1. A gas that cannot be collected over water is

(a) N_2 (b) O_2

(c) SO_2 (d) PH_3

2. Sulphur on boiling with $NaOH$ solution gives

(a) $Na_2S_2O_3 + NaHSO_3$ (b) $Na_2S_2O_3 + Na_2S$

(c) $Na_2SO_3 + H_2S$ (d) $Na_2SO_3 + SO_2$

3. The most efficient agent for the absorption of SO_3 is

(a) $80\%\ H_2SO_4$ (b) $98\%\ H_2SO_4$

(c) $50\%\ H_2SO_4$ (d) $20\%\ H_2S_2O_7$

4. Conc. H_2SO_4 is diluted

(a) By adding water in H_2SO_4

(b) By adding H_2SO_4 in water

(c) By adding glacial acetic acid in H_2SO_4

(d) None of the above

5. The smog is essentially caused by the presence of

(a) Oxides of sulphur and nitrogen

(b) O_2 and N_2

(c) O_2 and O_3

(d) O_3 and N_2

6. Bleaching action of SO_2 is due to its

(a) Oxidising property (b) Acidic property

(c) Basic property (d) Reducing property

7. Sulphur in +3 oxidation state is present in

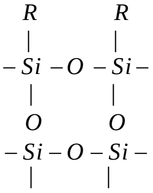
(a) Sulphurous acid (b) Pyrosulphuric acid

(c) Dithionous acid (d) Thiosulphuric acid

8. Oncontrolled hydrolysis and condensation, R_3SiCl yields

(a) $R_3Si-O-SiR_3$ (b) $\left(R_3Si-O-SiR_3 \right)_n$

(c) R_3SiOH (d)



9. Ozone deplict due to the formation of following compound in Antarctica

(a) Acrolein (b) Peroxy acetyl nitrate

(c) SO_2 and SO_3 (d) Chlorine nitrate

(e) Formaldehyde

10. Unlike other halogens fluorine does not show higher oxidation states because
(a) It is highly electronegative
(b) It has no *d*-orbitals
(c) Its atomic radius is very small
(d) The F^- ion is stable and isoelectronic with neon

11. Fluorine is prepared by
(a) Oxidation of HF
(b) Electrolysis of KF
(c) Electrolysis of fused KHF_2
(d) Decomposition of HgF_2

12. The alkali metal halides are soluble in water but LiF is insoluble because
(a) It is amphoteric
(b) The $Li-F$ bond is highly ionic
(c) Its lattice energy is high
(d) Li^+ ion is least hydrated

13. Which of the following halogens does not form oxyacid
(a) Fluorine (b) Chlorine
(c) Bromine (d) Iodine

14. Which of the following is used in the preparation of chlorine
(a) $Only\ MnO_2$
(b) $OnlyKMnO_4$
(c) Both MnO_2 and $KMnO_4$
(d) Either MnO_2 or $KMnO_4$

15. Which of the following properties increases on going down from F to I in Group VII-A of the periodic table ?
(a) Electronegativity (b) Volatile nature
(c) Ionic radius (d) Oxidising power

16. When I_2 is passed through *KCl, KF* and *KBr* solutions
(a) Cl_2 and Br_2 are evolved
(b) Cl_2 is evolved
(c) Cl_2, Br_2 and F_2 are evolved
(d) None of these

17. Which of the hydrogen halides forms salts like KHX_2 (where *X* is a halogen atom)
(a) *HF* (b) *HCl*
(c) *HI* (d) *HBr*
(e) All of these

