ALKALINE EARTH METALS -2

1. List down three physical properties of alkaline earth metals.

2. Write down three common chemical properties of alkaline earth metals.

3. Write down the spdf electron configurations of Be, Mg and Ca metals.

4. Fill the table below with the compounds of alkaline earth metals.

Alkaline Earth metal	oxide	hydroxide	carbonate
Mg			
Ca			
Ba			

5. Explain what hard water is, how many types of hardness are there in water and how can it be eliminated? Write down possible reactions that occur during elimination. What are the advantages and disadvantages of hard water?

6. Write down the common names of the following alkaline earth metal compounds.
$CaCO_3$, $CaSO_4.2H_2O$, CaO, $Ca(OH)_2$, CaC_2, $Ma(OH)_2$, $Mg(OH)2.7H_2O$

7. Fill the table below.

Formula	Chemical Name	Common Uses
$Mg(OH)_2$		
$CaSO_4$		
CaC_2		
CaO		
$BaSO_4$		

8. Complete the following reactions below,
A. $Mg + H_2 + heat \rightarrow$
B. $Ca + O_2 \rightarrow$
C. $Ba + H_2O \rightarrow$
D. $Mg + HCl \rightarrow$
E. $Ca + H_2SO_4 \rightarrow$
F. $Ba + HNO_3 \rightarrow$
G. $Be + Cl_2 \rightarrow$
H. $CaO + H_2O \rightarrow$
I. $CaCO_3 + heat \rightarrow$
J. $Ca(OH)_2 + CO_2 \rightarrow$
K. $CaC_2 + H_2O \rightarrow$
L. $Ca(OH)_2 + H_2CO_3 \rightarrow$
M. $MgO + HCl \rightarrow$
N. $Ba(OH)_2 + H_2SO_4 \rightarrow$

9. Complete the following transformations below.
A. $Ca \rightarrow CaO \rightarrow Ca(OH)_2 \rightarrow CaSO_4$
B. $MgCO_3 \rightarrow MgO \rightarrow MgCl_2 \rightarrow Mg(OH)_2 \rightarrow Mg(NO_3)_2$
C. $C \rightarrow CO_2 \rightarrow CaCO_3 \rightarrow CaO \rightarrow CaSO_4$
D. $Ba \rightarrow Ba(OH)_2 \rightarrow BaCl_2 \rightarrow BaSO_4$

10. Calculate the mass percentage of alkaline earth metals in the following compounds.
A. $Ca(HCO_3)_2$ B. $BaSO_4$ C. $Mg(CH_3COO)_2$

11. Find the oxidation states of C, S, and Cr atoms in the following compounds.
A. CaC_2 B. $Ba(NO_3)_2$ C. $MgCrO_4$

12 Calculate the volume of hydrogen gas produced from the reaction of 10.8 g of magnesium metal with 70% purity by mass.

13. A 250 grams of limestone sample is heated and the volume of gas evolved is measured to be 44.8 L at STP. What would be the percent purity of the sample?

14. What is the volume of acetylene gas at STP produced from the reaction of 3.2 grams of calcium carbide with 9 grams of water?

15. A 15.6 grams alloy of Mg-Al is reacted with excess hot water and 17.92 L of hydrogen gas at STP is produced. Calculate the percent of magnesium in the alloy.

16. An alkaline earth metal is reacted with 3.6 grams of water and 7.4 grams of its base is obtained. Find the alkaline earth metal reacted.

17. What is the mass of beryllium bromide produced at the end of reaction of 2.7 grams of beryllium with excess bromine with 90% efficiency?

18. Calculate the mass of gypsum obtained from 250 grams of calcium sulfate with 12% impurities.

19. Magnesium metal reacts with concentrated nitric acid as follows;
$Mg(s) + 4HNO_3(aq) \rightarrow Mg(NO_3)_2(aq) + 2NO_2(g) + 2H_2O(l)$
How many liters of nitrogen dioxide gas is obtained from the reaction of a 10-L of 60% by mass nitric acid solution with 1.02 g/mL density.

20. What is the mass of slaked lime obtained from 1 kg of limestone with 75% purity by mass with a series of reactions?