Basic Exercise

1. Correct order of density is –

(1) Li > Na (2) K > Na (3) Mg > Ca (4) Cs < Rb

Ans. **(3)**

2. Which is having highest m.p. –

(1) Be (2) Mg (3) Ca (4) Sr

Ans. **(1)**

3. Weak reductant in alkali metal is –

(1) Li (2) Na (3) K (4) Cs

Ans. **(2)**

4. The metal used in photoelectric cell is –

(1) Na (2) K (3) Mg (4) Ca

Ans. **(2)**

5. Lithium chloride is highly soluble in –

(1) C_6H_6 (2) H_2O (3) D_2O (4) All

Ans. **(1)**

6. Which metal will not form superoxide –

(1) Li (2) Be (3) Na (4) All

Ans. **(4)**

7. More stable hydride is –

(1) Cs – H (2) Rb – H (3) K – H (4) Li – H

Ans. **(4)**

8. In which compound hydrogen is electronegative –

(1) CaH_2 (2) CH_4 (3) HCl (4) All

Ans. **(1)**

9. Which of the following metal will give apple green colour on Bunsen flame –

(1) Ba (2) Sr (3) Ca (4) K

Ans. **(1)**

10. The density of –

(1) Na > K (2) Na = K (3) K > Na (4) Li > K

Ans. **(1)**

11. Alkali metals salts are –

(1) Diamagnetic and coloured (2) Diamagnetic and colourless

(3) Paramagnetic and coloured (4) Paramagnetic and colourless

Ans. **(2)**

12. Ionic conductances of hydrated M^+ ions are in the order –

(1) $Li^+(aq) > Na^+(aq) > K^+(aq) > Rb^+(aq) > Cs^+(aq)$

(2) $Li^+(aq) > Na^+(aq) < K^+(aq) < Rb^+(aq) < Cs^+(aq)$

(3) $Li^+(aq) > Na^+(aq) > K^+(aq) > Rb^+(aq) < Cs^+(aq)$

(4) $Li^+(aq) < Na^+(aq) < K^+(aq) < Rb^+(aq) < Cs^+(aq)$

Ans. **(4)**

13. Which of the following halides has the highest melting point –

(1) NaCl (2) KCl (3) NaBr (4) NaF

Ans. **(4)**

14. Which of the following does not give an oxide on heating –

(1) $MgCO_3$ (2) Li_2CO_3 (3) $ZnCO_3$ (4) K_2CO_3

Ans. **(4)**

15. When heated in steam, Mg burns brilliantly producing –

(1) $Mg(OH)_2$ (2) MgO and H_2 (3) MgO and O_2 (4) MgO and O_3

Ans. **(2)**

16. When magnesium ribbon is heated to redness in an atmosphere of nitrogen and subsequently cooled with water, the gas evolved is –

(1) N_2 (2) NH_3 (3) O_2 (4) CO_2

Ans. **(2)**

17. Molten potassium chloride conduct electricity due to the presence of –

(1) Free electron (2) Free ions

(3) Free molecules (4) Atom of potassium & chloride

Ans. **(2)**

18. Which of the following element have maximum tendency to form complex compound –

(1) Be (2) Ba (3) Ca (4) Mg

Ans. **(1)**

19. On heating sodium metal in the current of dry ammonia leads to the formation of which gas–

(1) $NaNH_2$ (2) NaN_3 (3) NH_3 (4) H_2

Ans. **(4)**

20. Sodium reacts with water more vigorously than lithium because it –

(1) Has higher atomic weight (2) Is more electronegative

(3) Is more electropositive (4) Is a metal

Ans. **(3)**

21. Which of the following alkali metals has the biggest tendency of the half reaction $-M_{(g)} \longrightarrow M^+_{(aq)} + e^-$

