



CHEMISTRY

BOOKS - DISHA PUBLICATION CHEMISTRY (HINGLISH)

THE s-BLOCK ELEMENTS

Jee Main 5 Years At A Glance

1. Lithium aluminium hydride reacts with silicon tetrachloride to form :

A. $LiCl$, AlH_3 and SiH_4

B. $LiCl$, $AlCl_3$ and SiH_4

C. LiH , $AlCl_3$ and $SiCl_2$

D. LiH , AlH_3 and SiH_2

Answer: B



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2. Which one of the following is an oxide ?

A. KO_2

B. BaO_2

C. SiO_2

D. CsO_2

Answer: D

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3. The correct order of the solubility of alkaline- earth metal sulphates in water is :

A. $Mg > Ca > Sr > Ba$

B. $Mg > Sr > Ca > Ba$

C. $Mg < Ca < Sr < Ba$

D. $Mg < Sr < Ca < Ba$

Answer: B



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4. The commercial name for calcium oxide is :

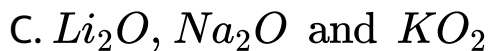
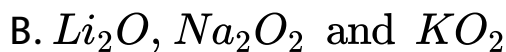
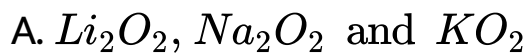
- A. Quick lime
- B. Milk of lime
- C. Slaked lime
- D. Limestone

Answer: C



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5. The main oxides formed on combustion of Li, Na and K in excess of air respectively are



Answer: A

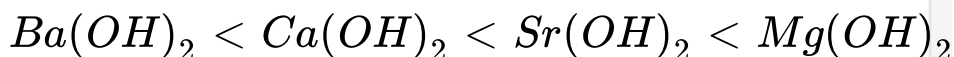


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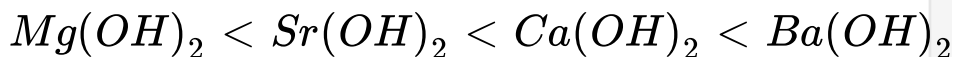
6. The correct order of thermal stability of hydroxides

is :

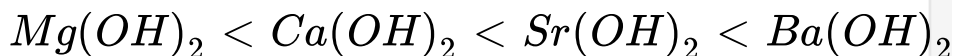
A.



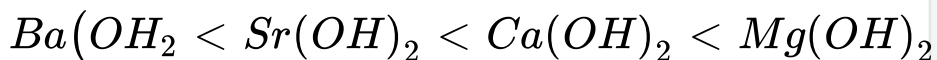
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C.



D.

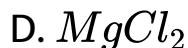


Answer: A



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7. Which of alkaline earth metal halides given below is essentially covalent in nature?

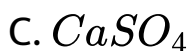
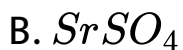


Answer: D



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8. Which one of the following alkaline earth metal sulphates has its hydration enthalpy greater than its lattice enthalpy?



Answer: D



9. Which of the following statements about Na_2O_2 is not correct?

A. It is diamagnetic in nature

B. It is derivative of H_2O_2

C. Na_2O_2 oxidises Cr^{3+} to CrO_4^{2-} in acid medium.

D. It is the super oxide of sodium

Answer: D



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Exercise 1 Concept Builder Topicwise Topic 1 Preparation And Properties Of Alkali Metals And Their Compounds

1. Ionisation enthalpy of Na would be same as

A. electron affinity of Na^+

B. electronegativity of Na^+

C. electron affinity of He

D. ionization potential of Mg

Answer: A



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2. Which compound will show the highest lattice energy ?

A. RbF

B. CsF

C. NaF

D. KF

Answer: C



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3. Strongest bond is in between

A. CsF

B. $NaCl$

C. $LiBr$

D. None of above

Answer: A



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4. In the crystals of which of the following ionic compounds would you expect maximum distance between the centres of the cations and anion?

