1. Chloroform is obtained by the partial reduction of
   (a) CCl_4 (b) CH_4
   (c) $CHCl_3$ (d) CH_3OH
2. Which of the following statements is true for enzymes?
   I. Enzymes do not have nucleophilic groups.
   II. Enzymes are specific in joining with chiral molecules and catalyse their reaction.
   III. Enzyme catalysis the chemical reactions by decreasing the activation energy.
   IV. Pepsin is a proteolytic enzyme.
   (a) I (b) I and IV
   (c) I and III (d) II, III and IV
3. Identify the correct statement.
   (a) Plaster of Paris is obtained by the partial oxidation of gypsum.
   (b) The percentage of plaster of calcium in gypsum is less than plaster of Paris.
   (c) Gypsum is obtained by the plaster of Paris on heating.
   (d) Plaster of Paris is obtained by the addition of water in gypsum.
4. The electronic configuration of a element is $1s^2, 2s^2, 2p^6, 3s^2, 3p^3$. What is the atomic number of element which is below exactly this element in the Periodic Table?
   (a) 49 (b) 31
   (c) 34 (d) 33
5. Sodium is prepared by the electrolysis of molten mixture of 40% NaCl and 60% $CaCl_2$ because
   (a) Ca^{2+} can reduce the NaCl into Na.
   (b) $CaCl_2$ helps in electrical conduction.
   (c) this mixture has less melting point than NaCl.
   (d) Ca^{2+} can displace Na from NaCl.
6. Ideal gas which obeys the molecular kinetic theory of gases can be liquified. If
   (a) it cannot be liquified at any pressure and temperature.
   (b) its pressure is greater than p_c at less temperature from T_c.
   (c) its temperature is greater than critical temperature T_c.
   (d) its pressure is greater than critical pressure.
7. The correct order of O—O bond length in O_2, H_2O_2 and O_3.
   (a) $H_2O_2 > O_3 > O_2$ (b) $O_2 > O_3 > H_2O_2$
   (c) $O_2 > H_2O_2 > O_3$ (d) $O_3 > H_2O_2 > O_2$
8. The oxidation of glucose in living cell is a important reaction. What are number of ATP molecules which are produced by one molecule of glucose in cells?
   (a) 28 (b) 38
   (c) 12 (d) 18
9. Which of the following compound exists in optically active forms?
   (a) $CH_3—\underset{\displaystyle CH_3}{\underset{|}{CH}}—CH_2OH$
   (b) $CH_3—CH_2—CH_2OH$
   (c) $CH_3CH_2—\underset{\displaystyle OH}{\underset{|}{CH}}—CH_3$
   (d) $CH_3(CH_2)_3—CH_2OH$
10. On moving downward in Be group, the solubility of sulphates in water is : Be > Mg > Ca > Sr > Ba. It is due to
    (a) increase in melting points
    (b) decreasing lattice energy
    (c) increasing molecular weight
    (d) more solvation energy for small ions like Be^{2+}.

11. A chemical reaction is catalysed by catalyst X. Hence, X
(a) increases the activation energy of reaction.
(b) does not effect the equilibrium constant of reaction.
(c) decreases the velocity constant of reaction.
(d) decreases the enthalpy of reaction.

12. What will be the number of neutrons in atom after the emission of one α-particle and one β-particle from atom $^{238}_{92}X$?
(a) 144 (b) 143
(c) 142 (d) 146

13. The formation of bakelite takes place between the reaction of
(a) phenol and formaldehyde
(b) ethylene glycol and dimethyl terephthalate
(c) urea and formaldehyde
(d) tetramethylene glycol and hexa methylene diisocynate

14. Aluminium (III) chloride forms a dimer because
(a) the ionisation energy of aluminium is high.
(b) it cannot form trimer.
(c) high coordination number can obtain by aluminium.
(d) aluminium belongs to third group.

15. The solubility of AgCl will be minimum in which of the following?
(a) 0.01 M NaCl (b) 0.01 M $CaCl_2$
(c) pure water (d) 0.001 M $AgNO_3$

16. The radius of hydrogen atom is 0.53 Å in the ground state. The radius of Li^{2+} ion ($Z = 3$) in this state is
(a) 0.17 Å (b) 1.06 Å
(c) 0.53 Å (d) 0.265 Å

17. Mercury is the only metal which is liquid at 0°C because
(a) high vapour pressure
(b) high ionisation energy and weak metallic bond
(c) low ionisation potential
(d) high atomic weight

18. The pH does not change on the addition of some amount of acid or base in the blood, because blood
(a) becomes coagulate easily
(b) has serum protein which acts as buffer
(c) is liquid of body
(d) has iron in the form a part of molecule

19. When 3, 3-dimethyl-2-butanol is heated with H_2SO_4 then the major product is
(a) 3, 3-dimethyl-1-butene
(b) 2, 3-dimethyl-2-butene
(c) 2, 3-dimethyl-1-butene
(d) *cis* and *trans* isomers of product (b).