(1) Sodium (2) Lithium (3) Potassium (4) Cesium

Ans. **(2)**

22. The strongest reducing agent is –

(1) Be (2) Mg (3) Sr (4) Ba

Ans. **(4)**

23. Both Be and Al become passive on reaction with conc. nitric acid due to –

(1) The non reactive nature of the metal

(2) The non reactive nature of the acid

(3) The formation of an inert oxide layer on the surface of the metals

(4) None of these

Ans. **(3)**

24. Sodium loses its lustre on exposure to air due to formation of –

(1) Na_2O, NaOH and Na_2CO_3 (2) Na_2O and NaOH

(3) Na_2O and Na_2CO_3 (4) NaOH and Na_2CO_3

Ans. **(1)**

25. Potassium carbonate when heated to high temperature.

(1) Gives CO_2 (2) Gives O_2 (3) Gives CO (4) Gives no gas at all

Ans. **(3)**

26. On Flame test K give -------- colour –

(1) Golden yellow (2) Crimson red (3) Violet (4) Apple green

Ans. **(3)**

27. An element having electronic configuration $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1$ will form –

(1) Acidic oxide (2) Basic oxide (3) Amphoteric oxide (4) Neutral oxide

Ans. **(2)**

28. Which does not form double salt –

(1) Li_2SO_4 (2) Na_2SO_4 (3) K_2SO_4 (4) Rb_2SO_4

Ans. **(1)**

29. Which decomposes on heating –

(1) NaOH (2) KOH (3) LiOH (4) RbOH

Ans. **(3)**

30. Which metal does not form ionic hydride –

(1) Na (2) Rb (3) Ca (4) Be

Ans. **(4)**

31. The element of IA group which combines directly with nitrogen is –

(1) Li (2) Na (3) K (4) Cs

Ans. **(1)**

32. Which of the following releases 0.2 moles of hydrogen on hydrolysis –

(1) 0.1 mole of LiH (2) 0.2 mole of LiH (3) 0.3 mole of LiH (4) 0.4 mole of LiH

Ans. **(2)**

33. Which of the following has an unpaired electron in it

(1) K_2O (2) K_2O_2 (3) KO_2 (4) Na_2O

Ans. **(3)**

34. A compound which on hydrolysis releases ammonia is –

(1) Li_3N (2) $LiNO_3$ (3) $NaNO_3$ (4) None of these

Ans. **(1)**

35. The metal ion which does not give any flame colouration is –

(1) Li^+ (2) Be^{+2} (3) Na^+ (4) K^+

Ans. **(2)**

36. Which of the following exists as hydrated salt –

(1) NaCl (2) LiCl (3) RbCl (4) KCl

Ans. **(2)**

37. Strong reductant in IIA and IA group is –

(1) Ba, Li (2) Li, Be (3) Cs, Ba (4) Ba, Cs

Ans. **(1)**

38. Which statement will be true for solution, when Ba is dissolved in ammonia:-

(1) Solution becomes blue (2) Solution becomes good conductor

(3) Solution remains colourless (4) Both (1) and (2) are correct

Ans. **(4)**

39. The correct order of density of following elements is:- (Be, Mg, Ca, Sr)

(1) Be > Mg > Ca > Sr (2) Ca > Mg > Be > Sr (3) Ca < Mg < Be < Sr (4) Mg < Ca < Sr < Be