A. LiF

B. CsF

C. CsI

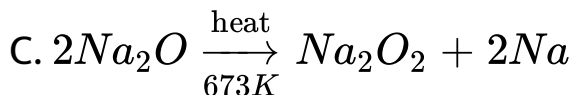
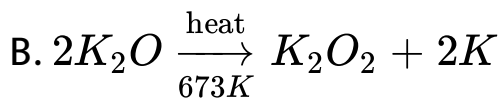
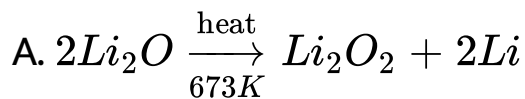
D. LiI

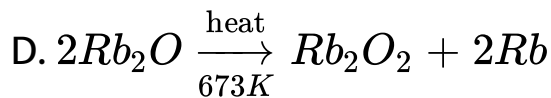
Answer: C



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5. Which of the following is not correct?





Answer: A



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6. The ionic mobility of alkali metal ions in aqueous solution is maximum for:

A. Li^+

B. Na^+

C. K^+

D. Rb^+

Answer: D



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7. Which of the following does not illustrate the anomalous properties of lithium?

A. The melting point and boiling point of Li are comparatively high.

B. Li is much softer than the other group I metals.

C. Li forms a nitride Li_3N unlike group I metals.

D. The ion of Li and its compounds are more heavily hydrated than those of the rest of the

group.

Answer: B



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8. Which of the following statements is incorrect

A. Alkali metal hydroxide are hygroscopic.

B. Dissolution of Alkali metal hydroxide is endothermic.

C. Aqueous solution of alkali meta hydroxides are strongly basic.

D.

Answer: B



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9. Which is not basic in character?

A. $CsOH$

B. KOH

C. $NaOH$

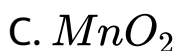
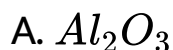
D. $LiOH$

Answer: A



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10. An inorganic compound which on heating first melts, then solidifies and liberates O_2 gas the inorganic compound is



Answer: D



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11. The element which on burning in air gives peroxide is

A. lithium

B. sodium

C. rubidium

D. cesium

Answer: B



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12. Which of the following is known as fusion mixture ?

A. Mixture of $Na_2CO_3 + NaHCO_3$

B. $Na_2CO_3 \cdot 10H_2O$

C. Mixture of $K_2CO_3 + Na_2CO_3$

D. $NaHCO_3$

Answer: C



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13. The dominant cation in the blood plasma (extracellular fluid) is

A. potassium

B. calcium

C. magnesium

D. sodium

Answer: D



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14. Among LiI , NaI , KI the one which is more ionic and more soluble in water :

A. KI

B. NaI

C. LiI

D. None of these

Answer: A



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15. Based on lattice energy and other considerations which one of the following alkali metal chlorides is expected to have the highest melting point

A. *NiCl*

B. *NaCl*

C. *KCl*

D. *RbCl*

Answer: B



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16. The correct order of radii is A) $N < Be < B$ B)

$F^- < O^{2-} < N^{3-}$ C) $Fe^{3+} < Fe^{2+} < Fe^{4+}$ D)

$N < Li < K$

A. $Li < Be < Mg$

B. $H^+ < Li < H$

C. $Mn^{3+} < Mn^{2+} < Mn^{7+}$

D. $K^+ > Cl^- > S^{2-}$

Answer: B



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17. The melting point of lithium ($181^{\circ}C$) is just double the melting point of sodium ($98^{\circ}C$) because

-

A. down the group, the hydration energy decreases.

B. down the group, the ionization energy decreases.

C. down the group the cohesive energy decreases.

D. none of these

Answer: C



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18. Alkali metals are generally extracted by

- A. reduction methods.
- B. displacement methods.
- C. electrolytic methods.
- D.

Answer: D



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19. Which of the following has the least ionization potential ?

