P BLOCK ELEMENTS

1) Which one of the halogen acids is a liquid

1) HBr 2) HCl 3) HI 4) HF

Sol.:(4)

HF is liquid because of intermolecular H-Bonding.

2) The one which does not form pentachloride is

1) Phosphorous 2) Nitrogen 3) Arsenic 4) Antimony

Sol.:(2)

Nitrogen cannot expand its valency to five due to absence of d-orbits in its valence shell.

3) Colour of iodine solution is disappeared by shaking it with aqueous solution of

1) Na_2S 2) H_2SO_4 3) $Na_2S_2O_3$ 4) Na_2SO_4

Sol.:(3)

$2Na_2S_2O_3 + I_2 \rightarrow 2NaI + Na_2S_4O_6$

4) A quick supply of Cl_2 gas may be made by reacting crystals of $KMnO_4$ with a concentrated solution of

1) Bleaching powder 2) Sodium chloride 3) Hydrochloric acid 4) Potassium chloride

Sol.:(3)

$2KCl + 2MnCl_2 + 5Cl_2 + 8H_2O$

5) Which is the most volatile compound

1) HI 2) HCl 3) HF 4) HBr

Sol.:(2)

Hybride: HF HCl HBr HI

B.pt(in K): 293 189 206 238

Because of having low boiling point HCl is more volatile.

6) Nitrogen is relatively inert element because

1) Dissociation energy of its molecule is fairly large

2) Its atom has relatively stable electronic configuration

3) Its electronegativity is fairly high

4) It has smaller atomic radius

Sol.: (1)

Dissociation energy of N_2 molecule is very high due to triple bond holding the two atoms.

7) Phosgene is the common name of

1) Phosphine

2) Carbonyl chloride

3) Phosphorous oxychloride

4) Phosphorous trichloride

Sol.: (2)

$$CHCl_3 + \frac{1}{2}O_2 \rightarrow \underset{\substack{Phosgene\ or \\ carbonyl\ chloride}}{COCl_2} + HCl$$

8) Bad conductor of electricity is

1) H_2F_2 2) HBr 3) HI 4) HCl

Sol.:(1)

Due to H- Bonding free ions are not present in aqueous Solution. Hence, bad conductor.

9) When Cl_2 gas is passed through hot and concentrated solution of KOH, following compound is formed

1) KCl 2) $KClO_2$ 3) $KClO_4$ 4) $KClO_3$

Sol.: (4)

$$6KOH + 3Cl_2 \rightarrow 5KCl + KClO_3 + 3H_2O$$

10) A solution containing NH_4Cl and $NaNO_2$ on boiling produces

1) Nitrogen peroxide 2) Nitrogen 3) Nitrous oxide 4) Ammonia

Sol.:(2)

$NaNO_2 + NH_4Cl \rightarrow NaCl + N_2 + 2H_2O$

11) Which compound of lead is generally used in white paints?

1)PbS 2) $PbCO_3.Pb(OH)_2$ 3) PbO_2 4) $PbCl_2$

Sol.: (2)

$PbCO_3.Pb(OH)_2$ is called white lead and is used in white paints

12) Which of the following has greatest reducing power?

1) HCl 2) HBr 3) HF 4) HI

Sol.:(4)

HI is the strongest reducing agent among halogen acids because of lowest bond dissociation energy.

13) When KBr is treated with concentrated H_2SO_4 reddish brown gas evolved, gas is

1) HBr 2) Bromine

3) Mixture of bromine and HBr 4) None of these

Sol.:(2)

$2KBr + 3H_2SO_4 + MnO_2 \xrightarrow{\Delta} 2KHSO_4 + MnSO_4 + 2H_2O + Br_2$

14) Which of the following is obtained when N_2 reacts with calcium carbide?

1) Calcium cyanate 2) Calcium carbonate 3) Calcium cyanamide 4) Calcium acetate

Sol.:(3)

$CaC_2 + N_2 \rightarrow \underset{calcium\ cyananide}{CaCN_2} + C$

15) Strongest hydrogen bonding is shown by

1) Ammonia 2) Hydrogen fluoride

3) Water 4) Hydrogen sulphide

Sol.: (2)

F—H….. F hydrogen bond is the strongest because of high electronegativity and small atomic size of fluorine.

16) Which element has maximum number of isotopes?

1) Carbon 2) Lead 3) Tin 4) Hydrogen

Sol.:(3)

Tin element has as many as 8 isotopes.

17) Nitric acid converts iodine into

1) Iodine nitrate 2) Hydroiodic acid 3) Iodic acid 4) Iodine pentaoxide

Sol.: (3)

$I_2 + 10HNO_3 \rightarrow 2HIO_3 + 10NO_2 + 4H_2O$

18) In the manufacture of bromine from sea water, the mother liquor containing bromides is treated with

1) SO_2 2) CO_2 3) I_2 4) Cl_2

Sol.:(4)

$MgBr_2 + Cl_2 \rightarrow MgCl_2 + Br_2$

19) Which one of the following substances is used in the laboratory for fast drying of neutral gases?