Ans. **(3)**

40. Identify the correct statement elemental sodium:-

(1) Is a strong oxidising agent

(2) Can be extracted by electrolysis of aqueous solution

(3) It's density is lower than K

(4) Is easily oxidised

Ans. **(4)**

41. Which of the following s-block element reacts with NaOH to give water soluble complex :-

(1) Al (2) Ca (3) Be (4) Li

Ans. **(3)**

42. Which is having least mpt. :-

(1) Ba (2) Ca (3) Mg (4) Be

Ans. **(3)**

43. When Na and Li placed in dry air we get :-

(1) NaOH, Na_2O, Li_2O (2) Na_2CO_3, Na_2O_2, Li_2O

(3) Na_2O, Li_3N, NH_3 (4) Na_2O, Li_2O, Li_3N

Ans. **(4)**

44. Which of the following oxide having O_2^{-2} (peroxide) anion :-

(1) Na_2O (2) BaO_2 (3) RbO_2 (4) KO_2

Ans. **(2)**

45. Which of the following properties of IA group metals increases as the atomic number rises:

(a) Metallic character (b) Ionic radius (c) Melting point (d) Density

(e) Ionisation potential

Correct answer is :-

(1) a, b, c (2) a, b, d (3) c, d, e (4) All

Ans. **(2)**

46. Which of the following s-block metals do not impart any colour to the flame -

(1) Li, Be (2) Cs, Fr (3) Be, Mg (4) Ba, Ra

Ans. **(3)**

47. Which can not be used to generate H_2 :–

(1) Al + NaOH (2) Zn + NaOH (3) Mg + NaOH (4) LiH + H_2O

Ans. **(3)**

48. Only those elements of s-block can produce superoxides which have :-

(1) High ionisation energy (2) High electronegativity

(3) High charge density (4) Low ionisation potential

Ans. **(4)**

49. Which does not exists in solid state :-

(1) $LiHCO_3$ (2) $CaCO_3$ (3) $NaHCO_3$ (4) Na_2CO_3

Ans. **(1)**

50. Alkali metals dissolve in liquid NH_3 then which of the following observations is not true:

(1) It becomes paramagnetic

(2) Solution turns into blue due to solvated electrons

(3) It becomes diamagnetic

(4) Solution becomes conducting

51. Alkali metals give colour in bunsen flame due to –

(1) Low electronegativity (2) One e^- in outer most orbit

(3) Smaller atomic radii (4) Low ionisation energy

Ans. **(4)**

52. Which of the following ions forms a hydroxide that is highly soluble in water ?

(1) K^+ (2) Zn^{2+} (3) Ni^{2+} (4) Al^{3+}

Ans. **(1)**

53. The slaked lime is prepared by adding water to-

(1) Quick lime (2) Nitrolim (3) Lime stone (4) Plaster of parris

Ans. **(1)**

54. The plaster of paris is hardened by

(1) Liberating CO_2 (2) Giving out water

(3) Combining with water (4) Changing into $CaCO_3$

Ans. **(3)**

55. Which of the following alkali metal carbonate is the least stable and decomposes readily

(1) Li_2CO_3 (2) Na_2CO_3 (3) K_2CO_3 (4) Cs_2CO_3

Ans. **(1)**

56. In the reaction $M + O_2 \longrightarrow MO_2$ (super oxide) the metal is

(1) Li (2) Na (3) K (4) Ba

Ans. **(3)**

57. Li does not resemble other alkali metals in following properties

(1) Li_2CO_3 decomposes into oxides while other alkali carbonates are thermally stable

(2) LiCl is predominantly covalent

(3) Li_3N is stable

(4) All

Ans. **(4)**

58. Be and Al resemble in

(1) Both become passive on reaction with HNO_3 due to formation of oxide layer

(2) Their chlorides are Lewis acids

(3) Hydroxides are soluble in alkali as well as in acid

(4) All

Ans. **(4)**

59. Mg^{+2} does not form either peroxide or superoxide, because

(1) Mg^{+2} ion is relatively bigger (2) Mg^{+2} ion is relatively smaller

(3) Mg^{+2} ion is stable (4) Mg^{+2} ion is unstable

Ans. **(2)**

60. The stability order of oxide, peroxide and superoxide of alkali metal is

(1) Normal oxide > super oxide > per oxide (2) Normal oxide > per oxide > super oxide

(3) super oxide > per oxide > normal oxide (4) per oxide > normal oxide > super oxide

Ans. **(2)**

61. Which of the following statement is not correct

(1) LiOH is amphoteric in nature

(2) LiCl is soluble in pyridine

(3) Li_3N is stable while Na_3N doesn't exist even at room temperature

(4) BeO is amphoteric in nature

Ans. **(1)**

62. In between the metals A and B both form oxide but B also forms nitride, when both burn in air so A and B are

(1) Cs, K (2) Mg, Ca (3) Li, Na (4) K, Mg

Ans. (4)

63. $Na_2[Be(OH)_4]$ is formed when :

(1) BeO reacts with NaOH solution (2) Be reacts with NaOH solution

(3) both correct (4) none is correct

Ans. (3)

64. A wire of an alkaline earth metal X, burnt in air and dipped in water, a gas 'Y' is evolved X and Y are respectively :–

(1) Na, NO_2 (2) Be, NO_2 (3) Mg, CO_2 (4) Mg, NH_3

Ans. (4)

65. Which of the following hydride is covalent and polymeric :-

(1) CaH_2 (2) BeH_2 (3) NaH (4) BaH_2

Ans. (2)

Analytical Exercise

1. A solid compound 'X' on heating gives CO_2 gas and a residue. The residue mixed with water forms 'Y'. On passing an excess of CO_2 through 'Y' in water, a clear solution, 'Z', is obtained. On boiling 'Z', compound 'X' is reformed. The compound 'X' is :

(1) $CaCO_3$ (2) Na_2CO_3 (3) K_2CO_3 (4) $Ca(HCO_3)_2$

Ans. **(1)**

2. On dissolving moderate amount of sodium metal in liquid NH_3 at low temperature, which one of the following does not occur

(1) Blue coloured solution is obtained.

