IA AND IIA GROUP ELELMENTS

1	Which of the following is strongest base? (1) $Be(OH)_2$ (2) $Mg(OH)_2$ (3) $Al(OH)_3$ (4) $Si(OH)_4$
2	In which of the following molecule central atom is having complete octet (1) $BeCl_2$ (dimer) (2) BeH_2 (dimer) (3) BeH_2 (s) (4) $BeCl_2$ (s)
3	**Among CaH_2, BeH_2, BaH_2, the order of ionic character is [NEET-2018]** 1) $BeH_2 < CaH_2 < BaH_2$ 2) $BaH_2 < BeH_2 < CaH_2$ 3) $BeH_2 < BaH_2 < CaH_2$ 4) $CaH_2 < BeH_2 < BaH_2$
4	**On heating which of the following releases CO_2 most easily [AIPMT- 2015]** 1 K_2CO_3 2) Na_2CO_3 3) $MgCO_3$ 4) $CaCO_3$
5	**Which solubility of alkaline earth's metal sulphates in water decreases in the sequence:[AIPMT - 2014]** 1) $Ca > Sr > Ba > Mg$ 2) $Sr > Ca > Mg > Ba$ 3) $Ba > Mg > Sr > Ca$ 4) $Mg > Ca > Sr > Ba$
6	**Property of the alkaline earth metals that increases with their atomic number [AIPMT -2011]** (1) Solubility of their hydroxides in water (2) Solubility of their sulphates in water (3) Ionization energy (4) Electronegativity
7	**Which of the following oxides is not expected to react with sodium hydroxide? [AIPMT 2009]** (1) CaO (2) SiO_2 (3) BeO (4) B_2O_3
8	**In which of the following the hydration energy is higher than the lattice energy? [AIPMT 2007]** (1) $MgSO_4$ (2) $RaSO_4$ (3) $SrSO_4$ (4) $BaSO_4$
9	**The correct order of increasing thermal stability of K_2CO_3, $MgCO_3$, $CaCO_3$ and $BeCO_3$ is [AIPMT 2006]** (1) $BeCO_3 < MgCO_3 < CaCO_3 < K_2CO_3$ (2) $MgCO_3 < BeCO_3 < CaCO_3 < K_2CO_3$ (3) $K_2CO_3 < MgCO_3 < CaCO_3 < BeCO_3$ (4) $BeCO_3, < MgCO_3 < K_2CO_3 < CaCO_3$.
10	**A metal M forms water soluble MSO_4 and amphoteric MO. MO in aqueous solution forms insoluble $M(OH)_2$, soluble in NaOH. The metal M is [AIEEE-2002]** 1) Be 2) Mg 3) Ca 4) Si
11	**Which of the alkali metal chlorides (MCl) form is dihydrate salt ($(MCl.2H_2O)$ easily [NEET-2019]** 1) $LiCl$ 2) $CsCl$ 3) $RbCl$ 4) KCl
12	**The alkali metals form salt-like hydrides by the direct synthesis at elevated temperature. The thermal stability of these hydrides decreases in which of the following orders? [AIPMT 2005]** (1) LiH > NaH > KH > RbH > CsH (2) CsH > RbH > KH > NaH > LiH (3) KH > NaH > LiH > CsH > RbH (4) NaH > LiH > KH > RbH > CsH

