

Exercise 2 (Taking It Together)

- Mg* and *Zn* does not resemble in the following properties
 - oxides are amphoteric**
 - carbonates on heating form metal oxides
 - widely used as electrodes
 - used to prevent corrosion
- When Cl_2 is passed into moist slaked lime, compound formed is
 - CaO_2Cl_2
 - CaO_2Cl
 - CaOCl_2**
 - CaCl_2O_4
- A colourless solid (*X*) on heating evolved CO_2 and also gave a white residue, soluble in water. Residue also gave CO_2 when treated with dilute acid. (*X*) is
 - Na_2CO_3
 - CaCO_3
 - $\text{Ca}(\text{HCO}_3)_2$
 - NaHCO_3**
- II A (alkaline earth metals) and IIB (zinc family) resemble
 - $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ is isomorphous with $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$**
 - II A and II B cations are not precipitated by H_2S in acidic medium
 - Both (a) and (b)
 - None of the above
- Be and Al show diagonal relationship hence, both have
 - same degree of electronegativity
 - amphoteric nature of oxides
 - approximately same charge/radius ratio
 - all the properties above**

6. Be and Al do not resemble to
- (a) both become passive on reaction with HNO_3 due to formation of oxide layer
- (b) their chlorides are Lewis bases**
- (c) chlorides exist in polymeric form
- (d) hydroxides are soluble in alkali as well as in acid
7. Going down to IIA group, following properties increase except
- (a) solubility of hydroxides of H_2O
- (b) hydration energy**
- (c) thermal stability of carbonates
- (d) ionic radius
8. Identify the correct statement.
- (a) Gypsum is obtained by heating plaster of Paris.
- (b) Plaster of Paris can be obtained by hydration of Paris.
- (c) Plaster of Paris contains higher percentage of calcium than does gypsum.**
- (d) Plaster of Paris is obtained from gypsum by oxidation.
9. Following are the ionisation potential value of
- (I_1) 899 kJ mol^{-1} , (I_2) 1757 kJ mol^{-1} , (I_3) 15000 kJ mol^{-1} ,
- (a) Na (b) K
- (c) Be** (d) Ne
10. Which is most stable out of the following?
- (a) $[\text{Be}(\text{H}_2\text{O})_4]^{2+}$** (b) $[\text{Mg}(\text{H}_2\text{O})_4]^{2+}$
- (c) $[\text{Ca}(\text{H}_2\text{O})_4]^{2+}$ (d) $[\text{Sr}(\text{H}_2\text{O})_4]^{2+}$
11. Lattice energy of II A group compounds (oxides, carbonates, fluorides)
- (a) decreases (less negative) as size of the ion increase**

(b) increase as size of the ion increases

(c) constant for a given type of anion

(d) All of above are incorrect

12. Which of the following statements are true about II A group elements?

(a) All form nitrides in air

(b) Be is amphoteric

(c) MH_2 is ionic 'salt-like' hydride

(d) All the above are correct statements

13. Choose the incorrect statements.

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

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

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

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

14. Which are true statements about s-block elements?

(a) Metals are obtained by the electrolysis of fused chlorides

(b) Only one type of valency, +1 for I A and +2 for II A, is shown

(c) Oxides are basic except BeO

(d) All the above are correct statements

15. Which cannot be used to generate H_2 ?

(a) $Al + NaOH$

(b) $Zn + NaOH$

(c) $Mg + NaOH$

(d) $LiH + H_2O$

16. Portland cement does not contain

(a) $CaSiO_4$

(b) $CaSiO_3$

(c) $Ca_3Al_2O_6$

(d) $Ca_3(PO_4)_2$

17. Setting of plaster of Paris is

- (a) oxidation with atmospheric oxygen
- (b) combination with atmospheric CO_2
- (c) dehydration
- (d) hydration to yield another hydrate**

18. Mixture of MgCl_2 is called

- (a) Portland cement
- (b) Sorel's cement**
- (c) double salt
- (d) None of these

19. Setting of cement is

- (a) exothermic reaction**
- (b) endothermic reaction
- (c) neither endothermic nor exothermic
- (d) None of the above

20. Which is the main constituent of egg-shell?

- (a) CaSO_3**
- (b) CaSiO_3
- (c) $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$
- (d) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

21. The deliquescent among the following is

- (a) CaCl_2**
- (b) $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$
- (c) $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
- (d) $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$

22. Which is the incorrect statement?

- (a) The heats of hydration of the dispositive alkaline earth metal ions decrease with an increase in their ionic size
- (b) NaNO_3 forms Na_2O on heating**
- (c) Hydration of alkali metal ion is less than that of II A

