We have
__no__ home

work

November 13, 2014

No Notebook today.

Check these Robin Williams answers:

energy storage & transfer

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Name __ANSWERS__

Date ____

Come for assistance and cheerful encouragement
after school Tues, Thurs, or every day at lunch

R. Williams by Omar Momani

1) Heating is a form of (energy storage / (energy transfer))

2) E_{th} is a form of ((energy storage) / energy transfer)

3) E_{ch} is a form of ((energy storage) / energy transfer)

4) Radiating is a form of (energy storage / (energy transfer))

5) Complete the description by circling the best choice. E_{ph} is…
   a. (a) way to store energy
   b. a way for energy to enter or leave an object

6) Pushing (working) is a form of (energy storage / (energy transfer))
   a. a way to store energy
   b. (a) way for energy to enter or leave an object

You will always be given these numbers on tests and quizzes.

0 degrees C = 273 kelvins

760. torr = 760. mmHg = 1.00 atm = 101 kPa = 101,300 pascals = 14.7 p.s.i.

R = 0.0821 liter-atm/mol-K   (for PV=nRT problems, if you use this R value you must use these units)

1.00 mole of things is 6.02×10^{23} things.

Conversions practice

7) Your best friend gives you 0.00000044 moles of gummi worms. How many worms is this?

$$0.00000044 \text{ mol} \times \left(\frac{6.02 \times 10^{23} \text{ worm}}{1 \text{ mol}} \right) = 2.6 \times 10^{17} \text{ worms}$$

8) The pressure in a certain bike tire is 77.0 psi. How many kilopascals is this?

$$77.0 \text{ psi} \left(\frac{101 \text{ kPa}}{14.7 \text{ psi}} \right) = 529 \text{ kPa}$$

9) What is Standard Pressure in kilopascals?

$$101 \text{ kPa}$$

10) If a scuba diver has 23,000 mmHg pressure in her air tank, what is the pressure in atm?

$$23,000 \text{ mmHg} \times \left(\frac{1.00 \text{ atm}}{760. \text{ mmHg}} \right) = 30.3 \text{ atm}$$

11) If a squirrel caches 235 acorns under an oak tree, how many moles of acorns does the squirrel have?

$$235 \text{ acorns} \times \left(\frac{\text{mol}}{6.02 \times 10^{23} \text{ acorns}} \right) = 3.90 \times 10^{-22} \text{ mol}$$

12) A small silver coin could have 3.06×10^{24} atoms of silver. How many moles of silver atoms is this?

$$3.06 \times 10^{24} \text{ atoms} \times \left(\frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ atoms}} \right) = 5.08 \text{ mol}$$

13) American pennies contain about 0.0393 moles of copper. How many atoms is this?

$$0.0393 \, mol \times \left(\frac{6.02 \times 10^{23} \, atoms}{1 \, mol}\right) = 2.36 \times 10^{22}$$

Match the name with the description of the scientist.

14) __C__ Wrongly thought heat was a fluid called 'caloric' [Oops!]

15) __B__ Moving objects can create heat; $E_{kinetic}$ can freely convert into E_{th}

16) __E__ Adding salt to -3°C ice melts it to -7°C water (which shows E_{ph} exists)

17) __D__ Evidence that temperature isn't caused by an invisible substance: showed the weight of frozen water is the same as weight of same water when liquid.

18) __A__ Evidence that temperature isn't caused by an invisible substance: showed that a nearly infinite amount of heat can come out of a cannon as you grind the metal.

a) Rumford

b) Joule

c) Lavoissier

d) Boyle

e) Drebbel

19) For a girl peddling a bike, show arrows with Q, R, and/or W coming in and out of the circle. Show bar graphs for before and after. A girl peddling a bike.
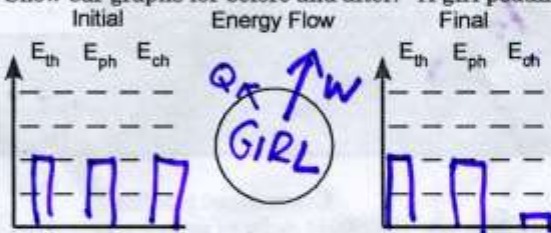
20) A water molecule in a microwave

iF no boiling
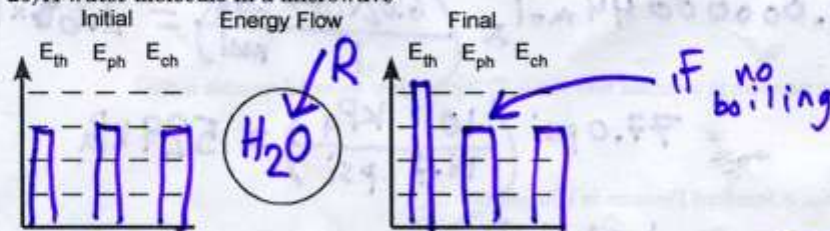
21) At what temperature will 5.00mol of Cl_2 exert a pressure of 900 torr at a volume of 750 mL? **fix the units first! They must match the units of your "R".