(2) Na^+ ions are formed in the solution.

(3) Liquid NH_3 becomes good conductor of electricity.

(4) Liquid ammonia remains diamagnetic.

Ans. **(4)**

3. Which of the following pair can't exist in solution ?

(1) $NaHCO_3$ and NaOH (2) Na_2CO_3 and NaOH

(3) Na_2CO_3 and NaCl (4) $NaHCO_3$ and NaCl

Ans. **(1)**

4. NaOH is manufactured by electrolysis of brine solution. The products of the reaction are

(1) Cl_2 and H_2 (2) Cl_2 and Na–Hg (3) Cl_2 and Na (4) Cl_2 and O_2

Ans. **(1)**

5. Sodium carbonate is manufactured by Solvay process, the products that are recycled are

(1) CO_2 and NH_3 (2) CO_2 and NH_4Cl (3) NaCl and CaO (4) $CaCl_2$ and CaO

Ans. **(1)**

6. At anode in the electrolysis of fused NaCl :

(1) Na^+ is oxidised (2) Cl^- is oxidised (3) Cl^- is reduced (4) Na^+ is reduced

Ans. **(2)**

7. Which alkali metal on flame test gives red violet colour

(1) Li (2) Cs (3) Na (4) Rb

Ans. **(4)**

8. In presence of iron, alkali metal react with liquid ammonia and form

(1) Metal mixture + H_2 (2) Iron metal mixture + H_2

(3) Metal mixture (4) Metal amide + H_2

Ans. **(4)**

9. Photoelectric effect is maximum in

(1) Cs (2) Na (3) K (4) Li

Ans. **(1)**

10. When a standard solution of NaOH is left in air for a few hours,

(1) a precipitate will form (2) strength will decrease

(3) strength will increase (4) the concentration of Na^+ ions remain same

Ans. **(2)**

11. Which is used in purification of air in the space craft.

(1) Slaked lime (2) Quick lime

(3) Potassium superoxide (4) $CaCl_2$

Ans. **(3)**

12. The correct order of ionic character of oxides of alkali earth metal :-

(1) MgO > CaO > SrO > BaO (2) BaO > SrO > CaO > MgO

(3) CaO > SrO > BaO > MgO (4) SrO > BaO > MgO > CaO

Ans. (2)

13. Potassium superoxide is used in oxygen cylinders of space craft as it -

(1) Absorbs CO_2

(2) Eliminate moisture

(3) Absorbs CO_2 and increases O_2 content

(4) Forms ozone

Ans. (3)

14. Compounds of alkaline earth metals are generally less soluble in water than that of alkali metals because of :-

(1) High hydration energy (2) More covalent character

(3) More ionic character (4) Less lattice energy

Ans. (2)

15. Which of the following on thermal-decomposition yields a basic as well as an acidic oxide ?

(1) NH_4NO_3 **(2)** $NaNO_3$ **(3)** $KClO_3$ **(4)** $CaCO_3$

Ans. (4)

16. Fire extinguishers contain H_2SO_4 and which one of the following :-

(1) $CaCO_3$ **(2)** $NaHCO_3$ and Na_2CO_3

(3) Na_2CO_3 **(4)** $NaHCO_3$

Ans. (3)

17. Which one of the following will react most vigorously with water ?

(1) Li **(2)** K **(3)** Rb **(4)** Na

Ans. (3)

18. A metal M on heating in nitrogen gas gives Y. Y on treatment with H_2O gives a colourless gas which when passed through $CuSO_4$ solution gives a blue colour, Y is :-

(1) NH_3 **(2)** MgO **(3)** Mg_3N_2 **(4)** $Mg(NO_3)_2$

Ans. (3)

