Name _____ Date _____ Period ____

Algebraic Manipulations Practice for Science Classes

Perform the following algebra tasks. Show all of the steps necessary to solve for the given variable.

1. $Q = mc\Delta T$ solve for m

2. $d = m/V$ solve for V

3. $P_1V_1 = P_2V_2$ solve for V_2

4. $E = h\nu$ solve for ν

5. $P_1V_1T_2 = P_2V_2T_1$ solve for P_2

6. $\lambda = h/m\nu$ solve for ν

7. $E = mc^2$ solve for c

8. $T_F = 1.80(T_C) + 32$ solve for T_C

9. $PV = nRT$ solve for R

10. $\frac{P_1V_1}{n_1T_1} = \frac{P_2V_2}{n_2T_2}$ solve for T_2

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Algebraic Manipulations Practice, Part 2

Provide the answer to the following calculations. **Solve the equation for the unknown variable** before substituting the values into the equation. SHOW ALL WORK!

1. A 4.0 g (m) sample of glass was heated from 0°C to 41°C (ΔT), and was found to have absorbed 32 J (Q) of heat. What is the specific heat (c) of this type of glass?

2. A piece of copper 12.00 cm long, 8.50 cm wide, and 0.50 cm thick (what's the volume? V) has a mass (m) of 457.00 g. What is its density (d)?

3. A sample of oxygen gas collected occupies a volume of 150 mL (V_1) when its pressure is 720 mm Hg (P_1). What volume (V_2) will the gas occupy at a pressure of 750 mm Hg (P_2)?

4. What is the frequency (ν) of a wave with an energy of 1.55×10^{-24} J (E)? ($h = 6.626 \times 10^{-34}$ J-s)

5. A helium-filled balloon has a volume of 50.0 L (V_1) at 25°C (T_1) and 820 mm Hg (P_1). What volume (V_2) will it occupy at 650 mm Hg (P_2) and 10°C (T_2)?

6. What is the mass (m) of a particle with a wavelength of 4.257×10^{-7} cm (λ), and a frequency of 7.05×10^{14} Hz (ν)?

7. Calculate the energy (E) of a nuclear particle with a mass of 1.673×10^{-24} g (m). ($c = 2.998 \times 10^{8}$ m/s)

8. Convert 47°F to Celsius.

9. What is the pressure in atmospheres (P) exerted by a 0.500 mol (n) sample of chlorine in a 10.0 L (V) container at 298 K (T)?

10. What is the initial temperature (T_1) of a 1.50 mol (n) sample of gas at 760 mm Hg (P_1) and a volume of 2.65 L (V_1) that is heated to 305 K (T_2) at a pressure of 675 mm Hg (P_2) and a new volume of 5.00 L (V_2)?