$$PV = nRT$$

$$750 \, mL \rightarrow 0.750 \, L$$

$$900 \, torr \times \frac{1 \, atm}{760 \, torr} = 1.18 \, atm$$

$$T = \frac{PV}{Rn}$$

22) How many moles of nitrogen gas will occupy a volume of 347 mL at 6.680 kPa and 27°C?

$$PV = nRT$$

$$n = \frac{PV}{RT}$$

$$n = \frac{(0.0659 \, atm)(0.347 \, L)}{(0.0821 \frac{L \cdot atm}{mol \cdot K})(300K)} = 9.28 \times 10^{-4} \, mol$$

$$T = \frac{(1.18 \, atm)(0.750 \, L)}{(0.0821 \frac{L \cdot atm}{mol \cdot K})(5.00 \, mol)}$$

$$T = 2.15 \, K$$

1. What pressure is exerted by 0.693 moles of oxygen in a 5665mL vessel at 18°C?

$$P = \frac{nRT}{V}$$ Can't use mL, °C

2. Carbon monoxide, a poisonous gas, has a formula of CO. How many moles of carbon monoxide occupies a volume of 0.445 L at 0°C and 850.torr?

$$n = \frac{PV}{RT}$$ Can't use °C torr

3. What volume will 4.54x10²⁵ atoms of helium occupy at 1.05 atm and 25°C?

$$V = \frac{nRT}{P}$$ can't use atoms, °C

4. What is the pressure of 25.00 moles of methane at 50.0°C if it occupies a volume of 60.0L?

$$P = \frac{nRT}{V}$$ can't use °C

5. A 75.0 ~~gram~~ mole sample of argon is confined in a 3.1 L vessel. What is the pressure at 115°C.

$$P = \frac{nRT}{V}$$ can't use   TYPO! SHOULD SAY 75.0 moles

6. What pressure will be exerted by 25 moles of CO_2 at a temperature of 25°C and a volume of 500 mL?

1. What pressure is exerted by 0.693 moles of oxygen in a 5665mL vessel at 18°C?

$$P = n\frac{RT}{V}$$

$$P = \frac{(.693 \, mol)(0.0821 \frac{L \, atm}{mol \, K})(291 \, K)}{(5.665 \, L)}$$

$$P = 2.92 \, atm$$

2. Carbon monoxide, a poisonous gas, has a formula of CO. How many moles of carbon monoxide occupies a volume of 0.445 L at 0°C and 850.torr?

$$n = \frac{PV}{RT}$$

$$n = \frac{(1.12 \, atm)(0.445 \, L)}{(0.0821 \, L \, atm)(273 \, K)} = 0.0222 \, mol$$

3. What volume will 4.54×10^{25} atoms of helium occupy at 1.05 atm and 25°C?

$$V = \frac{nRT}{P}$$

$$V = \frac{(75.4 \, mol)(0.0821 \frac{L \, atm}{mol \, K})(298 \, K)}{(1.05 \, atm)}$$

$$V = 1760 \, L$$

4. What is the pressure of 25.00 moles of methane at 50.0°C if it occupies a volume of 60.0L?

$$P = \frac{nRT}{V}$$

$$P = \frac{(25.00 \, mol)(0.0821 \frac{L \, atm}{mol \, K})(323 \, K)}{(60.0 \, L)}$$

$$P = 11.0 \, atm$$

5. A 75.0 gram sample of argon is confined in a 3.1 L vessel. What is the pressure at 115°C.

$$PV = nRT$$

$$P = \frac{(75.0 \, mol)(0.0821 \frac{mL}{mol \, K})(388 \, K)}{(3.1 \, L)}$$

$$P = 770 \, atm$$

6. What pressure will be exerted by 25 moles of CO_2 at a temperature of 25°C and a volume of 500 mL?

$$P = \frac{(25 \, mol)(0.0821)(298 \, K)}{(0.500 \, L)}$$

$$P = 1200 \, atm$$