1. A colourless crystalline salt 'x' is soluble in dilute HCl. On adding NaOH solution, it gives a white precipitate which is insoluble in excess of NaOH. 'x' is :
   (a) $Al_2(SO_4)_3$ (b) $ZnSO_4$
   (c) $MgSO_4$ (d) $SnCl_2$

2. Which metal is used to make alloy steel for armour plates, safes and helmets ?
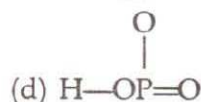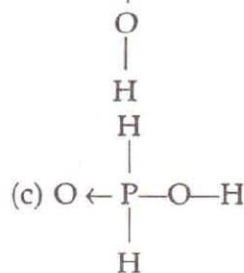   (a) Al   (b) Mn
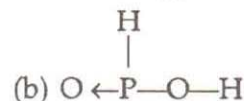   (c) Cr   (d) Pb

3. Iodoform test is not answered by :
   (a) C_2H_5OH (b) CH_3OH
   (c) CH_3COCH_3 (d) CH_3—CH—CH_3
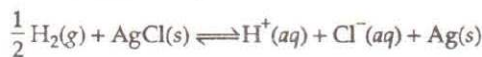 $\qquad\qquad\qquad\qquad\quad \underset{\displaystyle OH}{|}$

4. A gaseous carbon compound is soluble in dilute HCl. The solution on treating with $NaNO_2$ gives off nitrogen leaving behind a solution which smells of wood spirit. The carbon compound is :
   (a) HCHO
   (b) CO
   (c) $C_2H_5NH_2$
   (d) CH_3NH_2

5. Which of the following statements is incorrect regarding benzyl chloride ?
   (a) It gives white precipitate with alcoholic $AgNO_3$
   (b) It is an aromatic compound with substitution in the side chain
   (c) It undergoes nucleophilic substitution reaction
   (d) It is less reactive than vinyl chloride

6. Enthalpy of formation of HF and HCl are –161 kJ and –92 kJ respectively. Which of the following statements is incorrect?
   (a) HCl is more stable than HF
   (b) HF and HCl are exothermic compounds
   (c) The affinity of fluorine to hydrogen is greater than the affinity of chlorine to hydrogen
   (d) HF is more stable than HCl

7. Heat liberated with 100 ml of 1 N NaOH is neutralised by 300 ml of 1N HCl :
   (a) 11.56 kJ
   (b) 5.73 kJ
   (c) 22.92 kJ
   (d) 17.19 kJ

8. For a reaction $A + B \longrightarrow C + D$, if concentration of A is doubled without altering that of B, rate doubles. If concentration of B is increased nine times without altering that of A, rate triples. Order of the reaction is :
   (a) 2
   (b) 1
   (c) $1\frac{1}{2}$
   (d) $1\frac{1}{3}$

9. In Goldschmidt aluminothermic process, thermite contains :
   (a) 3 parts of Al_2O_3 and 4 parts of Al

(b) 3 parts of Fe_2O_3 and 2 parts of Al
(c) 3 parts of Fe_2O_3 and 1 part of Al
(d) 1 part of Fe_2O_3 and 1 part of Al

10. The structure of orthophosphoric acid is :

(a)
$$
\begin{array}{c}
O \\
\uparrow \\
H-O-P-O-H \\
| \\
O \\
| \\
H
\end{array}
$$

(b)
$$
\begin{array}{c}
H \\
| \\
O \leftarrow P-O-H \\
| \\
O \\
| \\
H
\end{array}
$$

(c)
$$
\begin{array}{c}
H \\
| \\
O \leftarrow P-O-H \\
| \\
H
\end{array}
$$

(d)
$$
\begin{array}{c}
O \\
| \\
H-O-P=O
\end{array}
$$
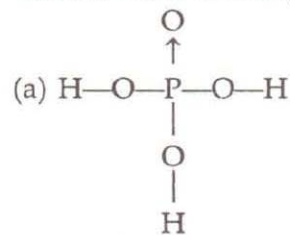
11. A galvanic cell is constructed using the redox reaction,

$$\frac{1}{2}H_2(g) + AgCl(s) \rightleftharpoons H^+(aq) + Cl^-(aq) + Ag(s)$$

it is represented as :
(a) Pt I $H_2(g)$ I HCl(sol.n) I I $AgNO_3$(sol.n) I Ag
(b) Ag I AgCl(s) I KCl(sol.n) I I HCl(sol. n), $H_2(g)$ I Pt
(c) Pt I $H_2(g)$ I KCl(sol.n) I I AgCl(s) I Ag
(d) Pt I $H_2(g)$, HCl(sol.n) I I AgCl(s) I Ag