13	**The correct order of the mobility of the alkali metal ions in aqueous solution is [AIPMT 2008, 2003]** (1) $Rb^+ > K^+ > Na^+ > Li^+$ (2) $Li^+ > Na^+ > K^+ > Rb^+$ (3) $Na^+ > K^+ > Rb^+ > Li^+$ (4) $K^+ > Rb^+ > Na^+ > Li^+$
14	**In the case of alkali metals, the covalent character decreases in the order [AIPMT 2009]** (1) MF > MCl > MBr > MI (2) MF > MCl > MI > MBr (3) MI > MBr > MCl > MF (4) MCl > MI > MBr > MF
15	**Which one of the following compounds is a peroxide? [AIPMT -2012]** (1) KO_2 (2) BaO_2 (3) MnO_2 (4) NO_2
16	**Which of the following on thermal decomposition yields a basic as well as acidic oxide?[AIPMT -2013]** 1) NaOH 2) $KClO_3$ 3) $CaCO_3$ 4) NH_4NO_3
17	**Water glass is [AIIMS-2017]** 1) Na_2SiO_3 2) Mg_2Si 3) $SiCl_4$ 4) $Ca(H_2PO_4)_2$
18	**Crude sodium chloride obtained by crystallisation of brine solution does not contain. [NEET-2019]** 1) $MgSO_4$ 2) Na_2SO_4 3) $MgCl_2$ 4) $CaSO_4$
19	**The solubilities of carbonates decrease down the IIA - group due to decreases in [AIEEE-2004]** 1) lattice energies of solids 2) hydration energies of cations 3) inter - ionic attractions 4) entropy of solution formation
20	**In curing cement plaster, water is sprinkled from time to time. This helps in [AIEEE-2003]** 1) Keeping it cool 2) developing interlocking needle like crystals of hydrated silicates 3) hydrating sand and gravel mixed cement 4) convertings and into silicic acid
21	**Equimolar solutions of the following were prepared in water separately. Which one of the solutions will record the highest pH? [AIPMT 2007]** (1) $CaCl_2$ (2) $SrCl_2$ (3) $BaCl_2$ (4) $MgCl_2$
22	**Which of the following oxides is not expected to react with sodium hydroxide? [AIPMT 2009]** (1) CaO (2) SiO_2 (3) BeO (4) B_2O_3
23	**The bleaching action of bleaching powder is due to the formation of [AIPMT - 2013]** 1) $CaCl_2$ 2) $CaSO_4$ 3) HClO 4) $Ca(ClO_3)_2$
24	**The correct formula for plaster of Paris is [JIPMER-2018]** 1) $CaSO_4.4H_2O$ 2) $CaSO_4.2H_2O$ 3) $CaSO_4.\frac{1}{2}H_2O$ 4) $CaSO_4.1H_2O$
25	**Which of the following oxides is most acidic in nature? [NEET-2018]** 1) MgO 2) CaO 3) BaO 4) BeO
26	**Magnesium reacts with an element (X) to form an ionic compound. If the ground state electronic configuration of (X) is $1s^2 2s^2 2p^3$, the simplest formula for this compound is: [NEET-2018]** 1) Mg_2X_3 2) Mg_3X_2 3) Mg_2X 4) MgX_2
27	**Out of $BeF_2, MgF_2, CaF_2, SrF_2$ which has maximum solubility? [AIIMS-2019]** 1) BeF_2 2) MgF_2 3) CaF_2 4) SrF_2
28	**Which is least soluble? [AIIMS -2019]** 1) Na_2S 2) MgS 3) $MgCl_2$ 4) $NaCl$

29	**Which of the following is an amphoteric hydroxide? [NEET -2019]** 1) $Sr(OH)_2$ 2) $Ca(OH)_2$ 3) $Mg(OH)_2$ 4) $Be(OH)_2$
30	**Enzymes that utilize ATP in phosphate transfer require an alkaline earth metal (M) as the cofactor. M is [NEET - 2019]** 1) Be 2) Mg 3) Ca 4) Sr
31	The correct order of hydration enthalpies of Alkali metal ions is, 1) $Li^+ > Na^+ > K^+ > Rb^+ > Cs^+$ 2) $Li^+ < Na^+ < K^+ < Rb^+ < Cs^+$ 3) $Li^+ > Na^+ = K^+ = Rb^+ > Cs^+$ 4) $Na^+ > Cs^+ > K^+ > Rb^+ > Li^+$
32	The pair of Alkali metals used as electrodes in Photoelectric cells 1) Na, Li 2) K, Cs 3) Rb, Li 4) Li, Cs
33	The alloy 'white metal' contains metals are 1) $Li + Pb$ 2) $Na + Pb$ 3) $Al + Pb$ 4) $Al + Li$
34	The alkali metal that cannot reacts with hydrogen at 693 K is 1) Na 2) Li 3) Rb 4) Cs
35	Which of the following has the lowest melting point ? 1) Be 2) Mg 3) Ca 4) Sr
36	Which of the following has highest standard reduction potential ? 1) Be 2) Mg 3) Ca 4) Ba
37	Beryllium compounds are largely covalent because 1) Electropositivity of beryllium is very high 2) Polarising power of Be^{2+} is very high 3) Beryllium atom is very larger 4) Beryllium is a metal
38	Plaster of paris hardens by 1) Giving off CO_2 2) Changing into $CaCO_3$ 3) Uniting with water 4) Giving out water
39	Solubility of the alkaline earth metal sulphates in water decreases in the sequence 1) $Sr > Ca > Mg > Ba$ 2) $Ba > Mg > Sr > Ca$ 3) $Mg > Ca > Sr > Ba$ 4) $Ca > Sr > Ba > Mg$
40	On heating which of the following releases CO_2 most easily ? 1) Na_2CO_3 2) $MgCO_3$ 3) $CaCO_3$ 4) K_2CO_3
41	Which of the following oxides is most acidic in nature ? 1) MgO 2) BeO 3) BaO 4) CaO
42	The product obtained on heating $LiNO_3$ will be: 1) $Li_2O + NO + O_2$ 2) $LiNO_2 + O_2$ 3) $Li_2O + NO_2 + O_2$ 4) $Li_3N + O_2$

