1. In the reaction

$R—C \equiv N + 4(H) \xrightarrow{X} RCH_2NH_2$

X can be

(a) $LiAlH_4$ (b) H_2SO_4

(c) Ni (d) 2KBr

2. At a given temperature the equilibrium constant for the reaction of $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ is 2.4×10^{-3}. At the same temperature, the equilibrium constant for the reaction $PCl_3(g) + Cl_2(g) \rightleftharpoons PCl_5(g)$ is

(a) 2.4×10^{-3} (b) -2.4×10^{-3}

(c) 4.2×10^{2} (d) 4.8×10^{-2}

3. Which of the following is called polyamide ?

(a) Terylene (b) Rayon

(c) Nylon (d) Orlon

4. The number of electrons in the valence shell of sulphur in SF_6 is

(a) 12 (b) 10

(c) 8 (d) 11

5. The minimum energy required for the reacting molecules to undergo reaction is

(a) potential energy (b) kinetic energy

(c) thermal energy (d) activation energy

6. Which of the following is correct for the reaction?

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

(a) $K_p = K_c$

(b) $K_p < K_c$

(c) $K_p > K_c$

(d) Pressure is required to predict the correlation

7. The rate constant of a first order reaction is $6.9 \times 10^{-3} s^{-1}$. How much time will it take to reduce the initial concentration to its $1/8^{th}$ value ?

(a) 100 s (b) 200 s

(c) 300 s (d) 400 s

8. Which has the minimum freezing point ?

(a) One molal NaCl aqueous solution

(b) One molal $CaCl_2$ aqueous solution

(c) One molal KCl aqueous solution

(d) One molal urea aqueous solution

9. Among the following, the most acidic is

(a) CH_3COOH (b) $ClCH_2COOH$

(c) $Cl_2CHCOOH$ (d) Cl_2CHCH_2COOH

10. For a Bohr atom angular momentum M of the electron is : ($n = 0, 1, 2, \ldots\ldots$)

(a) $\frac{nh^2}{4\pi}$ (b) $\frac{n^2h^2}{4\pi}$

(c) $\frac{\sqrt{nh^2}}{4\pi}$ (d) $\frac{nh}{2\pi}$

11. Which of the following combination will form an electrovalent bond ?

(a) P and Cl (b) NH_3 and BF_3

(c) H and Ca (d) H and S

12. How many moles of $Al_2(SO_4)_3$ would be in 50 g of the substance ?

(a) 0.083 mol (b) 0.952 mol

(c) 0.481 mol (d) 0.140 mol

13. The IUPAC name of the compound $CH_3CONHBr$ is

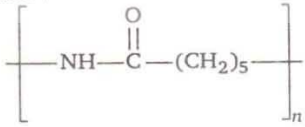
(a) 1-bromoacetamide

(b) ethanoylbromide

(c) N-bromoethanamide

(d) none of the above

14. Which of the following is a condensation polymer ?

(a) 

(b) Rubber

(c) Polyvinyl chloride

(d) Polyethylene

15. The solubility of CaF_2 in pure water is 2.3×10^{-4} mol dm^{-3}. Its solubility product will be

(a) 4.6×10^{-4} (b) 4.6×10^{-8}

(c) 6.9×10^{-12} (d) 4.9×10^{-11}

16. Copper sulphate solution, when added to an excess of ammonium hydroxide, forms a complex compound due to

(a) $[Cu(NH_3)_2]^{2+}$ (b) $[Cu(NH_3)_4]^{2+}$

(c) $[Cu(NH_3)_6]^{2+}$ (d) Cu^{2+}

17. If a solution containing 0.072 g atom of sulphur in 100 g of a solvent ($k_f = 7.0$) gave a freezing point depression of 0.84°C, the molecular formula of sulphur in the solutions is
(a) S_6 (b) S_7
(c) S_8 (d) S_9

18. Which of the following is a dynamic isomerism ?
(a) Metamerism
(b) Geometrical isomerism
(c) Tautomerism
(d) Co-ordinate isomerism

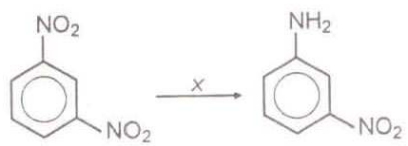
19. When $K_2Cr_2O_7$ is converted into K_2CrO_4, the change in oxidation number of chromium is
(a) 0 (b) 5
(c) 7 (d) 9

20. Which of the following will be the most effective in the coagulation of $Fe(OH)_3$ Sol ?
(a) KCN (b) $BaCl_2$
(c) NaCl (d) $Mg_3(PO_4)_2$

21. For *d*-block elements the first ionisation potential is of the order
(a) Zn > Fe > Cu > Cr
(b) Sc = Ti < V = Cr
(c) Zn < Cu < Ni < Co
(d) V > Cr > Mn > Fe

22. High basicity of Me_2NH relative to Me_3N is attributed to
(a) effect of solvent
(b) inductive effect of Me
(c) shape of Me_2NH
(d) shape of Me_3N

23. In the reaction



X is
(a) SiC (b) H_2SO_4
(c) $KMnO_4$ (d) Fe/HCl

24. In Grignard reagent the carbon-magnesium bond is
(a) electrovalent (b) covalent
(c) dative (d) hydrogen bonding

25. The radius of hydrogen atom in the ground state is 0.53 Å. The radius of Li^{2+} ion (atomic number = 3) in a similar state is
(a) 0.176 Å (b) 0.30 Å
(c) 0.53 Å (d) 1.23 Å

26. Tyndall effect shown by colloids is due to
(a) scattering of light by the particles
(b) movements of particles
(c) reflection of light by the particles
(d) coagulation of particles