12. Same amount of electric current is passed through solutions of $AgNO_3$ and HCl. If 1.08 g of silver is obtained in the first case, the amount of hydrogen liberated at S.T.P. in the second case is :
(a) 224 cm^3
(b) 1.008 g
(c) 112 cm^3
(d) 22400 cm^3

13. The flame colours of metal ions are due to :
(a) Frenkel defect
(b) Schottky defect
(c) Metal deficiency defect
(d) Metal excess defect

14. The order of reactivities of methyl halides in the formation of Grignard reagent is :
(a) $CH_3I > CH_3Br > CH_3Cl$
(b) $CH_3Cl > CH_3Br > CH_3I$
(c) $CH_3Br > CH_3Cl > CH_3I$
(d) $CH_3Br > CH_3I > CH_3Cl$

15. The reaction of an organic compound with ammonia followed by nitration of the product gives a powerful explosive, called RDX. The organic compound is :
(a) phenol   (b) toluene
(c) glycerine   (d) formaldehyde

16. A signature, written in carbon pencil weighs 1 mg. What is the number of carbon atoms present in the signature?
(a) 5.02×10^{23} (b) 5.02×10^{20}
(c) 6.02×10^{20} (d) 0.502×10^{20}

17. NH_3 and HCl gas are introduced simultaneously from the two ends of a long tube. A white ring of NH_4Cl appears first :
(a) nearer to the HCl end
(b) at the centre of the tube
(c) throughout the tube
(d) nearer to the NH_3 end

18. A gas formed by the action of alcoholic KOH on ethyl iodide, decolourises alkaline $KMnO_4$. The gas is :
(a) C_2H_6 (b) CH_4
(c) C_2H_2 (d) C_2H_4

19. Which of the following is not a characteristic of chemisorption?
(a) ΔH is of the order of 400 kJ
(b) Adsorption is irreversible
(c) Adsorption may be multimolecular layer
(d) Adsorption is specific

20. The concentration of electrolyte required to coagulate a given amount of As_2S_3 sol. is minimum in the case of :
(a) magnesium nitrate
(b) potassium nitrate
(c) potassium sulphate
(d) aluminium nitrate

21. Identify the organic compound which, on heating with strong solution of NaOH, partly converted into an acid salt and partly into alcohol :
(a) Benzyl alcohol   (b) Acetaldehyde
(c) Acetone   (d) Benzaldehyde

22. The process by which synthesis of protein takes place based on the genetic information present in m-RNA is called :
(a) translation
(b) transcription
(c) replication
(d) messenger hypothesis

23. The enthalpies of formation of Al_2O_3 and Cr_2O_3 are −1596 kJ and − 1134 kJ respectively. ΔH for the reaction,
$2Al + Cr_2O_3 \longrightarrow 2Cr + Al_2O_3$ is :
(a) −2730 kJ   (b) − 462 kJ
(c) −1365 kJ   (d) +2730 kJ

24. The gaseous reaction
$A + B \rightleftharpoons 2C + D + Q$ is most favoured at :
(a) low temperature and high pressure
(b) high temperature and high pressure
(c) high temperature and low pressure
(d) low temperature and low pressure

25. Temperature coefficient of a reaction is 2. When temperature is increased from 30°C to 100°C, rate of the reaction increases by :
(a) 128 times   (b) 100 times
(c) 500 times   (d) 250 times

26. The volume of water to be added to $\frac{N}{2}$ HCl to prepare 500 cm^3 of $\frac{N}{10}$ solution is :
(a) 450 cm^3 (b) 100 cm^3
(c) 45 cm^3 (d) 400 cm^3

27. The equivalent weight of a certain trivalent element is 20. Molecular weight of its oxide is :
(a) 152   (b) 56
(c) 168   (d) 68

28. Identify the reaction that doesn't take place during the smelting process of copper extraction :
(a) $2FeS + 3O_2 \longrightarrow 2FeO + 2SO_2\uparrow$
(b) $Cu_2O + FeS \longrightarrow Cu_2S + FeO$
(c) $2Cu_2S + 3O_2 \longrightarrow 2Cu_2O + 2SO_2\uparrow$
(d) $FeO + SiO_2 \longrightarrow FeSiO_3$

