Math Practice for the January Final Exam #2

East.H.S. ©λ€M|s+ry

Name ANSWERS

Date

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The most useful single item to review all of the old Review sheets on our website
However, this sheet you are holding is good for practicing some of the math problems that will be on the test.

1. What would be the new pressure if 350 cm^3 of gas at standard pressure is compressed to a volume of 150. cm^3?

you know that is 1.0 atm!!

FIRST, FIGURE OUT WHETHER YOU EXPECT THE PRESSURE TO GO ↑ OR ↓ → ANSWER: Pressure GOES up

THEN DO THE MATH:

$$1.0\,atm \times \left(\frac{350\,cm^3}{150\,cm^3}\right) = 2.3\,atm$$

2. Sam's bike tire contains 15 units of air particles and has a volume of 160mL. Under these conditions the pressure reads 13 psi. Sam pumps in 2.0 units of air using a pump and the volume stretches to 170 mL. What would the tire pressure be now?

read the problem!

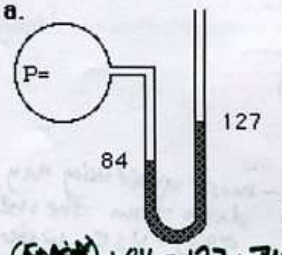
FIRST FIGURE OUT THAT
(1) added units make pressure ↑
(2) stretched volume makes pressure ↓

THEN DO THE MATH:

$$13\,psi \times \left(\frac{160\,mL}{170\,mL}\right) \times \left(\frac{17\,units}{15\,units}\right) = 13.87 \approx 14\,psi.$$

3. In each case, assume ambient pressure is 740 mmHg. Solve for the pressure inside the flask.

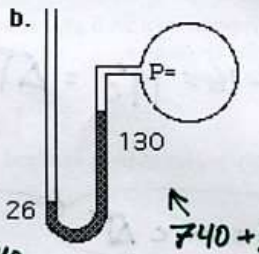
a.



(FLASK) + 84 = 127 + 740

FLASK = 783 mmHg

b.

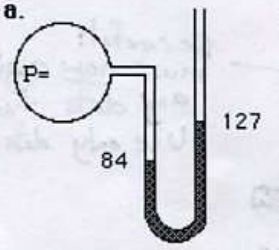


740 + 26 = 130 + flask

636 mmHg = flask

4. In each case, assume pressure inside the flask is 880mmHg. Solve for the ambient pressure.

a.

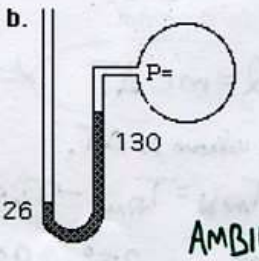


flask + 84 = 127 + ambient

880 + 84 = 127 + AMBIENT

837 mmHg = AMBIENT

b.

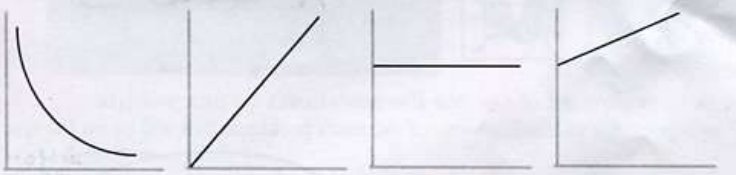


AMBIENT + 26 = 130 + 880

Ambient = 984 mmHg

For the next two questions, use the graphs below.

A B C D



Which graph represents the relationship between the pressure of a gas and the absolute temperature? B

Which graph represents the relationship between the pressure of a gas and its volume?

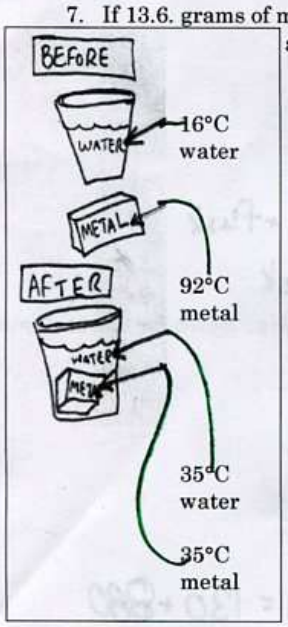
A

5. Name three special things about kelvins that make them more useful for science than degrees Celsius.
   1. they are proportional to kinetic energy
   2. all vibrational motion stops at zero kelvins
   3. they are required for solving gas law problems

6. How many silver atoms are contained in 0.650 grams of silver?

$$0.650\ \text{grams Ag} \times \left(\frac{1\ \text{mol Ag}}{107.9\ \text{grams Ag}}\right) \times \left(\frac{6.02\times10^{23}\ \text{atoms}}{1\ \text{mol Ag}}\right) = 3.63\times10^{21}\ \text{ATOMS}$$

7. If 13.6. grams of metal were dropped into 28.5 grams of water calculate the following



a) Find ΔT for the water.

$35 - 16 = 19^\circ C = \Delta T$

b) How many joules of heat entered the water?

$Q = m \cdot c\,\Delta T$ ← must avoid using any data from the metal; only use water data

$Q = (28.5\,g)\left(4.186\ \frac{J}{g^\circ C}\right)(19^\circ C)$

$Q = 2300$ joules

c) Find ΔT for the metal

$Q = mc\,\Delta T$ ← Be careful: must now avoid using any data from the water! Use only data for metal

The unknown is ΔT.

$\Delta T_{metal} = T_{final} - T_{initial}$

$\Delta T_{metal} = 35^\circ C - 92^\circ C$

$\Delta T = -57^\circ C$ TRICKY!