A. *Li*

B. *He*

C. *N*

D. *Zn*

Answer: A



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20. Fires, that result from the combustion of alkali metals can be extinguished by

A. CCl_4

B. sand

C. water

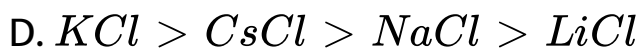
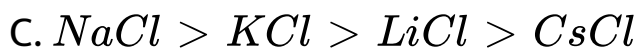
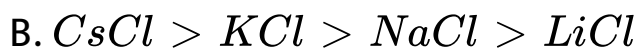
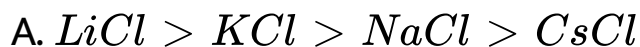
D. kerosene

Answer: A



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21. The stability of the following alkali metal chlorides follows the order:

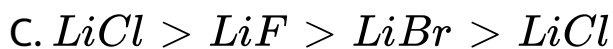
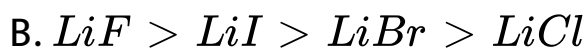
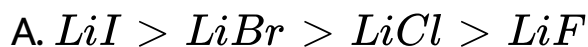


Answer: D



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22. The order of solubility of lithium halides in non-polar solvents follows the order



Answer: A



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23. Alkali metals form peroxides and superoxides except

A. *Na*

B. *Rb*

C. *Li*

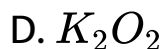
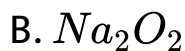
D. *Cs*

Answer: C



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24. Which of the following is used as a source of oxygen in square capsules, submarines and breathing masks?



Answer: C



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25. Which of the following statements is false for alkali metals ?

A. Lithium is the strongest reducing agent.

B. Sodium is amphoteric in nature.

C. Li^+ is exceptionally small.

D. All alkali metals give blue solution in liquid ammonia.

Answer: B



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26. Which of the following statements is correct for $CsBr_3$?

A. It is a covalent compound.

B. It contains Cs^{2+} and Br^- ions.

C. It contains Cs^+ and Br_3^- ions

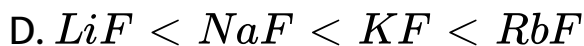
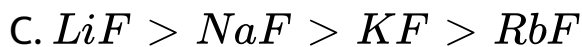
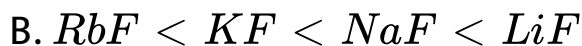
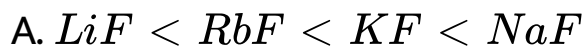
D. It contains Cs^+ , and Br^- and lattice Br_2 molecules.

Answer: C



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27. The solubility order for alkali metal fluoride in water is :



Answer: D



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28. An alloy of which pair of metals is liquid at ordinary temperature and is used in special thermometers used for finding temperatures above the boiling point of mercury.

A. Na and Hg

B. K and Hg

C. Na and K

D. None of these

Answer: C



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29. An alkaline metal oxide which is soluble in $NaOH$ has

A. $NaCl$ structure

B. wurzite structure

C. $CsCl$ structure

D. rutile structure

Answer: B



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30. The alkali metals which form normal oxide, peroxides as well as super oxides are :

A. *Na, Li*

B. *K, Li*

C. *Li, Cs*

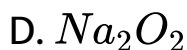
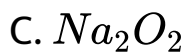
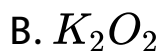
D. *K, Rb*

Answer: D



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31. Which of the following compounds are paramagnetic in nature?



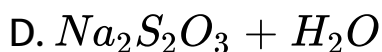
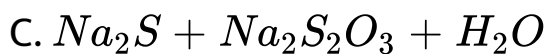
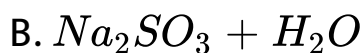
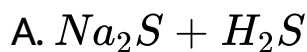
Answer: A



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Exercise 1 Concept Builder Topicwise Topic 2 Some Important Compounds Of Sodium

1. When sulphur is heated with NaOH (aq) the compounds formed are:



Answer: C



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2. If NaOH is added to an aqueous solution of Zn^{2+} ions a white precipitate appears and on adding excess of NaOH, the precipitate dissolves. In this solution Zinc exists in _____

- A. cationic part.
- B. anionic part.
- C. both in cationic and anionic parts.
- D. there is no zinc left in the solution.

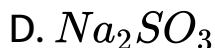
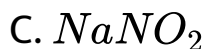
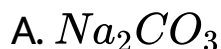
Answer: B



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3. An aqueous solution of salt 'R' when treated with dil. HCl , a colourless gas is given out. The gas so evolved when passed through acidified $KMnO_4$ decolourises $KMnO_4$ solution.