(d) Alkaline earth metal ions, because of their much larger charge to size ratio, exert a much stronger electrostatic attraction on the oxygen of water molecule surrounding them

23. Which is used for fixing atmospheric nitrogen?

- (a) CaCN_2 (nitrolim) (b) Li_3N
 (c) Mg_3N_2 (d) All of these

24. $\text{BaC}_2 + \text{N}_2 \xrightarrow{\Delta} (A)$

$\text{CaC}_2 + \text{N}_2 \xrightarrow{\Delta} (B)$

(A) and (B) are

- (a) BaCN_2 , CaCN_2 (b) $\text{Ba}(\text{CN})_2$, $\text{Ca}(\text{CN})_2$
 (c) $\text{Ba}(\text{CN})_2$, CaCN_2 (d) None is correct

25. Estimation of calcium and magnesium is done by

- (a) EDTA (b) oxalate
 (c) phosphate (d) None of these

26. Which of the following is/are correct statement(s)?

- (a) $\text{Ca}_3(\text{PO}_4)_2$ in part of bones
 (b) $3\text{Ca}_3(\text{PO}_4)_2 \cdot \text{CaF}_2$ is part of enamel on teeth
 (c) Ca^{2+} ions are important in blood clotting
 (d) All of the above are correct

27. 1 mole of a substance (X) was treated with an excess of water. 2 moles of readily combustible gas were produced along with solution which when reacted with CO_2 gas produced a white turbidity. The substance (X) could be

- (a) Ca (b) CaH_2
 (c) $\text{Ca}(\text{OH})_2$ (d) $\text{Ca}(\text{NO}_3)_2$

28. A basic refractory material among the following is

- (a) Al_2O_3 (b) SiO_2

(c) Fe_2O_3 (d) CaO

29. In water

(a) temporary hardness is due to the bicarbonates of Ca^{2+} and Mg^{2+} (b) permanent hardness is due to chlorides and sulphates of Ca^{2+} and Mg^{2+}

(c) hardness can be removed by adding phosphates

(d) All of the above properties are true30. $\text{Na}_2[\text{Be}(\text{OH})_4]$ is formed when(a) BeO reacts with NaOH solution(b) Be reacts with NaOH solution**(c) Both (a) and (b) correct**

(d) None of the above is correct

31. Which is used to treat acid indigestion?

(a) $\text{Be}(\text{OH})_2$ (b) KOH **(c) $\text{Mg}(\text{OH})_2$** (d) $\text{Ca}(\text{OH})_2$ 32. Which is not obtained when metal carbides react with H_2O ?**(a) $\text{Al}_4\text{C}_3 + \text{H}_2\text{O} \rightarrow \text{CH}\equiv\text{CH}$** (b) $\text{CaC}_2 + \text{H}_2\text{O} \rightarrow \text{CH}\equiv\text{CH}$ (c) $\text{Mg}_4\text{C}_3 + \text{H}_2\text{O} \rightarrow \text{CH}_3 \equiv \text{CH}$ (d) $\text{Be}_2\text{C} + \text{H}_2\text{O} \rightarrow \text{CH}_4$

33. Select the correct statements (s)

(a) Beryllium and magnesium hydride are covalent and polymeric

(b) CaH_2 , SrH_2 and BaH_2 are ionic(c) BeH_2 contains three-centre two-electron bond**(d) All the above are correct statements**

34. Select the correct statements(s).

(a) CaCO_3 is more soluble in a solution of CO_2 than in H_2O

(b) NaCO_3 is converted into Na_2O and CO_2 on heating

(c) Li_2CO_3 is thermally stable

(d) Presence of CaCl_2 or CaSO_4 in water causes temporary hardness

35. Select the correct statements(s)

(a) Mg^{2+} ions are necessary for the activation of phosphate transfer enzymes.

(b) Mg is present in chlorophyll used in photosynthesis in green plants

(c) Operation of $\text{Na}^+ - \text{K}^+$ pumps is biological

(d) All the above are correct statements

36. A metal M readily forms water soluble MSO_4 . It also forms oxide MO which becomes inert on heating. Hydroxide $\text{M}(\text{OH})_2$ is insoluble in water but soluble in NaOH solution. What is M?

