

Chemistry Worksheet Class 11 on Chapter 10 The s-Block Elements with Answer – Set 4

Q1. Which of the following is most stable?

- (a) Beryllium carbonate
- (b) Magnesium carbonate
- (c) Strontium carbonate
- (d) None of the above

Answer: (c) Strontium carbonate is the most stable.

Q2. Which of the following contains magnesium?

- (a) Vitamin B₁₂
- (b) Chlorophyll
- (c) Ascorbic acid
- (d) None of the above

Answer: (b) Chlorophyll contains magnesium.

Q3. What are the chemical name and formulas of quicklime?

- (a) Calcium oxide (CaO)
- (b) Calcium hydroxide [Ca(OH)₂]
- (c) Calcium carbonate [CaCO₃]
- (d) None of the above

Answer: (a) The chemical name and formula of quicklime is Calcium oxide (CaO).

Q4. Which of the following is formed when slaked lime reacts with chlorine?

- (a) Calcium oxychloride
- (b) Calcium oxide
- (c) Calcium chloride
- (d) None of the above

Answer: (a) Calcium oxychloride is formed when slaked lime reacts with chlorine.

Q5. What is the by-product of the Solvay ammonia process?

- (a) Calcium chloride
- (b) Calcium carbonate
- (c) Carbon dioxide
- (d) None of the above

Answer: (a) Calcium chloride is the by-product of the Solvay ammonia process.

Q6. Which of the following has the largest solubility in water?

- (a) Magnesium hydroxide
- (b) Barium hydroxide
- (c) Calcium hydroxide
- (d) None of the above

Answer: (b) Barium hydroxide has the largest solubility in water.

Q7. Write the general configuration of s-block elements.

Answer: The general configuration of s-block elements is $ns(1-2)$.

Q8. Why does the basic character of alkali metal hydroxide increase down the group?

Answer: The basic character of alkali metal hydroxides increases down the group. As the size of the metal cation increases, the internuclear distance between the metal cation and the oxygen of the hydroxide group increases. It increases the ease of ionisation of the hydroxide ion, thereby increasing the basicity.

Q9. Give the main reasons for the difference in properties of lithium and sodium.

Answer: The main reasons for the difference in properties of lithium and sodium are mentioned below.

1. Lithium is exceptionally small in size
2. It has high polarising power, which is a high charge to radius ratio.
3. Its compounds have a covalent character making them soluble in organic solvents.
4. It shows a diagonal relationship to magnesium due to its similar size

Q10. Among the alkali metals, which element has the

- (a) Highest melting point
- (b) Most electropositive character
- (c) Lowest ion size
- (d) Strongest reducing character

Answer: (a) Lithium has the highest melting point.

(b) Caesium is the most electropositive alkali metal.

(c) Lithium has the smallest ion size.

(d) Lithium shows the most robust reducing character.

Q11. Why is lithium hydride more stable than sodium hydride?

Answer: Lithium hydride is more stable than sodium hydride because both lithium-ion and hydrogen ion have small size and their combination have high lattice energy making lithium hydride more stable than sodium hydride.

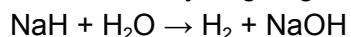
Q12. Why should we not extinguish sodium fire with water?

Answer: We should not extinguish sodium fire with water because sodium reacts violently with water producing hydrogen gas which also catches fire. Therefore, the fire increases by adding water instead

of getting extinguished. Hence, we should not use water to extinguish sodium fire. We can extinguish sodium fire using pyrene (CCl_4).

Q13. Can we dissolve sodium hydride in water?

Answer: No, we can not dissolve sodium hydride in water because it gets hydrolysed with the brisk evolution of hydrogen gas.

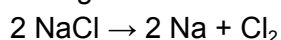


Q14. Why are alkali metals good reducing agents?

Answer: Alkali metals are good reducing agents because they have one valence electron in their outermost shell. It has to lose one electron and get itself oxidised to be stable. Hence, they are good reducing agents.

Q15. Explain the extraction of sodium from sodium chloride.

Answer: Sodium is extracted by electrolytic reduction of molten sodium chloride. On passing electricity through molten sodium chloride, decomposition occurs, and sodium metal and chlorine gas are formed.

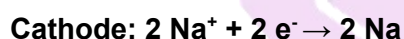


Molten sodium chloride contains sodium and chloride ions.

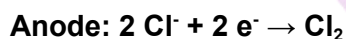
The reactions that occur during electrolysis are

The cathode produces electrons to reduce sodium ions to sodium atoms (or sodium metal) by acting as a reducing agent.

Sodium ions are cations; therefore, they are attracted to the negatively-charged cathode and deposited there.



Chloride ions are anions; therefore, they are attracted to the positively-charged anode. These chloride ions are oxidised to chlorine gas. Chlorine gas is produced at the anode.



Q16. What are the chemical formulae of the following ores?

- (a) Dolomite
- (b) Gypsum
- (c) Epsom salt
- (d) Carnalite

Answer:

S. No.	Ores	Chemical Formula
(a)	Dolomite	$\text{MgCO}_3 \cdot \text{CaCO}_3$
(b)	Gypsum	$\text{CaSO}_4 \cdot 2 \text{H}_2\text{O}$
(c)	Epsom Salt	MgSO_4

(d)	Carnalite	$\text{Cl}_3\text{H}_{12}\text{KMgO}_6$
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Q17. Why is it essential to add gypsum in the final stages of the preparation of cement?

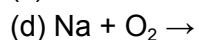
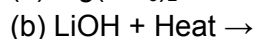
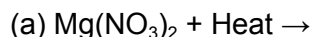
Answer: Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) is added in the final stages of preparation of cement since when water is added to cement, it slows down the process of setting of cement so that it gets sufficiently hardened, thereby imparting greater strength to it.

Q18. Name the chief factors responsible for the abnormal behaviour of lithium.

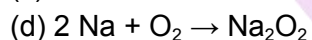
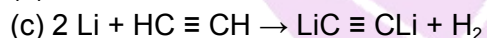
Answer: The chief factors responsible for the abnormal behaviour of lithium are mentioned below.

1. The small size of lithium and its ion.
2. It has high ionisation enthalpy and the least electropositive character.
3. The polarising power of lithium-ion is high due to its small size resulting in the covalent character of its compounds.
4. Unavailability of d orbitals in a lithium atom.

Q19. Complete the following reactions.



Answer: (a) $2\text{Mg}(\text{NO}_3)_2 + \text{Heat} \rightarrow 2\text{MgO} + 4\text{NO}_2 + \text{O}_2$



Q20. How do the following properties vary among the alkali metals?

- (a) Atomic radius
- (b) Ionisation energy
- (c) Metallic character

Answer: (a) Atomic radius: The atomic radius of elements increases down the group because of an increase in the number of shells.

(b) Ionisation energy: The ionisation energy of the elements decreases down the group as the number of shells increases and effective nuclear charge decreases. Therefore, a less effective nuclear charge requires less energy to remove the outermost electrons. Thus, ionisation energy decreases down the group.

(c) Metallic character: The metallic character increases down the group as the number of shells increases and the effective nuclear charge decreases. Therefore, a less effective nuclear charge requires less energy to remove the outermost electrons corresponding to a larger metallic character. Thus, the metallic character increases down the group.