The salt 'R' is

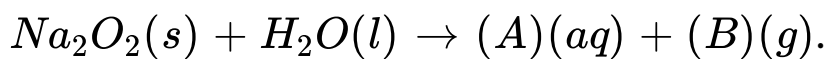


Answer: D

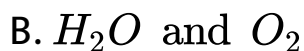


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4. On being placed in water, sodium peroxide not only produces an alkaline solution but also some bubbles. If we assume that the peroxide ion picks up two protons from water to produce a compound that can be seen as the dibasic conjugate acid of peroxide ion and then this compound undergoes a redox disproportionation. Using the above information complete the following equation:



(A) and (B) are:



C. $NaOH$ and O_2

D. Na_2O and $NaOH$

Answer: C



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5. Common table salt becomes moist and does not pour easily in rainy season because

A. it contains magnesium chloride.

B. it contains magnesium carbonate.

C. it metals slightly in rainy season.

D. sodium chloride is hygroscopic.

Answer: A



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6. Sodium thiosulphate, $Na_2S_2O_3 \cdot 5H_2O$ is used in photography to

A. reduce the silver bromide grains to metallic silver.

B. convert the metallic silver to silver salt.

C. remove undecomposed $AgBr$ as soluble silver thiosulphate complex.

D. remove reduced silver.

Answer: C



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7. Sodium carbonate solution in water is alkaline due to

A. hydrolysis of Na^+

B. hydrolysis of CO_3^{2-}

C. hydrolysis of both Na^+ and CO_3^{2-} ions

D. none of these

Answer: B



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8. Which of the following statement is incorrect

A. Pure sodium metals dissolves in liquid ammonia

to give blue solution.

B. $NaOH$ reacts with glass to give sodium

silicate.

C. Aluminium reacts with excess $NaOH$ to give



D. $NaHCO_3$ on heating gives Na_2CO_3 .

Answer: C



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9. A fire extinguisher contains H_2SO_4 and

A. $NaHCO_3$ and Na_2CO_3

B. Na_2CO_3

C. $NaHCO_3$

D. $CaCO_3$

Answer: A



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10. Which of the following statements about Na_2O_2 is not correct?

A. It is diamagnetic in nature

B. It is derivative of H_2O_2

C. Na_2O_2 oxidation Cr^{3+} to CrO_4^{2-} in acid medium.

D. It is the super oxide of sodium.

Answer: D



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11. Sodium cobaltinitrite is used in the detection of

A. K

B. Ca

C. Sr

D. Ba

Answer: A



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Exercise 1 Concept Builder Topicwise Topic 3 Preparation And Properties Of Alkaline Earth Metals And Their Compounds

1. Amongst the metal Be, Mg, Ca and Sr of group 2 of the periodic table, the least ionic chloride would be formed by

A. *Be*

B. *Mg*

C. *Ca*

D. Sr

Answer: A



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2. Which one is known as barytes?

A. $BaSO_4$

B. $BaCl_2 \cdot 2H_2O$

C. BaO

D. $BaCO_3$

Answer: A



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3. Which of the following salt does not impart colour to the flame?

A. KI

B. $LiCl$

C. $CaCl_2$

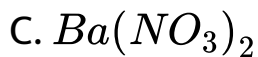
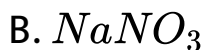
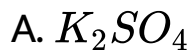
D. $MgCl_2$

Answer: D



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4. Which of the following compounds is used in preparation of green fire?



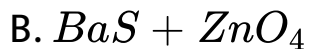
D. None of these

Answer: C



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5. Lithopone is a mixture of



Answer: C



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6. The mixture of $MgCl_2$ and MgO is called _____.