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

(1) $BaSO_4$ **(2)** $SrSO_4$ **(3)** $CaSO_4$ **(4)** $BeSO_4$

Ans. (4)

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

(1) LiO_2, Na_2O_2 and K_2O **(2)** Li_2O_2, Na_2O_2 and KO_2

(3) Li_2O, Na_2O_2 and KO_2 **(4)** Li_2O, Na_2O and KO_2

Ans. (3)

21. In K, Rb and Cs, the decreasing order of reducing power in gaseous state is:-

(1) K > Cs > Rb (2) Cs > Rb > K (3) K < Cs < Rb (4) Rb > Cs > K

Ans. (2)

22. On addition of metal ions, colour of liquid NH_3 solutions converts into bronze, the reason is :-

(1) Ammoniated electrones (2) Metal amide formation

(3) Liberation of NH_3 gas (4) Cluster formation of metal ions

Ans. (4)

23. On allowing ammonia solution of s-block metals to stand for a long time, blue colour becomes fade. The reason is:-

(1) Formation of NH_3 gas (2) Formation of metal amide

(3) Cluster formation of metal ions (4) Formation of metal nitrate

Ans. (2)

24. Consider the following points

(a) Cs is the strongest reducing agent in IA group element

(b) Be does not form peroxide in II A group elements

(c) The density of potassium is less than sodium

(d) In alkali metals Li, Na, K and Rb, lithium has the minimum value of M.P.

Point out that the statement -

(1) (a) & (b) are correct (2) (a), (b) & (c) are correct

(3) (b) & (c) are correct (4) (b), (c) & (d) are correct

Ans. (3)

25. Which of the following statement is not correct

(1) BeF_2 forms complex ion with NaF in which Be goes with cation

(2) $BeCO_3$ is kept in the atmosphere of CO_2 since it is least thermally stable

(3) Be dissolves in alkali forming $[Be(OH)_4]^{-2}$

(4) BeF_2 forms complex ion with NaF in which Be goes with anion

Ans. (1)

26. CO_2 gas along with solid (Y) is obtained when sodium salt (X) is heated. (X) is again obtained when CO_2 gas is passed into aqueous solution of (Y). X and Y are :

(1) Na_2CO_3, Na_2O (2) Na_2CO_3, NaOH (3) $NaHCO_3$, Na_2CO_3 (4) Na_2CO_3, $NaHCO_3$

Ans. (3)

27. A compound which can be used in space vehicles both to absorb CO_2 and liberate O_2 is :

(1) NaOH (2) Na_2O (3) Na_2O_2 (4) CaO + NaOH

Ans. (3)

28. There is loss in weight when mixture of Li_2CO_3 and $Na_2CO_3.10H_2O$ is heated strongly. This loss is due to :

(1) Li_2CO_3 (2) $Na_2CO_3.10H_2O$ (3) both (4) none

Ans. (3)

Note : Q.29 to 32 are based on following reaction (s) :

$$A \xrightarrow{\Delta} B\,(oxide) + CO_2$$

$$B + H_2O \longrightarrow C$$

$$C + CO_2 \longrightarrow A\,(milky)$$

$$C + NH_4Cl \xrightarrow{\Delta} D\,(gas)$$

$$D + H_2O + CO_2 \longrightarrow E$$

$$E + NaCl \longrightarrow F$$

$$F \xrightarrow{\Delta} Na_2CO_3 + CO_2 + H_2O$$

29. Name of the process is :

(1) solvay (2) ammonia-soda (3) both correct (4) none is correct

Ans. (3)

30. A is :

(1) $Ca(HCO_3)_2$ (2) $CaCO_3$ (3) CaO (4) Na_2CO_3

Ans. (2)

31. B and C are :

(1) CaO, $Ca(OH)_2$ (2) $Ca(OH)_2$, $CaCO_3$ (3) $CaCO_3$, $Ca(OH)_2$ (4) $Ca(OH)_2$, CaO

Ans. (1)

32. D, E and F are :

(1) NH_3, NH_4Cl, NH_4HCO_3 (2) NH_3, NH_4HCO_3, $NaHCO_3$

(3) NH_4HCO_3, Na_2CO_3, $NaHCO_3$ (4) None

Ans. (2)