27. Iodine is a
(a) electrovalent solid
(b) atomic solid
(c) molecular solid
(d) covalent solid

28. Fe^{2+} ion is distinguished from Fe^{3+} ion by
(a) $BaCl_2$ (b) KCN
(c) $NaNO_3$ (d) NH_4SCN

29. Lattice energy of a solid increases if
(a) size of ions is small
(b) charges of ions are small
(c) ions are neutral
(d) none of the above

30. Which of the following will not give a positive iodoform test ?
(a) $CH_3CH_2CHOHCH_3$
(b) $CH_3CH_2CH_2COCH_3$
(c) $CH_3CH_2COCH_2CH_3$
(d) $CH_3COC_6H_5$

31. The reason for the loss of optical activity of lactic acid when —OH group is changed by H is that
(a) chiral centre of the molecule is destroyed
(b) molecules acquires asymmetry
(c) due to change in configuration
(d) structural changes occurs

32. To distinguish between salicylic acid and phenol one can use
(a) $NaHCO_3$ solution
(b) 5% NaOH solution
(c) neutral $FeCl_3$
(d) bromine water

33. C—H bond energy is about 101 kcal/mol for methane, ethane and other alkanes but is only 77 kcal/mol for C—H bond of CH_3 in toluene. This is because
(a) of inductive effect due to —CH_3 in toluene
(b) of the presence of benzene ring in toluene
(c) of resonance among the structures of benzyl radical in toluene
(d) aromaticity of toluene

34. Which of the following ions can be replaced by H^+ ions when H_2 gas is bubbled through the solutions containing these ions ?
(a) Li^+ (b) Ba^{2+} (c) Cu^{2+} (d) Be^{2+}

35. Alum is added to muddy water because
(a) it acts as disinfectant
(b) it results in coagulation of clay and sand
(c) clay is soluble in alum, hence removes it
(d) it makes water alkaline which is good for health

36. NH_3 gas is dried over
(a) CaO (b) HNO_3 (c) P_2O_5 (d) $CuSO_4$

37. Which one of the following is not correct for an ideal solution ?
(a) It must obey Raoult's law
(b) $\Delta H = 0$
(c) $\Delta U = 0$
(d) $\Delta H = \Delta V \neq 0$

38. Borax bead test of Cr (chromium) is
(a) green (b) blue
(c) violet (d) brown

39. A catalyst
(a) lowers the activation energy
(b) changes the rate constant
(c) changes the product
(d) itself destroys in the reaction

40. Which of the following is cross-linked polymer ?
(a) Teflon (b) Orlon
(c) Nylon (d) Bakelite

41. In the reaction sequence

$$CH_3CH{=}CH_2 \xrightarrow[(ii)\ H_2O/\ Zn]{(i)\ O_3} \text{Products}$$

Products will be
(a) CH_3COCH_3
(b) CH_3COCH_2OH
(c) $CH_3COOH + HCOOH$
(d) $CH_3CHO + HCHO$

42. The conditions for aromaticity is
(a) molecule must have clouds of delocalised π-electrons
(b) molecule must contain $(4n + 2)$ π-electrons
(c) both (a) and (b)
(d) none of the above

43. Which of the following increases the octane number ?
(a) Branching of chain
(b) Absence of double and triple bond
(c) Non-cyclic alkanes
(d) None of the above

44. Chlorobenzene gives aniline with
(a) NH_3/Cu_2O (b) NH_3/H_2SO_4
(c) $NaNH_2$ (d) none of these

45. In CsCl type structure the co-ordination of Cs^+ and Cl^- are
(a) 6, 6 (b) 6, 8 (c) 8, 8 (d) 8, 6

46. Hess's law is used to calculate :
(a) enthalpy of reaction
(b) entropy of reaction
(c) work done in reaction
(d) all of the above

47. Which of the following is not a Lewis base ?
(a) NH_3 (b) H_2O
(c) $AlCl_3$ (d) None of these

48. Active charcoal is a good catalyst because
(a) made up of carbon atoms
(b) is very reactive
(c) has more adsorption power
(d) has inert nature toward reagent

49. H_2 cannot be displaced by
(a) Li^+ (b) Sr^{2+}
(c) Al^{3+} (d) Ag^+

50. Which of the following is amphoteric ?
(a) V_2O_3 (b) CuO
(c) V_2O_5 (d) NiO

51. The emf of the cell, $(E^{\circ}_{Zn^{2+}/Zn} = -0.76\ V)$

$Zn / Zn^{2+}\ (1M) \| Cu^{2+}\ (1M) Cu$

$(E^{\circ}_{Cu^{2+}/Cu} = +0.34\ V)$ will be
(a) +1.10 V (b) −1.10 V
(c) +0.42 V (d) −0.42 V

52. Which of the following is correct number of carbon atom present as the constituent of kerosene oil ?
(a) C_{10}—C_{16} (b) C_4—C_6
(c) C_8—C_{16} (d) C_{12}—C_{18}

53. Water possesses a high dielectric constant, therefore
(a) it always contains ions
(b) it is a universal solvent
(c) can dissolve covalent compounds
(d) can conduct electricity

54. Aldehydes can be oxidised by
(a) Tollen's reagent (b) Fehling solution
(c) Benedict solution (d) All of these

55. The ΔH°_f for $CO_2(g)$, $CO(g)$ and $H_2O(g)$ are −393.5, −110.5 and −241.8 kJ/mol respectively. The standard enthalpy change (in kJ) for the reaction

$CO_2(g) + H_2(g) \longrightarrow CO(g) + H_2O(g)$ is
(a) 524.1 (b) 41.2
(c) −262.5 (d) −41.2

Answer – Key

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