A. portland cement

B. sorel's cement

C. double salt

D. none of these

Answer: B



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7. Estimation of calcium and magnesium is done by

A. EDTA

B. oxalate

C. phosphate

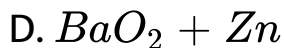
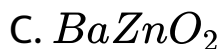
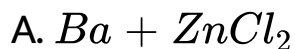
D. none of these

Answer: A



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8. Philosopher's wool when heated with BaO at $100^{\circ}C$ gives the compounds:



Answer: C



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9. Arrange the following compounds in order of increasing solubility

(i) MgF_2 (ii) CaF_2 (iii) BaF_2

A. (i) < (ii) < (iii)

B. (ii) < (i) < (iii)

C. (ii) < (iii) < (i)

D. (iii) < (ii) < (i)

Answer: A



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10. The first ionization potential of Mg is

A. less than Al

B. more than Al

C. equal to Al

D. can be less or more than Al

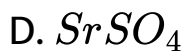
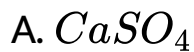
Answer: B



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11. Which one of the following alkaline earth metal sulphates has its hydration enthalpy greater than its

lattice enthalpy?



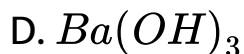
Answer: B



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12. BaO_2 and ozone reacts to produce





Answer: C



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Exercise 1 Concept Builder Topicwise Topic 4 Some Important Compounds Of Calcium

1. Which one of the following is flourspar?



B. CaO

C. H_2F_2

D. $CaCO_3$

Answer: A



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2. Gypsum on heating at $120 - 130^\circ C$ gives:

A. anhydrous salt

B. hemihydrate

C. monohydrate

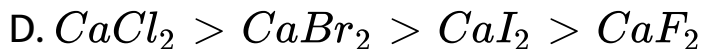
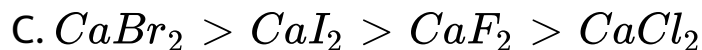
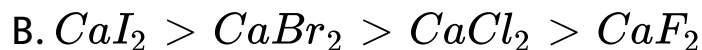
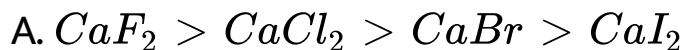
D. dihydrate

Answer: B



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3. Melting point of calcium halides decreases in the order

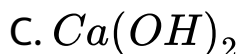


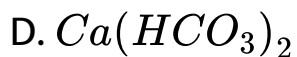
Answer: A



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4. Chemical A is used for water softening to remove temporary hardness. A reacts with sodium carbonate to generate caustic soda. When CO_2 is bubbled through a solution of A, it turns cloudy. What is the chemical formula of A ?





Answer: C



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5. The oxalate of which of the following elements is component of most kidney stones

- A. Potassium oxalate
- B. Barium oxalate
- C. Sodium phosphate
- D. Calcium oxalate

Answer: D



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6. Oxygen can be obtained from bleaching powder by:

- A. the action of dilute acid
- B. the action of alkali
- C. heating it with lime
- D. heating it with cobalt salt.

Answer: A



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Exercise 2 Concept Applicator

1. A sodium salt on treatment with $MgCl_2$ gives white precipitate only on heating. The anion of the sodium salt is :



Answer: A



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2. A well known reagent which contains copper sulphate, sodium potassium tartarate and sodium hydroxide is :

- A. Fenton's reagent
- B. Schiff's reagent
- C. Fehling's solution
- D. Nessler's reagent

Answer: C



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3. Select the correct statements :

I. Cs^+ is more highly hydrated than the other alkali metal ions.

II. Among the alkali metals. Li, Na, K and Rb, lithium has the highest melting point.

III. Among the alkali metals only lithium forms a stable nitride by direct combination with nitrogen.

A. I, II and III

B. I and II

C. I and III

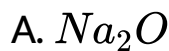
D. II and III

Answer: D



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4. Which of the following acts as an oxidising as well as reducing agent ?



Answer: D



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5. How many of the following orders are correct :

(i) $LiOH > NaOH > KOH$ (Solubility in water)

(ii) $LiHCO_3 < NaHCO_3 < KHCO_3$ (Solubility in water)

(iii) $Li_2CO_3 < Na_2CO_3 < K_2CO_3$ (Solubility in water)

(iv) $LiCl > NaCl > KCl > RbCl$ (Lattice energy)

A. 1 and 4

B. 1 and 3

C. 1 and 2

D. 2 and 3

Answer: A



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6. Identify the correct statement

- A. Elemental sodium can be prepared and isolated by electrolysing an aqueous solution of sodium chloride.
- B. Elemental sodium is a strong oxidising agent
- C. Elemental sodium is insoluble in ammonia.
- D. Elemental sodium is easily oxidised.

