

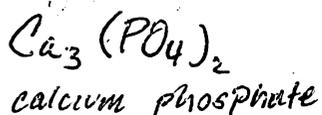
# CHEMISTRY

NAME: \_\_\_\_\_

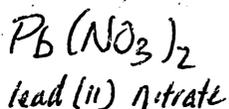
MIDTERM REVIEW:

1. Write chemical names and formulas for each of the following chemical combinations:

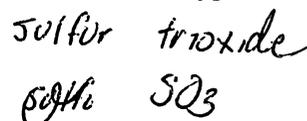
a. calcium and phosphate



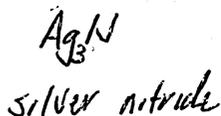
b. lead (II) and nitrate



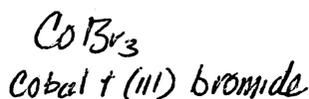
c. 1 sulfur and 3 oxygen



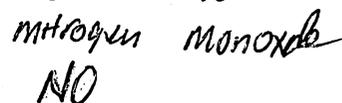
d. silver and nitrogen



e. cobalt (III) and bromine



f. 1 nitrogen and 1 oxygen

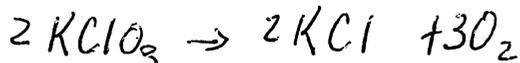


2. Write balanced chemical equations for the following reactions:

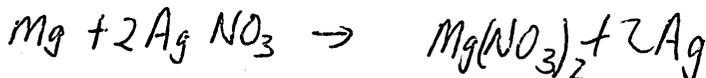
a. Copper (II) reacts with oxygen to form cupric oxide.



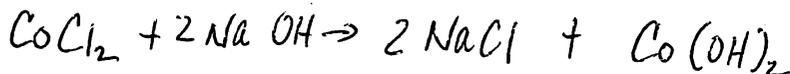
b. Potassium chlorate decomposes to form potassium chloride and oxygen.



c. Magnesium reacts with silver nitrate to form magnesium nitrate and silver.



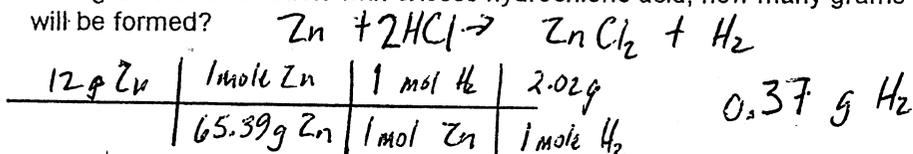
d. Cobalt (II) chloride reacts with sodium hydroxide to form NaCl and  $\text{Co}(\text{OH})_2$ .



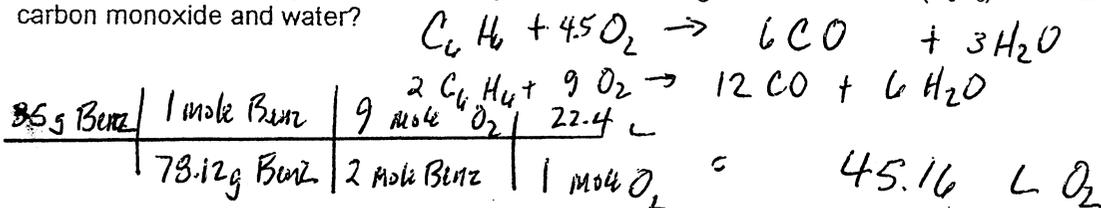
3. If 745 grams of a solid occupies 317 mL what will its density be?

$$D = m/V \quad 745/317 = 2.35 \text{ g/mL}$$

4. If 12 grams of zinc reacts with excess hydrochloric acid, how many grams of hydrogen will be formed?



5. How many liters of oxygen will it take to just burn with 35 grams of benzene ( $\text{C}_6\text{H}_6$ ) in forming carbon monoxide and water?



$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

6. If problem #5 is carried out at 725 mm and 18°C, what will the volume be?

$$\frac{4510 \cdot 760}{273} = \frac{V_2 \cdot 725}{291} \quad 4510 \quad 58.46 \text{ L}$$

273 + 18 = 291

7. 128 L of Ne gas at 529 mm is compressed to 984 mm, what is the new volume?

$$P_1 V_1 = P_2 V_2 \quad 128 \cdot 529 = 984 V_2 \quad 68.8$$

8. 258 mL of gas at 33°C is heated to 67°C what will the new volume be?

$$\frac{V_1}{T_1} = \frac{V_2}{T_2} \quad \frac{258}{306} = \frac{V_2}{340} \quad 287 \text{ mL}$$

