Name: _____   **Chem SOL Processes** Block:____

Record answer with a unit and with correct sig figs.

1. What is percentage error for a mass measurement of 17.7g, given that the correct value is 21.2g?

2. A handbook gives the density of calcium as 1.54 g/cm³. Based on lab measurements, what is the percent error of a density calculation of 1.25 g/cm³?

3. Calculate the average atomic mass of element x given the following relative atomic masses and abundances of each of the isotopes: 0.063% of 37.96amu; 0.337% of 35.97 amu; & 99.600% of 39.96 amu.

4. Determine the electron configuration for the following:
   a. Chromium

   b. Gallium

5. Determine the orbital diagram for the following:
   a. Silicon

   b. Oxygen

6. How much carbon dioxide is produced in liters assume STP when 25.0 g of calcium carbonate decomposes: $CaCO_3$ ➔ $CaO + CO_2$

7. How many molecules are there in 5.23 grams of diphosphorous pentachloride?

8. How much energy is associated with this reaction when there is 4.00 grams of hydrogen reacts with excess carbon?
   $C (s) + 2H_2 (g)$ ➔ $CH_4 (g) + 74.3 kJ$

9. What is the percentage of aluminum in aluminum oxide (Al_2O_3)?

10. A compound is composed of 85.64% carbon and 14.36% hydrogen. What is the empirical formula? What is the molecular formula, when the molecular formula's molar mass is 42.08 g/mole?

11. If the heat of fusion is 32.2 kJ/mol, the amount of heat energy required to melt 5.67 grams of iron (II)oxide is…

12. A 17.5 g sample of an unknown metal at 98.0°C is added to a foam cup calorimeter that has 25.2g of water at 14.6 °C. What is the specific heat of the metal?

13. The hydrogen ion concentration is 1.0×10^{-7}. What is the pH of this solution?

14. The hydroxide ion concentration is 2.5×10^{-3}. What is the pH of this solution?

15. What is the solution concentration formed from 52.63g of sodium chloride is dissolved into 1.3 L of water?

16. 1.8 L of a 2.4 M solution of $NiCl_2$ is diluted to 4.5 L. What is the resulting concentration of the diluted solution?

17. A gas storage tank has a volume of 3.5×10^3 L when the temperature is 27°C and the pressure is 101kPa. What is the new volume of the tank if the temperature drops to -10°C and the pressure drops to 95 kPa?

18. If 4.50g of methane gas (CH_4) is introduced into an evacuated 2.00L container at 35°C, what is the pressure in the container?

19. Given that the half-life of carbon-14 is 5730 years, consider a sample of fossilized wood that, when alive would have contained 24g of carbon-14. It now contains 1.5 g of carbon-14. How old is the sample?

20. determine which element is reduced and which element is oxidized.

$$Cu + 2AgNO_3 \rightarrow Cu(NO_3)_2 + Ag$$