Answer: D



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7. Sodium sulphate is soluble in water, whereas barium sulphate is sparingly soluble because

A. the hydration energy of sodium sulphate is more than its lattice energy.

B. the lattice energy of sodium is equal to its hydration energy.

C. the hydration energy of sodium sulphate is less than its lattice energy.

D. none of these

Answer: A



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8. Sodium cannot be extracted by the electrolysis of brine solution because

A. electrolysis cannot take place with brine solution.

B. sodium reacts with water to produce



C. sodium being more electropositive than hydrogen H_2 is liberated at cathode and not sodium.

D. none of these

Answer: C



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9. The raw materials of the Solvay process are

A. Na_2CO_3 , $CaCO_3$ and NH_3

B. Na_2SO_4 , $CaCO_3$ and NH_3

C. $NaCl$, NH_3 and $CaCO_3$

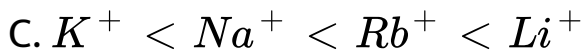
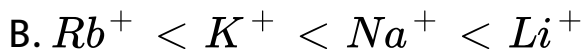
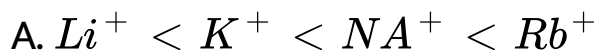
D. $NaOH$, CaO and NH_3 .

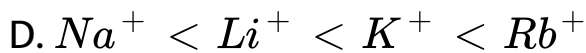
Answer: C



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10. The ease of adsorption of the hydrated alkali metal ions on ion-exchange resins follows the order:





Answer: B



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11. The spectrum of He is expected to be similar to that of

A. H

B. Na

C. Li^+

D. He^+

Answer: C



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12. Polyphosphates are used for softening agents because they

- A. they form soluble complexes with anionic species
- B. they precipitate out cationic species
- C. they form soluble complexes with cationic species.
- D.

Answer: D



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13. Which property of sodium is being used in street lights ?

A. It shows photoelectric effect.

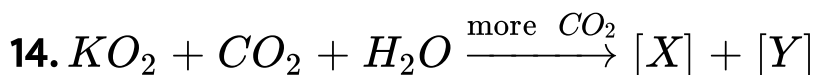
B. It has low melting point.

C. Sodium atom emits photons in the yellow region of visible spectrum, due to electrically stimulated transitions.

D. Sodium vapour show golden colour.

Answer: C

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Products [X] and [Y] are respectively:

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15. Which of the following metals is sensitive to a wide range of photons from the entire visible range of the electromagnetic spectrum?

A. Li

B. Na

C. Cs

D. Sr

Answer: C



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16. Amongst $LiCl$, $RbCl$, $BeCl_2$ and $MgCl_2$, the compounds with the greatest and the least ionic character respectively are :

A. $LiCl$ and $RbCl$

B. $MgCl_2$ and $BeCl_2$

C. $RbCl$ and $BeCl_2$

D. $RbCl$ and $MgCl_2$

Answer: C



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17. Which one of the following has minimum value of cation/anion ratio ?

A. $NaCl$

B. KCl

C. $MgCl_2$

D. CaF_2

Answer: C



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18. Which of the following statement is false?

A. Strontium decomposes water readily than beryllium.

B. Barium carbonate melts at a higher temperature than calcium carbonate.

C. Barium hydroxide is more soluble in water than magnesium hydroxide.

D. Beryllium hydroxide is more basic than barium hydroxide.

Answer: D

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19. The following compounds have been arranged in order of their increasing thermal stabilities. Identify the correct order.

