Chemistry: Conversions #2 Name Answer key

Show all your work on these problems. This includes the b.f.f!

1. Convert 72.9 oz to its equivalent in cg. cg || 72.9 oz | 28.35 g / 1 oz | 100 cg / 1 g = 207000 cg = 2.07×10^5 cg

2. Convert 3.55 yd to its equivalent in cm. cm || 3.55 yd | 3 ft / 1 yd | 12 in / 1 ft | 2.54 cm / 1 in = 325 cm = 3.25×10^2 cm

3. Convert 143.1 mL to its equivalent in pints. pt || 143.1 mL | 1 L / 1000 mL | 1 gal / 3.7854 L | 8 pts / 1 gal = 0.3024 pt = 3.024×10^{-1} pt

4. Convert a speed of 75.7 mi/hr to its equivalent in m/s. m/s || 75.7 mi / hr | 1.61 km / 1 mi | 1000 m / 1 km | 1 hr / 60 min | 1 min / 60 s = 33.9 m/s

5. Convert a density of 18.6 g/mL to its equivalent in lb/ft^3.

lb/ft^3 || 18.6 g / mL | 1 kg / 1000 g | 2.2046 lbs / 1 kg | 1000 mL / 1 L | 28.317 L / 1 ft^3 = 1160 lbs/ft^3 = 1.16×10^3 lbs/ft^3

6. A mole of hydrogen molecules contains 6.022 X 10^{23} molecules and occupies 22.4 L. How many hydrogen molecules are contained in 25.0 mL of this gas?

H_2 molecules || 25.0 mL H_2 | 1 L / 1000 mL | 6.022×10^{23} molecules / 22.4 L H_2 = 6.72×10^{20} H_2 molecules

7. What volume of hydrogen would contain 4.5 X 10^{21} hydrogen molecules? How many moles of hydrogen would this be?

L || 4.5×10^{21} H_2 molecules | 22.4 L / 6.022×10^{23} molecules = 0.17 L H_2

mol H_2 || 4.5×10^{21} H_2 molecules | 1 mol / 6.022×10^{23} molecules = 0.0075 mol H_2 = 7.5×10^{-3} mol H_2

8. A molecule of hydrogen moves at a speed of 115 cm/s. How long will it take to travel the length of a football field (100.0 yd long)?

s || 100.0 yds | 3 ft / 1 yd | 12 in / 1 ft | 2.54 cm / 1 in | 1 s / 115 cm = 79.5 s

– assuming 115 cm/s has 3 sig figs

9. The speed of light is 3.0 X 10^{10} cm/s. Express this in mi/hr.

mi/hr || 3.0×10^{10} cm / s | 1 in / 2.54 cm | 1 ft / 12 in | 1 mi / 5280 ft | 60 s / 1 min | 60 min / 1 hr = 6.7×10^8 mi/hr

10. A sample of sea water contains 0.075 g of sodium chloride per mL of solution. How many moles of sodium chloride are there per L of this solution? A mole of sodium chloride is equivalent to 58.5 g of sodium chloride.

mol/L || 0.075 g NaCl / 1 mL NaCl(aq) | 1000 mL / 1 L | 1 mol NaCl / 58.5 g NaCl = 1.3 mol/L NaCl

11. A doctor orders that a patient receive 1.5 X 10^{-3} mole of sodium chloride. The only solution available contains 1.00 g per 100.0 mL of solution. A mole of sodium chloride is equivalent to 58.5 g of sodium chloride. What volume of this solution should the nurse give the patient?

mL NaCl(aq) || 1.5×10^{-3} mol NaCl | 58.5 g NaCl / 1 mol NaCl | 100.0 mL NaCl(aq) / 1.00 g NaCl = 8.8 mL NaCl(aq)

12. A sample of air contains 2.33 X 10^{-4} mg of lead per mL of gas. This air passes through an office, the volume of which is 3.25 X 10^4 L. Seven people normally work in this office. How many µg of lead will each person in the office receive from this sample of air?

µg Pb / person || 3.25×10^4 L / office | 1000 mL / 1 L | 2.33×10^{-4} mg Pb / 1 mL | 1000 µg / 1 mg | 1 office / 7 people = 1080000 µg Pb / person = 1.08×10^6 µg Pb / person

EPA ⇒ < 0.15 µg Pb / m^3

µg/m^3 || 2.33×10^{-4} mg / mL | 1000 mL / 1 L | 1000 L / 1 m^3 | 1000 µg / 1 mg = 233000 µg/m^3 ↳ equals 1.6×10^6 times more concentrated than accepted.

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