

Group 1 – alkali metals

- 1) Explain why the alkali metals are stored in oil.**
- 2) Which of the 3 alkali metals have a density of less than 1gcm^{-3} ?**
- 3) Describe and explain the trend in melting point down group 1.**
- 4) Describe and explain the trend in reactivity down group 1.**
- 5) Write a balanced chemical equation, complete with state symbols for the reaction of potassium and water.**
- 6) What pH would you expect the resulting solution to be? Explain your answer.**

Answers:

1) The alkali metals are stored in oil to prevent the reaction with the oxygen in the air.

2) Lithium, sodium and potassium all have densities lower than 1gcm^{-3} (to float on water, a substance must have a density of less than the density of water which is 1gcm^{-3}).

3) Melting point decreases down group 1 as the metallic bond get weaker.

4)

- **Reactivity increases down the group.**
- **The distance between the nucleus and the outer electron increases down a group as the number of occupied energy levels increases (atomic radius increases).**
- **Less energy is required to remove the outer electron (ionisation energy decreases).**

5) $2\text{K}_{(s)} + 2\text{H}_2\text{O}_{(l)} \rightarrow 2\text{KOH}_{(aq)} + \text{H}_{2(g)}$



6) The resulting solution would be pH 12-14. The KOH dissociates into K^+ and OH^- ions – the OH^- ions increase the pH of the solution.