29. Pick out the complex compound in which the central metal atom obeys EAN rule strictly :
(a) $K_4[Fe(CN)_6]$ (b) $K_3[Fe(CN)_6]$
(c) $[Cr(H_2O)_6]Cl_3$ (d) $[Cu(NH_3)_4]SO_4$

30. In a reversible reaction, the catalyst :
(a) increases the activation energy of the backward reaction
(b) increases the activation energy of the forward reaction
(c) decreases the activation energy of both, forward and backward reaction
(d) decreases the activation energy of forward reaction

31. Solubility product of a salt AB is 1×10^{-8} in a solution in which concentration of A is 10^{-3} M. The salt will precipitate when the concentration of B becomes more than :
(a) 10^{-4} M   (b) 10^{-7} M
(c) 10^{-6} M   (d) 10^{-5} M

32. The standard reduction potentials of Zn and Ag in water at 298 K are,
$Zn^{+2} + 2e^- \rightleftharpoons Zn;$ $E° = -0.76V$ and
$Ag^+ + e^- \rightleftharpoons Ag;$ $E° = +0.80$ V. Which of the following reactions take place?
(a) $Zn^{+2}(aq) + 2Ag(s) \longrightarrow 2Ag^+(aq) + Zn(s)$
(b) $Zn(s) + 2Ag^+(aq) \longrightarrow Zn^{+2}(aq) + 2Ag(s)$
(c) $Zn^{+2}(aq) + Ag^+(aq) \longrightarrow Zn(s) + Ag(s)$
(d) $Zn(s) + Ag(s) \longrightarrow Zn^{+2}(aq) + Ag^+(aq)$

33. The ratio of cationic radius to anionic radius in an ionic crystal is greater than 0.732. Its co-ordination number is :
(a) 6   (b) 8
(c) 1   (d) 4

34. Dacron is obtained by the condensation polymerisation of :
(a) Dimethyl terephthalate and ethylene glycol
(b) Terephthalic acid and formaldehyde
(c) Phenol and phthalic acid
(d) Phenol and formaldehyde

35. 4-chloro-3, 5-dimethyl phenol is called :
(a) Chloramphenicol
(b) Paracetamol
(c) Barbital
(d) Dettol

36. The percentage s-character of the hybrid orbitals in methane, ethene and ethyne are respectively :
(a) 25, 33, 50   (b) 25, 50, 75
(c) 50, 75, 100   (d) 10, 20, 40

37. In the manufacture of sulphuric acid by contact process, Tyndall box is used to :
(a) filter dust particles
(b) remove impurities
(c) convert SO_2 to SO_3
(d) test the presence of dust particles

38. The pH value of gastric juice in human stomach is about 1.8 and in the small intestine it is about 7.8. The pK_a value of aspirin is 3.5. Aspirin will be :
(a) completely ionised in the small intestine and in the stomach
(b) unionised in the small intestine and in the stomach
(c) ionised in the small intestine and almost unionised in the stomach
(d) ionised in the stomach and almost unionised in the small intestine

39. The number of α and β particles emitted during the transformation of $_{90}Th^{232}$ to $_{82}Pb^{208}$ are respectively :
(a) 4, 2   (b) 2, 2
(c) 8, 6   (d) 6, 4

40. When chlorine is passed through warm benzene in presence of the sunlight, the product obtained is :
(a) Benzotrichloride
(b) Chlorobenzene
(c) Gammexane
(d) D D T

41. Ethyl benzoate reacts with PCl_5 to give :
(a) $C_2H_5Cl + C_6H_5COCl + POCl_3 + HCl$
(b) $C_2H_5Cl + C_6H_5COCl + POCl_3$
(c) $CH_3COCl + C_6H_5COCl + POCl_3$
(d) $C_2H_5Cl + C_6H_5COOH + POCl_3$

42. Pick out the statement which is not relevant in the discussion of colloids :
(a) Sodium aluminium silicate is used in the softening of hard water
(b) Potash alum is used in shaving rounds and as a styptic in medicine
(c) Artificial rain is caused by throwing electrified sand on the clouds from an aeroplane
(d) Deltas are formed at a place where the river pours its water into the sea