Previous Year Exercise

1. Ionic mobility of which of the following alkali metal ions is lowest when aqueous solution of their salts are put under an electric field ? **[NEET- 2017]**

(1) Na (2) K (3) Rb (4) Li

Ans. **(4)**

2. The suspension of slaked lime in water is known as **[NEET-(Phase-2)-2016]**

(1) Limewater (2) Quick lime

(3) Milk of lime (4) Aqueous solution of slaked lime

Ans. **(3)**

3. In context with beryllium, which one of the following statements is incorrect ? **[NEET-(Phase-2)-2016]**

(1) It is rendered passive by nitric acid

(2) It forms Be_2C

(3) Its salts rarely hydrolyze

(4) Its hydride is electron-deficient and polymeric

Ans. **(3)**

4. Which of the following statements is false ? **[NEET- 2016]**

(1) Mg^{2+} ions are important in the green parts of plants

(2) Mg^{2+} ions from a complex with ATP

(3) Ca^{2+} ions are important in blood clotting

(4) Ca^{2+} ions are not important in maintaining the regular beating of the heart

Ans. **(4)**

5. On heating which of the following releases CO_2 most easily ? **[Re-AIPMT-2015]**

(a) $MgCO_3$ (2) $CaCO_3$ (3) K_2CO_3 (4) Na_2CO_3

Ans. **(1)**

6. The function of "Sodium pump" is a biological process operating in each and every cell of all animals. Which of the following biologically important ions is also a constituent of the pump ? **[AIPMT-2015]**

(1) Fe^{2+} (2) Ca^{2+} (3) Mg^{2+} (4) K^+

Ans. **(4)**

7. Solubility of the alkaline earth's metal sulphates in water decreases in the sequence **[AIPMT-2015]**

(1) Ba > Mg > Sr > Ca (2) Mg > Ca > Sr > Ba

(3) Ca > Sr > Ba > Mg (4) Sr > Ca > Mg > Ba

Ans. **(2)**

8. Which one of the alkali metals, forms only, the normal oxide, M_2O on heating in air ? **[AIPMT(Prelims)-2012]**

(1) Li (2) Na (3) Rb (4) K

Ans. **(1)**

9. Equimolar solutions of the following substances were prepared separately. Which one of these will record the highest pH value ? **[AIPMT(Prelims)-2012]**

(1) LiCl (2) $BeCl_2$ (3) $BaCl_2$ (4) $AlCl_3$

Ans. **(3)**

10. Which one of the following compounds has the lowest melting point ? **[AIPMT(Prelims)-2011]**

(1) CaF_2 (2) $CaCl_2$ (3) $CaBr_2$ (4) CaI_2

Ans. **(4)**

11. Which one of the following is present as an active ingredient in bleaching powder for bleaching action ?

[AIPMT(Prelims)-2011]

(1) $CaCl_2$ (2) $CaOCl_2$ (3) $Ca(OCl)_2$ (4) CaO_2Cl

Ans. **(3)**

12. Which of the following statements is incorrect ? **[AIPMT(Prelims)-2011]**

(1) Aluminium reacts with excess NaOH to give $Al(OH)_3$

(2) $NaHCO_3$ on heating gives Na_2CO_3

(3) Pure sodium metal dissolves in liquid ammonia to give blue solution

(4) NaOH reacts with glass to give sodium silicate

Ans. **(1)**

13. Match List-I with List-II for the composition of substances and select the correct answer using the code given below the lists :- **[AIPMT (Mains)-2011]**

List-I (Substances)	**List-II (Composition)**
(A) Plaster of Paris	(i) $CaSO_4.2H_2O$
(B) Epsomite	(ii) $CaSO_4.\frac{1}{2}H_2O$
(C) Kieserite	(iii) $MgSO_4.7H_2O$
(D) Gypsum	(iv) $MgSO_4.H_2O$

Code :

	(A)	(B)	(C)	(D)
(1)	(i)	(ii)	(iii)	(iv)
(2)	(iv)	(iii)	(ii)	(i)
(3)	(iii)	(iv)	(i)	(ii)
(4)	(ii)	(iii)	(iv)	(i)

