



Class: XI	DEPARTMENT: SCIENCE (2021-22) SUBJECT: CHEMISTRY	Date of completion: III week of December, 2021
Worksheet No: 12 with answers	TOPIC: THE s -BLOCK ELEMENTS	Note: A4 FILE FORMAT
NAME OF THE STUDENT	CLASS & SEC:	ROLL NO.

MULTIPLE CHOICE QUESTIONS

- The hydration enthalpies of alkali metal ions decrease in the order
 - $\text{Li}^+ > \text{Na}^+ > \text{K}^+ > \text{Rb}^+ > \text{Cs}^+$
 - $\text{Li}^+ < \text{Na}^+ < \text{K}^+ < \text{Rb}^+ < \text{Cs}^+$
 - $\text{Cs}^+ > \text{K}^+ > \text{Rb}^+ > \text{Na}^+ > \text{Li}^+$
 - $\text{Li}^+ > \text{K}^+ > \text{Na}^+ > \text{Rb}^+ > \text{Cs}^+$
- What is the oxidation state of oxygen in KO_2 ?
 - 1
 - 2
 - $-\frac{1}{2}$
 - +1
- The alkali metals dissolve in liquid ammonia giving solutions
 - brick red
 - pale green
 - violet
 - deep blue
- Which of the following is not an oxoacid?
 - Carbonic acid
 - Hydrochloric acid

- c) Sulphuric acid
d) Nitric acid
5. Why is KO_2 paramagnetic?
- a) due to one unpaired electron in π^*2p molecular orbital
b) due to two unpaired electrons in π^*2p molecular orbital
c) due to one unpaired electron in π^*3p molecular orbital
d) due to two unpaired electrons in π^*3p molecular orbital
6. Identify the incorrect statement.
- a) Lithium is much harder than other alkali metals.
b) LiCl is deliquescent and crystallises as a hydrate.
c) Lithium is most reactive and the strongest oxidising agent among all the alkali metals.
d) Lithium unlike other alkali metals forms no ethynide on reaction with ethyne.
7. Chlorides of and do not impart any colour to the flame
- a) Be and Ca b) Sr and Mg
c) Be and Mg d) Ca and Sr
8. Magnesium reacts with hydrochloric acid. $\text{Mg(s)} + 2\text{HCl(aq)} \rightarrow \text{MgCl}_2\text{(aq)} + \text{H}_2\text{(g)}$.
Which statement about this reaction is correct?
- a) magnesium atoms act as oxidising agents
b) hydrogen molecules act as reducing agents
c) hydrogen ions act as oxidising agents
d) chloride ions act as oxidising agents
9. Going from calcium to barium in Group 2, which property changes as stated?
- a) ionic radius decreases
b) first ionisation energy decreases
c) melting temperature increases
d) reactivity with water decreases
10. The properties of Group 2 compounds change down the group from magnesium to barium.
Which statement is correct?
- a) solubility of Group 2 sulphates increases

- b) solubility of Group 2 hydroxides decreases
- c) thermal stability of Group 2 carbonates decreases
- d) thermal stability of Group 2 nitrates increases

Read the given passage and answer the questions that follow:

All the alkali metals are silvery white, soft and light metals. Because of the large size, these elements have low density which increases down the group from Li to Cs. However, potassium is lighter than sodium. The melting and boiling points of the alkali metals are low indicating weak metallic bonding due to the presence of only a single valence electron in them.

- 11. The alkali metals and their salts impart characteristic colour to an oxidizing flame. Why?
- 12. Mg does not impart any colour to the flame. Why?
- 13. Beryllium and magnesium are kinetically inert to oxygen and water. Give reason.

Assertion and Reasoning Questions:

- 14. **Assertion:** MgSO_4 is readily soluble in water.

Reason: The greater hydration enthalpy of Mg^{2+} ions overcome the lattice enthalpy.

- a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
- b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- c) Assertion is correct statement but reason is wrong statement.
- d) Assertion is wrong statement but reason is correct statement.