1) Na_3PO_4 2) Phosphorous pentoxide

3) Anhydrous calcium chloride 4) Active charcoal

Sol.: (2)

Phosphorus pentoxide is very good drying agent for neutral gases

20) Bromine is liberated when an aqueous solution of potassium bromide is treated with

1) I_2 2) dil. H_2SO_4 3) Cl_2 4) SO_2

Sol.: (3)

$Cl_2 + 2KBr \rightarrow 2KCl + Br_2$

A more electronegative halogen can displaces less electronegative halogen.

21) Which of the following halides group 15 element does not exist?

1) NCl_3 2) $BiCl_3$ 3) PCl_5 4) $BiCl_5$

Sol.:(4)

$BiCl_5$ does not exist. Bi does not have O.N of +5 due to inert pair effect.

22) When chlorine water is exposed to sunlight, O_2 is liberated. Hence,

1) Hydrogen has little affinity to O_2

2) Hydrogen has more affinity to O_2

3) It is a reducing agent

4) Hydrogen has more affinity to Cl_2

Sol.:(4)

$$H_2O + \underset{exposed\ air}{Cl_2} \rightarrow HCl + HClO$$

$$HClO \rightarrow HCl + [O] \quad or \quad 2HClO \rightarrow 2HCl + O_2$$

23) Which of the following forms of phosphorous is most stable?

1) Red 2) Black

3) White 4) All are equally stable

Sol.:(1)

Red phosphorus is thermodynamically most stable.

24) The correct order of thermal stability of hydrogen halides (H – X) is

1) HF > HCl > HBr > HI

2) HI > HCl < HF < HBr

3) HCl < HF < HBr < HI

4) HI > HBr > HCl > HF

Sol.: (1)

HF > HCl > HBr > HI (Thermal stability)

25) The electrolysis of a certain liquid resulted in the formation of hydrogen at the cathode and chlorine at the anode. The liquid is

1) Pure water

2) NaCl solution in water

3) $CuCl_2$ solution in water

4) H_2SO_4 solution

Sol.:(2)

$$2NaCl + 2H_2O \rightarrow 2NaOH + \underset{anode}{Cl_2} + \underset{cathode}{H_2}$$

26) Elements of which of the following groups will form anions most readily?

1) Alkali metals 2) Nitrogen group 3) Halogens 4) Oxygen group

Sol.: (3)

Halogens have highest electron affinity

27) Which of the following element forms $p_\pi - d_\pi$ bonding in its oxide?

1) Lithium 2) Nitrogen 3) Boron 4) Sulphur

Sol.:(4)

Among the given elements sulphur forms $d\pi - p\pi$ bonding in its oxides such as SO_2 and SO_3

28) When cold NaOH reacts with Cl_2 which of the following is formed

1) $NaClO_2$ 2) NaClO 3) $NaClO_3$ 4) None of these

Sol.:(2)

$2NaOH + Cl_2 \rightarrow NaClO + NaCl + H_2O$

29) H_3PO_2 is the molecular formula of an acid of phosphorous. Its name and basicity respectively are

1) Hypo phosphoric acid and two
2) Hypo phosphorous acid and two
3) Phosphorous acid and two
4) Hypo phosphorous acid and one

Sol.: (4)

Hypophosphorus acid (H_3PO_2) has only one -OH group and hence is monobasic

30) When I_2 is dissolved in CCl_4, the colour that results is

1) Brown
2) colourless
3) Violet
4) Bluish green

Sol.:(3)

$2NaI + Cl_2 \rightarrow 2KCl + I_2$

$CCl_4 + I_2 \rightarrow$ Violet colour

31) Which of the following is formed when phosphoric acid is heated to 600°C ?

1) PH_3 and P_2
2) P_2O_5 and H_2O
3) $H_4P_2O_7O_5$
4) HPO_3

Sol.: (4)

$H_3PO_4 \rightarrow HPO_3 + H_2O$

32) Which of the following gives nitrogen on heating?

1) $NaNO_2$
2) NH_4NO_2
3) Ba $(NO_2)_2$
4) $AgNO_2$

Sol.:(2)

$NH_4NO_2 \rightarrow N_2 + 2H_2O$

33) Which of the following hydrogen halides has the highest boiling point?

1) HBr
2) HF
3) HI
4) HCl

Sol.:(2)

In HF the molecules aggregate because of intermolecular hydrogen bonding. Hence it has highest boiling point.

34) Oleum is a solution of

1) NO_2 in HNO_3 2) SO_3 in H_2SO_4 3) SO_2 on H_2SO_4 4) NO in HNO_4

Sol.: (2)

Oleum is conc. H_2SO_4 containing excess dissolved SO_3. Its formula is $H_2S_2O_7$

35) The solubility of iodine in water increases in the presence of

1) Sodium hydroxide 2) Chloroform 3) Potassium iodide 4) Alcohol

Sol.: (3)

Iodine has the least affinity for water and is only slightly soluble in it. However, it dissolves in 10% aq. Solution of KI due to the formation of a complex ion i.e. I_3^-.