(I) $BaCO_3$ (II) $MgCO_3$
(III) $CaCO_3$ (IV) $BeCO_3$

A. $I < II < III < IV$

B. $IV < II < III < I$

C. $IV < II < I < III$

D. $II < IV < III < I$

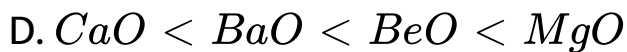
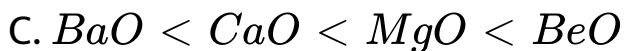
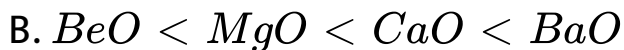
Answer: B



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20. Which of the following is/are correct for basic strength:

A. $MgO < BeO < CaO < BaO$

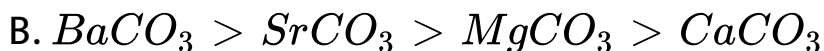
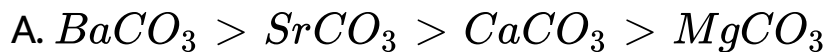


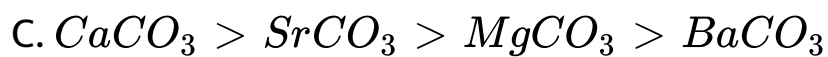
Answer: B



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21. Thermal stability of alkaline earth metal carbonates decreases in order





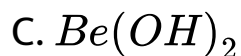
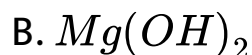
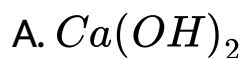
D. none of these

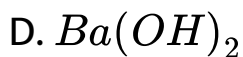
Answer: A



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22. Amongst the following hydroxides, the one which has the lowest value of K_{sp} is:





Answer: C



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23. Beryllium shows diagonal relationship with aluminum . Which of the following similarity is incorrect?

A. Be forms beryllates and Al forms aluminates.

B. $Be(OH)_2$ like $Al(OH)_3$ is basic.

C. Be like Al is rendered passive by HNO_3 .

D. Be_2C like Al_4C_3 yields methane on hydrolysis.

Answer: B



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24. Choose the incorrect statement in the following

A. BeO is almost insoluble but $BeSO_4$ is soluble in water.

B. BaO is soluble but $BaSO_4$ is insoluble in water.

C. LiI is more soluble than KI in ethanol.

D. Both Li and Mg form solid hydrogen carbonates.

Answer: D

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25. 100 mL of tap water containing $Ca(HCO_3)_2$ was titrated with $N/50HCl$ with methyl orange as indicator. If 30 mL of HCl were required, calculate the temporary hardness as parts of $CaCO_3$ per 10^6 parts of water.

A. 150 ppm

B. 300 ppm

C. 450 ppm

D. 600 ppm

Answer: B



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26. Which of the following mixture is known as mortar?

A. $CaCO_3$, sand and water

B. slaked lime and water

C. $CaCO_3$ and water

D. slaked lime and water

Answer: B



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27. A certain metal is used to prepare an antacid, this metal accidentally catches the fire which can not be put out by using CO_2 based extinguishers. The metal is -

A. *C*

B. *Ca*

C. *Mg*

D. *Na*

Answer: C



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28. The solubility of hydroxides, fluorides of oxalates of the metals of Group IIA

- A. increases down the group.
- B. decreases down the group.
- C. varies randomly.
- D. is constant.

Answer: A



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29. Match list-I with list-II for the composition of substances and select the correct answer using the code given below the lists

List-I (Substances)	List-II (Composition)
(A) Plaster of paris	(i) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
(B) Epsomite	(ii) $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$
(C) Kieserite	(iii) $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$
(D) Gypsum	(iv) $\text{MgSO}_4 \cdot \text{H}_2\text{O}$

(1) A(i), B(ii), C(iii), D(iv)

- A. (A) (B) (C) (D)
 (iii) (iv) (i) (ii)
- B. (A) (B) (C) (D)
 (ii) (iii) (iv) (i)

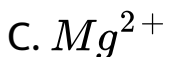
- C. (A) (B) (C) (D)
(i) (ii) (iii) (iv)
- D. (A) (B) (C) (D)
(iv) (iii) (ii) (i)

Answer: B



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30. Which of the following metal ions plays an important role in muscle contraction?



D. Ca^{2+}

Answer: D



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