National Dong Hwa University, 1, Sec. 2,
Da Hsueh Rd., Shou-Feng, Hualien, 974, Taiwan

General Physics I, Quiz 5
PHYS10400, Class year 99
12-23-2010

SN:_____, Name:_____

Chapter 18-20, Serway; ABSOLUTELY NO CHEATING!
Please write the answers on the blank space or on the back of this paper to save resources.

1. Two sinusoidal waves traveling in opposite directions interfere to produce a standing wave with the wave function

$$y = 1.50 \sin(0.400x) \cos(200t)$$

Where x and y are in meters and t is in seconds. Determine (a) the wavelength, (b) the frequency, and (c) the speed of the interfering waves.

2. The fundamental frequency of an open organ pipe corresponds to middle C (261.6 Hz on the chromatic musical scale). The third resonance of a closed organ pipe has the same frequency. What is the length of (a) the open pipe and (b) the closed pipe?

3. (a) Find the number of moles in one cubic meter of an ideal gas at 20.0℃ and atmospheric pressure. (b) For air, Avogadro's number of molecules has mass 28.9 g. Calculate the mass of one cubic meter of air, (c) State how this result compares with the tabulated density of air at 20.0℃.

4. An ideal gas is taken through a quasi-static process described by $P = \alpha V^2$, with α = 5.00atm/m^6, as shown in Figure P20.23. The gas is expanded to twice its original volume of 1.00 m^3. How much work is done on the expanding gas in this process?

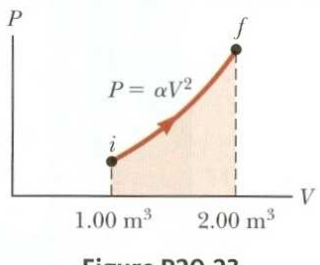

Figure P20.23