$I_2 + KI \rightleftharpoons KI_3 \quad or \quad I_2 + I^- \rightleftharpoons I_3^- \ (complex\ ion)$

36) Which of the following is both oxidizing and reducing agent?

1) HNO_3 2) HCl 3) HNO_2 4) H_2SO_4

Sol.: (3)

HNO_2 can be oxidized to HNO_3 and can be reduced to NO or N_2

37) A gas reacts with CaO, but not with $NaHCO_3$. The gas is

1) Cl_2 2) N_2 3) CO_2 4) O_2

Sol.:(1)

$CaO + Cl_2 \rightarrow CaOCl_2$

$NaHCO_3 + Cl_2 \rightarrow$ No reaction

38) Which of the following hydride is most acidic?

1) H_2O 2) H_2Se 3) H_2Te 4) H_2S

Sol.:(3)

Acidic character of hybrides of group – 16 element increases on descending the group.

39) White enamel of our teeth is

1) $CaCl_2$ 2) CaF_2 3) $Ca_3(PO_4)_2$ 4) $CaBr_2$

Sol.:(2)

The enamel of our teeth is the hardest substance in the body made up of CaF_2 and dentine below it made of $Ca_3(PO_4)_2$.

40) Oxygen and sulphur have same

1) Outer electronic configuration 2) Electron affinity

3) Electronic configuration 4) Atomic size

Sol.: (1)

Oxygen and sulphur belong to the same group and hence have similar outershell electronic configuration.

41) When chlorine is passed over dry slaked lime at room temperature, the main reaction product is

1) $Ca(OCl_2)_2$ 2) $Ca(ClO_2)_2$ 3) $CaOCl_2$ 4) $CaCl_2$

Sol.:(3)

$\underset{slaked\ lime}{Ca(OH)_2} + Cl_2 \rightarrow CaOCl_2 + H_2O$

42) Which of the following will not occur?

1) $CuO + H_2 \rightarrow Cu + H_2O$ 2) $Cu + 2AgNO_3 \rightarrow Cu(NO_3)_2 + 2Ag$

3) $2KBr + I_2 \rightarrow 2KI + Br_2$ 4) $Fe + H_2SO_4 \rightarrow FeSO_4 + H_2$

Sol.:(3)

Electronegativity of I_2 is less than Br_2. Therefore unable to displace bromine.

43) Which of the following processes does not involve a catalyst?

1) Haber's process 2) Thermite process

3) Ostwald process 4) Contact process

Sol.:(2)

The catalyst is a substance, which lowers the activation energy of reaction because it provides an alternate pathway for reaction. Generally, catalyst increases the speed of a reaction.

The reaction involved in the thermite process is as follows:

$4Al+2Cr_2O_3 \rightarrow 2Al_2O_3+4Cr$ is itself a very fast reaction.
Apart from this, all processes are catalyzed.

44) The element which forms oxides in all oxidation state +I to +V is

1) P 2) N 3) As 4) Sb

Sol.: (2)

N forms oxides in all oxidation states from +I to +V

N_2O, NO, N_2O_3, NO_2, N_2O_5

45) Which hydrogen compound of nitrogen acts as acid?

1) N_2H_4 2) NH_3 3) HN_3 4) None of these

Sol.:(3)

HN_3 is hydrazoic acid and forms corresponding azides

46) When ammonia is passed over heated CuO, it is oxidized to

1) NO_2 2) N_2 3) N_2O 4)HNO_2

Sol.:(2)

$2NH_3 + 3CuO \rightarrow N_2 + 3H_2O + 3Cu$

47) The least active halogen with hydrogen is

1) I 2) Br 3) Cl 4) F

Sol.:(1)

As the electronegativity decreases reactivity also decreases

48) Basicity of orthophosphoric acid is

1) 1 2) 2 3) 3 4) 5

Sol.:(3)

Orthophosphoric acid contains three — OH group and gives three H^+ ions per molecule on compelte dissociation.

49) A solution of HCl in water is good conductor while gaseous hydrogen chloride is not. This is due to the reason that

1) HCl in water ionises

2) Water is a good conductor of electricity

3) Gas cannot conduct electricity but water can

4) None of these

Sol.:(1)

$$HCl \xrightarrow{H_2O} \underset{aq}{H^+} + \underset{(aq)}{Cl^-}$$

50) Which one of the following nitrogen oxides is the anhydride of nitrous acid?

1) N_2O 2) NO_2 3) N_2O_5 4) N_2O_3

Sol.:(4)

Two oxides of nitrogen are acid anhydrides; that is, they react with water to form nitrogen-containing oxyacids. Dinitrogen trioxide (N_2O_3) is the anhydride of nitrous acid, HNO_2, and dinitrogen pentoxide(N_2O_5) is the anhydride of nitric acid, HNO_3.