43	The by product of Solvay process is: 1) NH_4Cl 2) $CaCl_2$ 3) NH_3 4) CO_2
44	A mixture of X moles of Li_2CO_3 and Y moles of K_2CO_3 is heated. The volume of CO_2 produced at STP is: 1) 22.4 X 2) 22.4 Y 3) 44.8 (X + Y) 4) 22.4 (X + Y)

KEY

1	**ANS-2**
2	**ANS-4**
3	**ANS-1** : **(1)** : Correct order of ionic character is: $BeH_2 < CaH_2 < BaH_2$
4	**ANS-3** : **(3)** : Thermal stability increases in IIA gorup carbonates
5	**ANS-4** : **(4)** : Solubility of IIA group sulphates decreases
6	**ANS-1** : **(1)** : The solubility of an ionic compound depends on two factors: (a) lattice energy, and (b) hydration energy In case of alkaline metal hydroxides, the lattice energy decreases as we move down the group. This decrease is more than the decrease in the hydration energy down the group.
7	**ANS-1** : **(1)** : CaO being a basic oxide does not react with NaOH, however SiO_2 (acidic oxide), BeO (amphoteric oxide) and B_2O_3 (acidic oxide) react with NaOH.
8	**ANS-1** : **(1)** ; When hydration energy exceeds lattice energy, the compound becomes soluble in water. The solubility of alkaline earth metal sulphates decreases in the order $BeSO_4 > MgSO_4 > CaSO_4 > SrSO_4 > BaSO_4$ The solubilities of $BeSO_4$ and $MgSO_4$ are due to high energy of solvation of smaller Be^{2+} and Mg^{2+} ions.

9	**ANS-1** : (1) : More the polarising power of cation more is the distortion on CO_3^{2-} ion. More will be the instability. Hence the order of increasing thermal stability is $BeCO_3 < MgCO_3 < CaCO_3 < K_2CO_3$.
10	**ANS-1** : (1) : $BeSO_4$ is highly soluble in water. Beo is amphoteric $Beo + H_2O \rightarrow Be(OH)_2 \downarrow Be(OH)_2 + 2NaOH \rightarrow Na_2[Be(OH)_4]$
11	**ANS-1** : (1) : Lithium forms $LiCl.2H_2O$
12	**ANS-1** **Key : (1)** **Hint:** LiH > NaH > KH > RbH > CsH
13	**ANS-1** : (1) : mobility $\alpha \frac{1}{size}$ $Rb^+ > K^+ > Na^+ > Li^+$
14	**ANS-3** : (3) : Alkali metals are highly electropositive and halogens are electronegative. Thus for the halides of a given alkali metal, the covalent character decreases with increase in electronegativity of halogens. $\therefore$ Order of covalent character of halides is MI > MBr > MCl > MF
15	**ANS-2** : (2) : BaO_2 has peroxide linkage.
16	**ANS-3** : (3) : $CaCO_3 \rightarrow \underset{\text{Basic oxide}}{CaO} + \underset{\text{Acidic oxide}}{CO_2}$
17	**ANS-1** : (1) : Water glass is Na_2SiO_3
18	**ANS-1** : (1) : **Conceptual**
19	**ANS-2** : (2) : In the presence of very small amount of dilute acid , it gives nascent oxygen it acts as bleaching agent.

20	**ANS-2** : (2) : Solubilite decreases when lattice energy increases Hydration energy decrease.
21	**ANS-3** : (3) : Conceptual
22	**ANS-1** : (1) : CaO being a basic oxide does not react with NaOH, however SiO_2 (acidic oxide), BeO (amphoteric oxide)
23	**ANS-3**
24	**ANS-3** : (3) : plaster of paris - $CaSO_4.\frac{1}{2}H_2O$
25	**ANS-4** : (4) : BeO Order of basic nature is BeO<MgO<CaO<BaO
26	**ANS-2** : (2) : Mg_3X_2
27	**ANS-1** : (1) : BeF_2 is more soluble
28	**ANS-2** : (2) : **Conceptual**
29	**ANS-4** : (4) : $Be(OH)_2$ is an amphoteric in nature
30	**ANS-2** : (2) : **Conceptual**
31	**Ans-1**
32	**Ans-2**
33	**Ans-1**
34	**ANS-2**
35	**ANS-2**
36	**ANS-1**
37	**ANS-2**

38	**ANS-3**
39	**ANS-3**
40	**ANS-2**
41	**ANS-2**
42	**ANS-3**
43	**ANS-2**
44	**ANS-1**