Ans. **(4)**

14. Which of the following is not hygroscopic– **[AIIMS - 2011]**

(1) NaCl (2) $MgCl_2$ (3) $CaCl_2$ (4) LiCl

Ans. **(1)**

15. Which of the following alkaline earth metal sulphates has hydration enthalpy higher than the lattice enthalpy ?

[AIPMT(Prelims)-2010]

(1) $CaSO_4$ (2) $BeSO_4$ (3) $BaSO_4$ (4) $SrSO_4$

Ans. **(2)**

16. Property of the alkaline earth metals that increases with their atomic number **[AIPMT(Prelims)-2010]**

(1) Solubility of their hydroxides in water (2) Solubility of their sulphates in water

(3) Ionization energy (4) Electronegativity

Ans. **(1)**

17. Which one of the following compounds is a peroxide ? **[AIPMT(Prelims)-2010]**

(1) KO_2 (2) BaO_2 (3) MnO_2 (4) NO_2

Ans. **(2)**

18. The compound A on heating gives a colourless gas and a residue that is dissolved in water to obtain B. Excess of CO_2 is bubbled through aqueous solution of B, C is formed which is recovered in the solid form. Solid C on gentle heating gives back A. The compound is :- **[AIPMT(Mains)-2010]**

(1) $CaCO_3$ (2) Na_2CO_3 (3) K_2CO_3 (4) $CaSO_4.2H_2O$

Ans. **(1)**

19. Which of the following oxides is not expected to react with sodium hydroxide ? **[AIPMT(Prelims)-2009]**

(1) CaO (2) SiO_2 (3) BeO (4) B_2O_3

Ans. **(1)**

20. The alkali metals from salt-like hydrides by the direct synthesis at elevated temperature. The thermal stability of these hydrides decreases in which of the following orders ? **[AIPMT(Prelims)-2008]**

(1) LiH > NaH > KH > RbH > CsH (2) CsH > RbH > KH > NaH > LiH

(3) KH > NaH > LiH > CsH > RbH (4) NaH > LiH > KH > RbH > CsH

Ans. **(1)**

21. In which of the following the hydration energy is higher than the lattice energy ? **[AIPMT(Prelims)-2007]**

(1) $SrSO_4$ (2) $BaSO_4$ (3) $MgSO_4$ (4) $RaSO_4$

Ans. **(3)**

22. The correct order of increasing thermal stability of K_2CO_3, $MgCO_3$, $CaCO_3$ and $BeCO_3$ is **[AIPMT(Prelims)-2007]**

(1) $K_2CO_3 < MgCO_3 < CaCO_3 < BeCO_3$ (2) $BeCO_3 < MgCO_3 < K_2CO_3 < CaCO_3$

(3) $BeCO_3 < MgCO_3 < CaCO_3 < K_2CO_3$ (4) $MgCO_3 < BeCO_3 < CaCO_3 < K_2CO_3$

Ans. **(3)**

23. The correct order of the mobility of the alkali metal ions in aqueous solution is **[AIPMT(Prelims)-2006]**

(1) $Li^+ > Na^+ > K^+ > Rb^+$ (2) $Na^+ > K^+ > Rb^+ > Li^+$

(3) $K^+ > Rb^+ > Na^+ > Li^+$ (4) $Rb^+ > K^+ > Na^+ > Li^+$

Ans. **(4)**

24. The pair whose both species are used in antiacid medicinal preparations is – **[AIIMS - 2006]**

(1) $NaHCO_3$ and $Mg(OH)_2$ (2) Na_2CO_3 and $Ca(HCO_3)_2$

(3) $Ca(HCO_3)_2$ and $Mg(OH)_2$ (4) $Ca(OH)_2$ and $NaHCO_3$

Question asked prior to Medical Ent. Exams. 2005

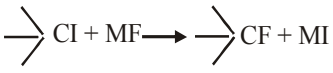
25. In Castner-Kellner cell for production of sodium hydroxide :

(1) Brine is electrolyzed with Pt electrodes (2) Brine is electrolyzed using graphite electrodes

(3) Molten sodium chloride is electrolysed (4) Sodium amalgam is formed at mercury cathode