43. A wooden box excavated from Indus valley had an activity of 1.18×10^{13} disintegration per minute per gm. of carbon. What is the approximate age of this civilisation?
(a) 4000 years   (b) 5700 years
(c) 8100 years   (d) 6000 years

44. For a reaction if $K_p > K_c$, the forward reaction is favoured by :
(a) low pressure
(b) high pressure
(c) high temperature
(d) low temperature

45. In a lime kiln, to get higher yield of CO_2, the measure that can be taken is :

(a) to remove CaO
(b) to add more $CaCO_3$
(c) to maintain high temperature
(d) to pump out CO_2

46. What is the volume of "20 volume H_2O_2" required to get $5000 \ cm^3$ of oxygen at S.T.P.?
(a) $250 \ cm^3$ (b) $50 \ cm^3$
(c) $100 \ cm^3$ (d) $125 \ cm^3$

47. The IUPAC name of $(CH_3)_3C—CH{=}CH_2$ is :
(a) 1, 1, 1-trimethyl-2-propene
(b) 3, 3, 3-trimethyl-2-propene
(c) 2, 2-dimethyl-3-butene
(d) 3, 3-dimethyl-1-butene

48. Railway wagon axles are made by heating iron rods embedded in charcoal powder. This process is known as :
(a) Tempering   (b) Case hardening
(c) Sherardising   (d) Annealing

49. Thomas slag is ...
(a) $CaSiO_3$ (b) $Ca_3(PO_4)_2$
(c) $MnSiO_3$ (d) $CaCO_3$

50. Urea is preferred to ammonium sulphate as a nitrogenous fertilizer because :
(a) it is more soluble in water
(b) it is cheaper than ammonium sulphate
(c) it is quite stable
(d) it does not cause acidity in the soil

51. Two gas cylinders having same capacity have been filled with 44 g of H_2 and 44 g of CO_2 respectively. If the pressure in CO_2 cylinder is 1 atmosphere at a particular temperature, the pressure in the hydrogen cylinder at the same temperature is :
(a) 2 atmosphere   (b) 1 atmosphere
(c) 22 atmosphere   (d) 44 atmosphere

52. Angular momentum of an electron in the nth orbit of hydrogen atom is given by :
(a) $\dfrac{nh}{2\pi}$ (b) nh
(c) $\dfrac{2\pi}{nh}$ (d) $\dfrac{\pi}{2nh}$

53. The element with atomic number 36 belongs to .... block in the periodic table :
(a) p
(b) s
(c) f
(d) d

54. The function of $AlCl_3$ in Friedel-Craft's reaction is :
(a) to absorb HCl
(b) to absorb water
(c) to produce nucleophile
(d) to produce electrophile

55. An important reaction of acetone is autocondensation in presence of concentrated sulphuric acid to give the aromatic compound ......
(a) mesitylene
(b) mesityl oxide
(c) trioxan
(d) phorone

56. Kinetic energy of one mole of an ideal gas at 300 K in kJ is :
(a) 3.74
(b) 348
(c) 34.8
(d) 3.48

57. The tripeptide hormone present in most living cells is :
(a) glutathione
(b) glutamine
(c) oxytocin
(d) ptyalin

58. Phenol $\xrightarrow{NaNO_2\,|\,H_2SO_4} B \xrightarrow{H_2O} C \xrightarrow{NaOH} D$
name of the reaction is :
(a) Liebermann's reaction
(b) Phthalein fusion test
(c) Reimer Tiemann reaction
(d) Schotten-Baumann reaction

59. Energy is stored in our body in the form of :
(a) ATP
(b) ADP
(c) Fats
(d) Carbohydrates

60. An organic compound answers Molisch's test as well as Benedict's test. But it does not answer Scliwanoff's test. Most probably, it is :
(a) sucrose
(b) protein
(c) fructose
(d) maltose

Answer – Key

1. c	2. a	3. b	4. d	5. d	6. a	7. b	8. c	9. c	10. a
11. d	12. c	13. d	14. a	15. d	16. d	17. a	18. d	19. c	20. d
21. d	22. a	23. b	24. d	25. a	26. d	27. c	28. a	29. a	30. c
31. d	32. b	33. b	34. a	35. d	36. a	37. d	38. d	39. d	40. c
41. b	42. a	43. c	44. a	45. d	46. a	47. d	48. d	49. b	50. d
51. c	52. a	53. a	54. d	55. a	56. a	57. a	58. a	59. a	60. d