

Names: _____

Determining The Universal Gas Constant

Aim: To determine the Universal Gas Constant, by measuring the volume, temperature and partial pressure of a known mass of Butane gas (C_4H_{10}).

Materials: Balance Thermometer Pneumatic trough
Barometer Butane lighter 250 mL graduated cylinder

Procedure:

1. Fill the pneumatic trough with room temperature water. Displace all air bubbles.
2. Fill a 250 mL graduated cylinder with room temperature water. Displace all air bubbles
3. Record the mass of a butane lighter to the nearest 0.01 grams.
4. Invert the graduated cylinder into the pneumatic trough without letting any air into the cylinder.
5. Hold the lighter under the graduate and open trigger on the lighter until between 200 and 250 mL of water have been displaced.
6. Record: the room Temperature, the air pressure and the volume of Butane collected.
7. Dry the lighter and record its new mass to the nearest 0.01 grams.

Data:

Initial mass of lighter (g)	
Room Temperature (K)	
Room pressure (kPa)	
Volume of gas (L)	
Final mass of lighter (g)	

Calculations and Conclusion: (Show work and don't forget units)

Mass of Butane used:

Moles of Butane used:

Partial pressure of Butane:

Universal Gas Constant (R):

Temperature (°C)	Vapor pressure of Water (kPa)
20	2.3
21	2.5
22	2.6
23	2.8
24	3.0
25	3.2
26	3.4
27	3.6
28	3.8
29	4.0