Ans. **(4)**

26. In the replacement reaction



The reaction will be most favourable if M happens to be

(1) Na (2) K (3) Rb (4) Li

Ans. **(3)**

27. The solubility in water of sulphate down the Be group is Be > Mg > Ca > Sr > Ba. This is due to

(1) Decreasing lattice energy

(2) High heat of solvation for smaller ions like Be^{2+}

(3) Increase in melting points

(4) Increasing molecular weight

Ans. **(2)**

28. The sodium is made by the electrolysis of a molten mixture of about 40% NaCl and 60% $CaCl_2$ because

(1) Ca^{++} can displace Na from NaCl

(2) This mixture has a lower melting point than NaCl

(3) $CaCl_2$ helps in conduction of electricity

(4) Ca^{++} can reduce NaCl to Na

Ans. **(2)**

29. Identify the correct statement

(1) Plaster of Paris can be obtained by hydrocarbon of gypsum

(2) Plaster of Paris is obtained by partial oxidation of gypsum

(3) Gypsum contains a lower percentage of calcium than Plaster of Paris

(4) Gypsum is obtained by heating Plaster of Paris

Ans. **(3)**

30. Calcium is obtained by

(1) Reduction of calcium chloride with carbon

(2) Electrolysis of molten anhydrous calcium chloride

(3) Roasting of limestone

(4) Electrolysis of solution of calcium chloride is H_2O

Ans. **(2)**

31. When a substance (a) reacts with water it produces a combustible gas (b) and a solution of substance (c) in water. When another substance (d) reacts with this solution of (c) it also produces the same gas (b) on warming but (d) can produce gas (b) on reaction with dilute sulphuric acid at room temperature. Substance (a) imparts a deep golden yellow colour to a smokeless flame of Bunsen burner. Then (a), (b), (c) and (d) respectively are

(1) Ca, H_2, $Ca(OH)_2$, Sn

(2) K, H_2, KOH, Al

(3) Na, H_2, NaOH, Zn

(4) CaC_2, C_2H_2, $Ca(OH)_2$, Fe

Ans. **(3)**

ASSERTION & REASON QUESTIONS

These questions consist of two statements each, printed as *Assertion* and *Reason*. While answering these Questions you are required to choose any one of the following four responses.

A. If both *Assertion* & *Reason* are True & the *Reason* is a correct explanation of the *Assertion*.

B. If both *Assertion* & *Reason* are True but *Reason* is not a correct explanation of the Assertion.

C. If *Assertion* is True but the *Reason* is False.

D. If both *Assertion* & *Reason* are False.

1. ***Assertion*** **:** In the solution of K in liquid NH_3, blue colour appears.

Reason **:** K reacts with NH_3 to form KNH_2

Ans. (B)

2. ***Assertion*** **:** Na_2O_2 is coloured and paramagnetic

Reason **:** Na_2O_2 is superoxide

Ans. (D)

3. ***Assertion*** **:** $KHCO_3$ can not be obtained by solvay process.

Reason **:** $KHCO_3$ is less soluble than $NaHCO_3$.

Ans. (C)

4. ***Assertion*** **:** Mg can burn in the atmosphere of N_2.

Reason **:** Mg reacts with N_2 to form nitride.

Ans. (A)

5. ***Assertion*** **:** Li_2SO_4 do not form double salt like alum.

Reason **:** Atomic size of Li is too small.

Ans. (A)

6. ***Assertion*** **:** NaCl when exposed in air it becomes wet.

Reason **:** NaCl contains hygroscopic impurities like $CaCl_2$, $MgCl_2$ etc.

Ans. (A)

7. ***Assertion*** **:** Lithium is most reducing element.

Reason **:** IP of lithium is minimum in the elements.

Ans. (C)

8. ***Assertion*** **:** When cement is mixed with water and left as such, it becomes hard mass.

Reason **:** Setting of cement is exothermic process.

Ans. (B)

9. **Assertion** **:** Beryllium is most reducing s-block element

Reason **:** Hydration energy of Be is greater than its I.P.

Ans. (D)

10. ***Assertion*** **:** Halides of Be dissolve in organic solvents

Reason **:** Atomic size of Be is smallest in the s–block elements.

Ans. (B)

11. ***Assertion*** **:** Be exhibit photoelectric effect.

Reason **:** Be has least IP in the s–block

Ans. (D)

12. **Assertion** **:** Chlorides of Li, Be and Mg are covalent in nature

Reason **:** Li, Be and Mg have large cationic size in the s-block elements

Ans. (C)