1. Carbon and silicon belong to (IV) group. The maximum coordination number of carbon in commonly occurring compounds is 4, whereas that of silicon is 6. This is due to
   (a) Large size of silicon
   (b) More electropositive nature of silicon
   (c) Availability of low lying *d*-orbitals in silicon
   (d) Both (a) and (b)

2. The ionic carbide is
   (a) ZnC (b) TiC
   (c) SiC (d) CaC_2

3. Which one of the following statements is not correct
   (a) Zinc dissolves in sodium hydroxide solution
   (b) Carbon monoxide reduces iron (III) oxide to iron
   (c) Mercury (II) iodide dissolves in excess of potassium iodide solution
   (d) Tin (IV) chloride is made by dissolving tin solution in concentrated hydrochloric acid

4. In laboratory silicon can be prepared by the reaction
   (a) By heating carbon in electric furnace
   (b) By heating potassium with potassium dichromate
   (c) Silica with magnesium
   (d) None of these

5. Metalloid among the following is
   (a) Si (b) C
   (c) Pb (d) Ge

6. Colour is imported to glass by mixing
   (a) Synthetic dyes (b) Metal oxide
   (c) Oxides of non-metal (d) Coloured salt

7. Plumbosolvancy implies dissolution of lead in
   (a) Bases (b) Acids
   (c) Ordinary water (d) $CuSO_4$ sol

8. Which of the following glass is used in making wind screen of automobiles
   (a) Crook's (b) Jena
   (c) Safety (d) Pyrex

9. Glass reacts with HF to produce
   (a) SiF_4 (b) H_2SiF_6
   (c) H_2SiO_3 (d) Na_3AlF_6

10. When carbon monoxide is passed over solid caustic soda heated to 200^oC, it forms
   (a) Na_2CO_3 (b) $NaHCO_3$
   (c) $H-COONa$ (d) CH_3COONa

11. Which gas is used in excess water

(a) CO_2 (b) SO_2

(c) CO (d) Water vapours

12. The compound which does not possess a peroxide linkage is

(a) Na_2O_2 (b) CrO_5

(c) H_2SO_5 (d) PbO_2

13. SiF_4 gets hydrolysed giving .....

(a) SiO_2 (b) $Si(OH)_2F_2$

(c) H_2SiF_6 (d) $Si(OH)_4$

14. Carborundum is

(a) SiC (b) $AlCl_3$

(c) $Al_2(SO_4)_3$ (d) $Al_2O_3.2H_2O$

15. Soldiers of Napolean army while at Alps during freezing winter suffered a serious problem as regards to the tin buttons of their uniforms. White metallic tin buttons got converted to grey powder. This transformation is related to

(a) A change in the partial pressure of oxygen in the air

(b) A change in the crystalline structure of tin

(c) An interaction with nitrogen of the air at very low to temperatures

(d) An interaction with water vapour contained in the humid air

16. Which one of the following statements about the zeolites is false

(a) Zeolites are aluminosilicates having three dimensional network

(b) Some of the SiO_4^{-4} units are replaced by AlO_4^{-5} and AlO_6^{9-} ions in zeolites

(c) They are used as cation exchangers

(d) They have open structure which enables them to take up small molecules

17. Which of the following cuts ultraviolet rays

(a) Soda glass (b) Crooke's glass

(c) Pyrax (d) None of these

18. Carbon suboxide C_3O_2 has

(a) Linear structure

(b) Bent structure

(c) Trigonal planar structure

(d) Distorted tetrahedral structure

19. Which of the following is a mixed oxide

(a) Fe_2O_3 (b) PbO_2

(c) Pb_3O_4 (d) BaO_2

20. Lapis lazuli is

(a) Ferrous sulphate (b) Copper sulphate

(c) Sodium alumino silicate (d) Zinc sulphate

21. When tin is treated with concentrated nitric acid
(a) It is converted into stannous nitrate
(b) It is converted into stannic nitrate
(c) It is converted into metastannic acid
(d) It becomes passive