(a) Mg

(b) Ba

(c) Ca

(d) Be

37. Which one of the following has magnesium?

(a) Vitamin B_{12}

(b) Chlorophyll

(c) Haemocyanin

(d) Carbonic anhydrase

38. In which of the following the hydration energy is higher than the lattice energy?

(a) BaSO_4

(b) MgSO_4

(c) RaSO_4

(d) SrSO_4

39. Epsom salt is

(a) $\text{BaSO}_4 \cdot 2\text{H}_2\text{O}$

(b) CaSO_4

(c) $\text{MgSO}_4 \cdot 2\text{H}_2\text{O}$

(d) MgSO_4

40. Slaked lime and chlorine reacts to produce
- (a) quick lime
 - (b) CaCl_2
 - (c) CaOCl_2
 - (d) mixture of CaCl_2 and Ca(OCl)_2**
41. Mg and Li are similar in their properties due to
- (a) same e/m ratio
 - (b) same electron affinity
 - (c) same group
 - (d) same radius**
42. Which one of the following hydroxide is insoluble in water?
- (a) Ca(OH)_2
 - (b) Ba(OH)_2
 - (c) Be(OH)_2**
 - (d) Mg(OH)_2
43. The pair of amphoteric hydroxide is
- (a) Al(OH)_3 , LiOH
 - (b) Be(OH)_2 , Mg(OH)_2
 - (c) B(OH)_3 , Be(OH)_2
 - (d) Be(OH)_2 , Zn(OH)_2**
44. The pair whose both species are used in antacid medicinal preparation is
- (a) NaHCO_3 and Mg(OH)_2**
 - (b) Na_2CO_3 and $\text{Ca(HCO}_3)_2$
 - (c) $\text{Ca(HCO}_3)_2$ and Mg(OH)_2
 - (d) Ca(OH)_2 and NaHCO_3
45. Lithopone is a mixture of
- (a) ZnCO_3 , BaCO_3
 - (b) ZnS , Na_2SO_4
 - (c) ZnSO_4 , BaSO_4
 - (d) ZnS , BaSO_4**
46. Gypsum is
- (a) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$**
 - (b) $\text{CaCO}_3 \cdot 2\text{H}_2\text{O}$

(c) $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$ (d) SiO_2

47. Alkaline earth metals are

(a) **reducing agent** (b) dehydrating agent
(c) amphoteric (d) oxidising agent

48. A covalent chloride is

(a) **BeCl_2** (b) NaCl
(c) MgCl_2 (d) CaCl_2

49. Plaster of Paris is hardened by

(a) giving out water (b) **uniting with water**
(c) changing into CaCO_3 (d) liberating CO_2

50. Which of the following halide of calcium is insoluble in water?

(a) CaCl_2 (b) Cl_2
(c) **CaF_2** (d) CaBr_2

51. The substance used as a pigment in paint is

(a) borax (b) alumina
(c) **lithopone** (d) None of these

52. Lightest alkaline earth metal is

(a) Be (b) Mg
(c) **Ca** (d) Sr

53. Which of the following is not an ore of magnesium?

(a) Carnallite (b) Magnesite
(c) Dolomite (d) **Gypsum**

54. The activity of alkaline earth metals as reducing agent
- (a) decreases from Be to Ba
 - (b) increases from Be to Ba**
 - (c) increase from Be to Ca and decreases from Ca to Ba
 - (d) decreases from Be to Ca and increases from Ca to Ba
55. Magnalium contains
- (a) aluminium + magnesium**
 - (b) magnesium + copper
 - (c) magnesium + iron
 - (d) magnesium + silver
56. Be in BeCl_2 undergoes
- (a) linear hybridisation**
 - (b) trigonal hybridisation
 - (c) tetrahedral hybridisation
 - (d) no hybridisation
57. CaCl_2 is used as
- (a) disinfectant
 - (b) desiccant agent**
 - (c) medicine
 - (d) None of these
58. The product obtained on fusion of BaSO_4 and Na_2SO_4 is
- (a) BaCO_3
 - (b) BaO**
 - (c) Ba(OH)_2
 - (d) BaHSO_4
59. Which of the following is known as dead burnt?
- (a) Gypsum
 - (b) Plaster of Paris
 - (c) Anhydrite**
 - (d) None of these
60. The decomposition temperature is maximum for
- (a) MgCO_3
 - (b) CaCO_3

