ALKALI METALS -2

1. Write down the formulae of compounds of alkali metals with oxide and hydroxide ions.

2. List down five physical properties of alkali metals.

3. Write down three common chemical properties of alkali metals.

4. Explain why these metals are not exist in free state in nature.

5. Explain how alkali metals are analyzed and determined.

6. Francium is radioactive element and has very short life in the alkali metals group. What are the meanings of "radioactive" and "half-life" terms?

7. Express the methods to store alkali metals to keep them pure and prevent them not reacting with other substances.

8. What are the name of minerals to extract lithium, sodium and potassium?

9. Explain "Down Method", what is it used for?

10. Fill the table below.

Alkali metal	oxide	hydroxide	salt
Li			
Na			
K			

10. Name the following alkali metal compounds below.
NaCl, KBr, K_2SO_4, LiOH, Na_2CO_3, K_3PO_4, $LiHCO_3$, $NaNO_3$, K_2O_2, LiO_2, NaH.

11. Complete the following reactions below,
A. $Na + O_2 \rightarrow$
B. $K + H_2O \rightarrow$
C. $Li + O_2 \rightarrow$
D. $NaCl$ + Electricity $\rightarrow$
E. $K + H_2 \rightarrow$
F. $Na + F_2 \rightarrow$
G. $K_2O + H_2O \rightarrow$
H. $NaOH + H_2S \rightarrow$
I. $Li_2O + SO_3 \rightarrow$
J. Na_2CO_3 + heat $\rightarrow$
K. $LiOH + HNO_3 \rightarrow$

12. Complete the following transformations below.
A. $Na \rightarrow Na_2O \rightarrow NaOH \rightarrow NaCl \rightarrow Na$
B. $K_2CO_3 \rightarrow K_2O \rightarrow KOH \rightarrow K_2SO_4$
C. $LiOH \rightarrow Li_2CO_3 \rightarrow Li_2O \rightarrow LiCl \rightarrow Li$

13. Explain how gun powder is produced and used in guns. Write the reaction that occurs when it explodes.

14. List down the uses of lithium, sodium and potassium compounds.

15. What is airbag? How is it used in life? Write down the reaction that occurs when air bag works.

16. Calculate the mass percentage of alkali metals in the following compounds.
A. $NaHCO_3$ B. $LiHCO_3$ C. K_2SO_4

17. Find the oxidation states of S, N, and C atoms in the following compounds.
A. Na_2SO_3 B. KNO_3 C. Li_2CO_3

18. Write down the electron configuration of K atom and calculate how many s and p electrons there are.

19. Calculate the mass of sodium metal that is necessary to produce 14.56 L of hydrogen gas at STP by the reaction of sodium with enough water.

20. If 7.45 grams of potassium chloride is produced from the reaction of 4.5 grams of potassium metal with enough chlorine gas what is the percentage purity of potassium metal?

21. A 2.1 grams of an alkali metal reacts with excess water and produces 3.36 L of hydrogen gas at STP. Find the alkali metal reacted.

22. A 40.4 g alloy of Na-K metals reacts with exactly 6.72 L of oxygen gas at STP. Calculate the mass percentage of the metals in the alloy.

23. Following reaction is given for the air bag systems,
$2NaN_3(s) \rightarrow 2Na(s) + 3N_2(g)$
What is the mass of sodium azide used to inflate an airbag that is made up from spherical balloon with a radius of 15 cm at STP.

24. Gun powder is prepared from mainly carbon with sulfur and potassium nitrate. When a bullet is fired 17.92 L of carbon dioxide and nitrogen gas mixture is produced at STP according to the reaction below.
$2KNO_3(s) + S(s) + 3C(s) \rightarrow K_2S(s) + N_2(g) + 3CO_2(g)$
Calculate the mass of each component in the gun powder.

25. How many grams of ethyl alcohol can be burnt with the oxygen gas at STP that is produced from the decomposition of 780 grams sodium peroxide?

26. Calculate the mass of sodium hydroxide and water to prepare 10 L and 10% sodium hydroxide solution with a 1.25 g/mL density.