- 15. **Assertion:** Beryllium shows anomalous behaviour as compared to the rest of the members.

Reason: Be shows diagonal relationship to aluminium.

- a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
- b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- c) Assertion is correct statement but reason is wrong statement.

d) Assertion is wrong statement but reason is correct statement.

16. Assertion: The alkaline earth metals have larger first ionization enthalpy than alkali metals.

Reason: This is due to the larger size of the atoms of group 2 elements.

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

d) Assertion is wrong statement but reason is correct statement.

Question – Answer Type:

17. Lithium halides are mostly covalent. Why? **1**

18. What are oxo-acids? Give an example. **1**

19. Write any 4 points of difference between lithium and other alkali metals. **2**

20. Write balanced chemical equations for the reaction between: **2**

a) sodium and oxygen to form peroxide

b) potassium and oxygen to form superoxide.

21. Write any 6 points of similarities between lithium and magnesium. **3**

22. Write the balanced chemical equations for the thermal decomposition of: **3**

a) LiNO_3

b) NaNO_3

c) $\text{Ca}(\text{NO}_3)_2$

ANSWERS

1.	a) $\text{Li}^+ > \text{Na}^+ > \text{K}^+ > \text{Rb}^+ > \text{Cs}^+$
2.	c) $-\frac{1}{2}$
3.	d) deep blue
4.	b) Hydrochloric acid
5.	a) due to one unpaired electron in π^*2p molecular orbital
6.	c) Lithium is most reactive and the strongest oxidising agent among all the alkali metals.
7.	c) Be and Mg
8.	c) hydrogen ions act as oxidising agents
9.	b) first ionisation energy decreases
10.	d) thermal stability of Group 2 nitrates increases
11.	The heat from the flame excites the outermost orbital electron to a higher energy level. When the excited electron comes back to the ground state, there is emission of radiation in the visible region of the spectrum.
12.	The electrons of magnesium are too strongly bound to get excited by flame.
13.	This is due to the formation of an oxide film on their surface.
14.	a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
15.	b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
16.	c) Assertion is correct statement but reason is wrong statement.
17.	Lithium halides are mostly covalent because of the high polarisation capability of lithium ion.
18.	Oxo-acids are those in which the acidic proton is on a hydroxyl group with an oxo group attached to the same atom. Eg:- Carbonic acid, H_2CO_3
19.	(i) Lithium is much harder. Its m.p. and b.p. are higher than the other alkali metals. (ii) Lithium is least reactive but the strongest reducing agent among all the alkali metals. (iii) LiCl is deliquescent and crystallises as a hydrate, $\text{LiCl} \cdot 2\text{H}_2\text{O}$ whereas other alkali metal chlorides do not form hydrates.

	(iv) Lithium hydrogencarbonate is not obtained in the solid form while all other elements form solid hydrogencarbonates.
20.	a) $2\text{Na} + \text{O}_2 \rightarrow \text{Na}_2\text{O}_2$ b) $\text{K} + \text{O}_2 \rightarrow \text{KO}_2$
21.	(i) Both lithium and magnesium are harder and lighter than other elements in the respective groups. (ii) Lithium and magnesium react slowly with water. Their oxides and hydroxides are much less soluble and their hydroxides decompose on heating. (iii) The oxides, Li_2O and MgO do not combine with excess oxygen to give any superoxide. (iv) The carbonates of lithium and magnesium decompose easily on heating to form the oxides and CO_2 . (v) Both LiCl and MgCl_2 are soluble in ethanol. (vi) Both LiCl and MgCl_2 are deliquescent and crystallise from aqueous solution as hydrates,
22.	a) $4\text{LiNO}_3 \rightarrow 2\text{Li}_2\text{O} + 4\text{NO}_2 + \text{O}_2$ b) $2\text{NaNO}_3 \rightarrow 2\text{NaNO}_2 + \text{O}_2$ c) $2\text{Ca}(\text{NO}_3)_2 \rightarrow 2\text{CaO} + 4\text{NO}_2 + \text{O}_2$

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