18. Of the following acids, the one that is strongest is
(a) $HBrO_4$ (b) $HOCl$

(c) HNO_2 (d) H_3PO_3

19. I_2 dissolves in KI solution due to the formation of

(a) KI_2 and I^- (b) K^+, I^- and I_2

(c) KI_3^- (d) None of these

20. Noble gases do not react with other elements because

(a) They have completely paired up and stable electron shells

(b) The sizes of their atoms are very small

(c) Are not found in abundance

(d) Are monoatomic

21. Which one of the following noble gases is the least polarizable

(a) Xe (b) Ar

(c) Ne (d) He

22. Which of the following statements is not correct for a noble gas

(a) Ar is used in electric bulbs

(b) Kr is obtained during radioactive disintegration

(c) Half life of Rn is only 3.8 days

(d) He is used in producing very low temperature

23. Which one of the following configuration represents a noble gas

(a) $1s^2,\ 2s^2 2p^6,\ 3s^2$

(b) $1s^2,\ 2s^2 2p^6,\ 3s^1$

(c) $1s^2,\ 2s^2 2p^6$

(d) $1s^2,\ 2s^2 2p^6,\ 3s^2 3p^6,\ 4s^2$

24. Which of the following has zero valency

(a) Sodium (b) Beryllium

(c) Aluminium (d) Krypton

25. The forces acting between noble gas atoms are

(a) Vander Waals forces

(b) Ion-dipole forces

(c) London dispersion forces

(d) Magnetic forces

26. Which of the following has sp^3 hybridisation

(a) XeO_3 (b) BCl_3

(c) XeF_4 (d) BBr_3

27. Which of the following are formed by Xenon

(a) XeF_3 (b) XeF_4

(c) XeF_5 (d) XeF_6

28. Which of the following gas is/are called rare gas

(a) *Ne* (b) *He*

(c) *Kr* (d) All of these

29. Which of the following inert gas liquifies easily

(a) *Kr* (b) *He*

(c) *Ne* (d) *Ar*

30. Which of the following is an inert gas

(a) H_2 (b) O_2

(c) N_2 (d) Argon

1. (c) SO_2 is soluble in water

$$H_2O + SO_2 \rightarrow \underset{\text{Sulphurus acid}}{H_2SO_3}$$

2. (b) $3S + 4\,NaOH \xrightarrow{\text{boiling}} Na_2S_2O_3 + Na_2S$

3. (b) 98% H_2SO_4 is used for absorbing dense fog of acid which is formed by dissolving SO_3 in water. Hence 98% H_2SO_4 is the most efficient agent for the absorption of SO_3.

4. (b) Concentrated H_2SO_4 is diluted by adding the conc. H_2SO_4 in the water drop by drop with constant stirring because it is an exothermic reaction and by doing so heat is generated slowly and dissipated in the atmosphere.

5. (a) Photochemical smog is caused by oxides of sulphur and nitrogen.

6. (d) SO_2 act as bleaching agent due to its reducing property.

$$SO_2 + 2H_2O \rightarrow H_2SO_4 + 2H$$

Coloured matter $+H \rightarrow$ Colourless matter

7. (c) Dithionous acid $(H_2S_2O_4)$ has sulphur in +3 oxidation state.

$$HO - \overset{\overset{O}{\|}}{S} - \overset{\overset{O}{\|}}{S} - OH \;;\; 2(+1) + 2x + 4(-2) = 0$$

$$2x = 8 - 2 = 6\;;\; x = +3$$

8. (a) R_3SiCl on hydrolysis forms only a dimer.

$$R_3SiOH + HOSiR_3 \rightarrow R_3Si - O - SiR_3.$$

9. (d) Formation of chlorine nitrate is the main cause of ozone depliction.

10. (B)

11. (c) $KHF_2 \rightarrow KF + HF$

$$KF \rightarrow K^+ + F^-$$

At cathode : $K^+ + e^- \rightarrow K$

$$2K + 2HF \rightarrow 2KF + H_2$$

At anode : $F^- \rightarrow F + e^-$

$$F + F \rightarrow F_2$$

12. (c) Small atomic size of *Li* and *F* lattice energy is highest.

13. (a) Fluorine does not form oxyacids because it is more electronegative than oxygen.

14. (c) $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$

$$2KMnO_4 + 3H_2SO_4 + 10\,HCl \rightarrow$$

$$K_2SO_4 + 2MnSO_4 + 8H_2O + 5Cl_2$$

15. (c) Ionic radius increases on going down the group because no. of shells increases.

16. (d) Upper halogen can replace lower halogen from their compounds solution.

17. (a) Due to highest electronegativity of fluorine the anion $[F---H-F]^-$ exists as a result of strong hydrogen bond by which K^+ associate to form KHF_2.

18. (a) Oxidation number of $HBrO_4$ is more than that of $HOCl$, HNO_2 and H_3PO_3 so it is the strongest acid among these.

19. (c) I_2 forms complex ion I_3^- in KI solution due to which it dissolves in it.

20. (A)

21. (d) *He* is least polarizable because of small atomic size.

22. (B)

23. (c) $1s^2\ 2s^2\ 2p^6 \rightarrow$ Neon

24. (D)

25. (A)

26. (a) XeO_3 shows sp^3 hybridization.

27. (b) XeF_2, XeF_4, XeF_6.

28. (d) *He*, *Ne*, and *Kr* all are found in very little amount in atmosphere, so all are called rare gas.

29. (a) The maximum temperature at which gas can be liquified is called its critical temperature. The gas which have high boiling point will change into liquid first and so critical temperature of the gas will be more.

$T_C \propto$ B.P. and B.P. $\propto$ Molecular weight

So *Kr* liquifies first.

30. (D)