(c) BaCO_3

(d) SrCO_3

61. Bleaching powder loses its power on keeping for a long time because

(a) it changes into calcium hypochlorate

(b) it changes into calcium chloride and calcium hydroxide

(c) it absorbs moisture

(d) it changes into calcium chloride and calcium chlorate

62. Among Na^+ , Na, Mg and Mg^{2+} the largest particle is

(a) Mg^{2+}

(b) Mg

(c) Na

(d) Na^+

63. The electron affinity of Be is similar to

(a) He

(b) B

(c) Li

(d) Na

64. Bleaching action of CaOCl_2 is due to

(a) nascent oxygen

(b) chlorine

(c) HClO

(d) HCl

65. In alkaline earth metal sulphates, the value of hydration energy decreases down the group because of the

(a) decrease in size

(b) increase in size

(c) greater lattice energy

(d) None of these

66. The correct order of increasing ionic character is

(a) $\text{BeCl}_2 < \text{MgCl}_2 < \text{CaCl}_2 < \text{BaCl}_2$

(b) $\text{BeCl}_2 < \text{MgCl}_2 < \text{BaCl}_2 < \text{CaCl}_2$

(c) $\text{BeCl}_2 < \text{BaCl}_2 < \text{MgCl}_2 < \text{CaCl}_2$

(d) $\text{BeCl}_2 < \text{CaCl}_2 < \text{MgCl}_2 < \text{BaCl}_2$

67. Ripening of fruits can be carried out in presence of
- (a) Na_2SO_4 (b) NaCl
(c) CaCl_2 (d) **Ca_2C_2**
68. The right order of the solubility of sulphates of alkaline earth metals in water
- (a) $\text{Be} > \text{Ca} > \text{Mg} > \text{Ba} > \text{Sr}$
(b) $\text{Mg} < \text{Be} > \text{Ba} > \text{Ca} > \text{Sr}$
(c) **$\text{Be} < \text{Mg} > \text{Ca} > \text{Sr} > \text{Ba}$**
(d) $\text{Mg} < \text{Ca} > \text{Ba} > \text{Be} > \text{Sr}$
69. Burning of Mg is extinguished by
- (a) throwing N_2 liquid
(b) throwing sand
(c) **throwing ice**
(d) throwing water
70. Flame test is not given by
- (a) Ca (b) Ba
(c) **Mg** (d) Li
71. Lithium shows similarities with magnesium in its chemical behavior because
- (a) similar size, greater electronegativity and lower polarizing power
(b) similar size, same electronegativity and similar high polarizing power
(c) **similar size, same electronegativity and similar high polarizing power**
(d) None of the above
72. The element whose electronic configuration is $1s^2 2s^2 2p^6 3s^2$ is
- (a) non-metal (b) noble gas
(c) metalloid (d) **metal**

73. On strong heating $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$ the product obtained is
- (a) MgCl_2 (b) MgO
(c) $\text{MgCl}_2 \cdot 2\text{H}_2\text{O}$ (d) $\text{MgCl}_2 \cdot 4\text{H}_2\text{O}$
74. Which of the following carbonate decompose most easily on heating?
- (a) Rb_2CO_3 (b) K_2CO_3
(c) Na_2CO_3 (d) MgCO_3
75. The solubilities of carbonates decrease down the magnesium group due to a decrease in
- (a) lattice energies of solids
(b) hydration energies of cations
(c) interionic attraction
(d) entropy of solution formation
76. The charge/size ration of a cation determines its polarizing power. Which one of the following sequences represents the increasing order of the polarizing power of cationic species; K^+ , Ca^{2+} , Mg^{2+} , Be^{2+} ?
- (a) $\text{Mg}^{2+} < \text{Be}^{2+} < \text{K}^+ < \text{Ca}^{2+}$
(b) $\text{Be}^{2+} < \text{K}^{2+} < \text{Ca}^{2+} < \text{Mg}^{2+}$
(c) $\text{K}^+ < \text{Ca}^{2+} < \text{Mg}^{2+} < \text{Be}^{2+}$
(d) $\text{Ca}^{2+} < \text{Mg}^{2+} < \text{Be}^{2+} < \text{K}^+$
77. What is impurity (as a salt) associated with table salt obtained from sea-water?
- (a) NaHCO_3 (b) MgCO_3
(c) MgCl_2 (d) NaI
78. Select the correct statements(s)
- (a) Presence of MgCl_2 in table salt causes it to clump
(b) Addition of NaHCO_3 to table salt converts MgCl_2 to non-hygroscopic salt
(c) Both (a) and (b)

(d)None of the above

79. In polymeric $(\text{BeCl}_2)_n$, there are

(a)three centre two-electron bonds

(b)three centre three-electron bonds

(c)two centre three-electron bonds

(d)two centre two-electron bonds

80. Be and Al resemble in the following but not in

(a)both form electron deficient hydrides

(b)both are rendered passive by HNO_3

(c)both form amphoteric oxides

(d)both have sp-hybridisation in their compounds