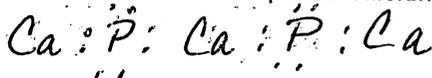
9. 0.23 moles of helium has a pressure of 2.3 atmospheres and a temperature of 25°C. What size balloon could it fill? (R = 0.0821)  $PV = nRT$

$$V = \frac{nRT}{P} = \frac{0.23 \cdot 0.0821 \cdot 298}{2.3} = 2.45 \text{ L}$$

10. Give the four quantum numbers for the last electron in the element sodium.

$$n = 3 \quad l = 0 \quad m = 0 \quad s = +\frac{1}{2}$$

11. Draw the Lewis dot diagram the compound calcium phosphide.  $\text{Ca}_3\text{P}_2$



12. What is the molarity of a solution that has 3.6 moles of tin (IV) sulfate in 6.8 liters of solution?

$$\text{molarity} = \frac{\text{moles}}{\text{L. soln}} = \frac{3.6 \text{ moles}}{6.8 \text{ L}} = 0.53 \text{ M}$$

13. How many grams of cobalt chloride will it take to make a 0.34 N solution in 540 mL of water?

$$\frac{540 \text{ mL} \cdot 1 \text{ L}}{1000 \text{ mL}} \cdot \frac{0.34 \text{ equiv}}{1 \text{ L}} \cdot \frac{1 \text{ mole}}{2 \text{ equiv}} \cdot 129.837 = 11.92 \text{ g}$$

14. How many molecules of barium oxide are in 18 grams of this substance?

$$\frac{18 \text{ g}}{153.32 \text{ g/mol}} \cdot \frac{1 \text{ mole}}{1 \text{ mol}} \cdot 6.02 \times 10^{23} \text{ atoms} = 7.07 \times 10^{22} \text{ molecules}$$

15. How many moles are in 12.6 liters of neon gas at STP?

$$\frac{12.6 \text{ L}}{22.4 \text{ L}} \cdot \frac{1 \text{ mole}}{1 \text{ mol}} = 0.56 \text{ moles Ne}$$

SOLVE THE FOLLOWING USING CORRECT SIGNIFICANT DIGITS:

16.  $567.08 + 120.6 + 35 = 723$  1's place

17.  $0.025 \times 1.8 = 4.5 \times 10^{-2}$  0.045 2 SF

18.  $23.67 - 12.4 = 11.27$

11.3 1/10's place

19.  $98.77 - 23.6 = \underline{4.19} \quad 3 \text{ SF}$

20.  $\frac{12.345 \times 1.66 \times 0.00042}{6.54 \times 0.0331} = \underline{0.040} \quad (2 \text{ SF})$

21. The prefix micro means  $\underline{10^{-6}}$

22. The prefix nano means  $\underline{10^{-9}}$

23. The prefix kilo means  $\underline{10^3}$

24. The prefix milli means  $\underline{10^{-3}}$

25. The evaporation of liquid chlorine is an example of (physical) (chemical) change.

26. How many calories does it take to melt 1 gram of ice at 0°C and raise the temperature to 50°C?  $\Delta H = m \cdot H_f + \Delta H = m \cdot \Delta T \cdot C_p$

$80 + 50 = \underline{130 \text{ cal}}$

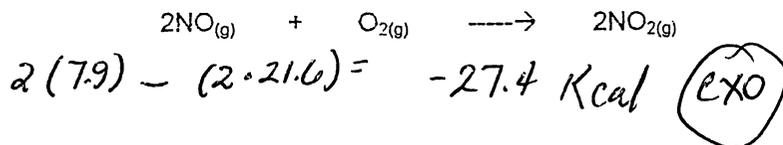
27. How many calories does it take to heat 25 grams of water from 10°C to 85°C 1875 cal/s

$\Delta H = m \Delta T C_p$   
 $\Delta H = 25 \cdot 75 \cdot 1 = 1875$

28. How many calories does it take to change 50 grams of water at 25°C into steam at 150°C?

$50 \cdot 75 \cdot 1 = 3750$   
 $50 \cdot 540 = 27000$   
 $50 \cdot 75 \cdot 0.5 = 1250$   
32,000 cal/s

29. Calculate the enthalpy change (H) for the following reaction, using your heat of formation chart (Hf). Is this reaction exothermic or endothermic?



30. Determine the number of protons, electrons and neutrons in the nuclides

	236	33	89
	Th	P	Sr <sup>+2</sup>
	90	15	38
protons	90	15	38
electrons	90	15	34
neutrons	146	18	51

31. Write the complete electron configuration for platinum (Pt). (1s<sup>2</sup>, 2s<sup>2</sup>, etc.)



32. Circle the bond that you think will be most polar or ionic in nature:

- P-I      P-At      P-Br      P-Cl      (P-F)

greatest difference  
in Electronegativity