22. A metal used in storage batteries is
(a) Copper (b) Lead
(c) Tin (d) Nickel

23. *Red lead* is
(a) Pb_3O_4 (b) PbO
(c) PbO_2 (d) Pb_4O_3

24. Lead pipes are corroded quickly by
(a) Dil. H_2SO_4 (b) Conc. H_2SO_4
(c) Acetic acid (d) Water

25. Litharge is chemically
(a) PbO (b) PbO_2
(c) Pb_3O_4 (d) $Pb(CH_3COO)_2$

26. Type metal is an alloy of Pb, Sb and Sn . It consists of
(a) Equal amounts of the three metals
(b) More amount of lead
(c) More amount of antimony
(d) More amount of tin

27. Sugar of lead is
(a) $2PbSO_4.PbO$ (b) $(CH_3COO)_2Pb$
(c) $PbCO_3$ (d) $PbCO_3.Pb(OH)_2$

28. Which of the following compounds has peroxide linkage
(a) Pb_2O_3 (b) SiO_2
(c) CO_2 (d) PbO_2

29. Red lead in an example of a/an .... oxide
(a) Basic (b) Super
(c) Mixed (d) Amphoteric

30. Which of the following element is a metalloid
(a) *Bi* (b) *Sn*
(c) *Ge* (d) *C*

1. (c)
2. (d)
3. (d)
4. (c)

5. (d) *C* and *Si* are non-metal and *Pb* is a metal.

6. (b) Metal oxides or some salts are fused with glass to imported colour of glass.

7. (c)

8. (c)

9. (a)

10. (c) $Co + NaOH \xrightarrow{200\,^{\circ}C} \underset{\text{Sod. formate}}{HCOONa}$

11. (A)

12. (D)

13. (d) It is hydrolysed with water to form a $Si(OH)_4$.

14. (b)

15. (b) Grey tin is very brittle and easily crumbles down to a powder in very cold climates.

$$\underset{\text{(Cubic)}}{\text{Grey tin}} \rightleftharpoons \underset{\text{(Tetragonal)}}{\text{White tin}}$$

The change of white tin to grey tin is accompanied by increase in volume. This is called tin disease or tin plague.

16. (b) Zeolite have SiO_4 and AlO_4 tetrahedrons linked together in a three dimensional open structure in which four or six membered ring predominate. Due to open chain structure they have cavities and can take up water and other small molecules.

17. (b) Crook's glass is a special type of glass containing cerium oxide. It does not allow the passage of ultra violet ray and is used for making lenses.

18. (a) Carbon suboxide has linear structure with $C-C$ bond length equal to $130\ \mathring{A}$ and $C-O$ bond length equal to $120\ \mathring{A}$.

$$O=C=C=C=O \leftrightarrow O^- - C \equiv C - C \equiv O^+$$

19. (c) Pb_3O_4 is a mixed oxide. It can be represented as $2PbO - PbO_2$.

20. (c) Lapis Lazuli is a rock composed mainly of the following mineral, lazurite, hauynite sodalite, nosean, calcite, pyrite, lapis lazuli is actually sulphur containing, sodium aluminium silicate having chemical composition $3Na_2O.3Al_2.6SiO_2.2Na_2S$.

21. (c) Tin is oxidised to meta stannic acid when it is treated with nitric acid.

$$Sn + 4HNO_3 \rightarrow H_2SnO_3 + 4NO_2 + H_2O$$

22. (b)

23. (a) $Pb_3O_4 \Rightarrow$ Red lead (Sindhur)

24. (c) Organic acids dissolve lead in presence of oxygen

$$Pb + 2CH_3COOH + \frac{1}{2}O_2 \rightarrow Pb(CH_3COO)_2 + H_2O$$

25. (A)

26. (b) Type metal *Pb* = 82%, *Sb* = 15%, *Sn* = 3%

27. (b) Sugar of lead $(CH_3COO)_2Pb \Rightarrow$ lead acetate

28. (D)

29. (c) Pb_3O_4 is a mixed oxide of $2PbO + PbO_2$

30. (c) Boron (*B*), *Si*, *Ge*, *As*, *Sb*, and *At* are the metalloid elements. Bismuth (*Bi*) and tin (*Sn*) are metals while carbon (*C*) is non-metal.