20. In $K_3Cr(C_2O_4)_3$ the coordination number and oxidation state of Cr are respectively
(a) 6 and +3 (b) 3 and zero
(c) 4 and +2 (d) 3 and +3

21. If a metal piece is heated from one end then after sometime the other end becomes hot. It is due to
(a) resistance of metal
(b) small change in the energy of atoms
(c) movement of energy full electron in other part of metal
(d) movement of atoms in metal

22. The half-life of C^{14} radioactive is 5760 yr. After how much time will 200 mg C^{14} sample be reduced to 25 mg?
(a) 23040 yr (b) 17280 yr
(c) 11520 yr (d) 5760 yr

23. When benzene diazonium chloride solution is boilded it yields
(a) benzene (b) phenol
(c) aniline (d) chlorobenzene

24. Acetone reacts with chloroform in the presence of NaOH to give
(a) chloral (b) chloretone
(c) acetyl chloride (d) ethyl chloride

25. What will be the uncertainty in position (correct at 0.001%) of a electron which is moving with 3.0×10^4 cm/s. Velocity, (mass of electron $= 9.1 \times 10^{-28}$, $h = 6.626 \times 10^{-22}$ erg/s) Use the uncertainty principle of $h / 4\pi$
(a) 3.84 cm (b) 1.92 cm
(c) 7.68 cm (d) 5.76 cm

26. In TiF_6^{2-}, CoF_6^{3-}, Cu_2Cl_2 and $NiCl_4^{2-}$ the colourless species is (Atomic number Ti = 22, Co = 27, Cu = 29, Ni = 28)
(a) TiF_6^{2-} and Cu_2Cl_2 (b) Cu_2Cl_2 and $NiCl_4^{2-}$
(c) TiF_6^{2-} and CoF_6^{3-} (d) CoF_6^{3-} and $NiCl_4^{2-}$

27. A ozone layer is present approximately 20 km above from earth. Which of the following statement is correct for ozone and ozone layer?
(a) The change of ozone into oxygen is a endothermic reaction.

(b) Ozone layer is harmful for us because it stops the rays which are useful for photosynthesis.
(c) Ozone layer is useful to us because ozone absorbs the ultra-violet rays of sun.
(d) Ozone is a trimolecular linear molecule.

28. For a spontaneous reaction
(a) ΔS should be negative
(b) $(\Delta H - T \cdot \Delta S)$ should be negative
(c) $(\Delta H + T \cdot \Delta S)$ should be negative
(d) ΔH should be negative

29. The electronic configuration of valence shell of nitrogen molecule in ground state is $(\sigma 2s^2), (\sigma^* 2s^2), (\pi 2p^4), (\sigma 2p^2)$. Hence, the bond order in nitrogen molecule is
(a) 3 (b) 0
(c) 1 (d) 2

30. A chiral centre produces in the reaction
$CH_3CHO + HCN \longrightarrow CH_3CH(OH)CN$
The product will be
(a) *meso* compound (b) racemic mixture
(c) Leavorotatory (d) dextrorotatory

31. If the general formula of a metal carbonyl is $M(CO)_x$. (where M = metal, $x = 4$) then metal is bonded with
(a) C ≡O triple bond (b) carbon and oxygen
(c) carbon (d) oxygen

32. According to Raoult's law the relative lowering in vapour pressure of a solution is equal to
(a) moles of solute
(b) mole fraction of solvent
(c) moles of solvent
(d) mole fraction of solute

33. In ideal condition, the number of moles of oxygen in 1 L air which has 21% oxygen according to volume
(a) 2.10 mol (b) 0.0093 mol
(c) 0.186 mol (d) 0.210 mol

34. The increasing acidity order of phenol, *p*-methyl phenol, *m*-nitrophenol and *p*-nitrophenol is
(a) phenol, *p*-methyl phenol, *p*-nitrophenol, *m*-nitrophenol
(b) *p*-methyl phenol, phenol, *m*-nitrophenol, *p*-nitrophenol
(c) *p*-methylphenol, *m*-nitrophenol, phenol, *p*-nitrophenol
(d) *m*-nitrophenol, *p*-nitrophenol, phenol, *p*-methylphenol

35. Alkene $R-CH=CH_2$ reacts with B_2H_6 to give a product. The oxidation of product by alkaline hydrogen peroxide to form
(a) $R-\overset{\overset{O}{\|}}{C}-CH_3$
(b) $R-\underset{OH}{\overset{|}{C}}H-\underset{OH}{\overset{|}{C}}H_2$
(c) $R-CH_2-CHO$
(d) $R-CH_2-CH_2-OH$

36. The molecule of BCl_3 is planar while the molecule of NCl_3 is pyramidal because
(a) N—Cl bond is more covalent than B—Cl bond
(b) the atom of nitrogen is smaller than boron
(c) B—Cl bond is more polar than N—Cl bond
(d) in BCl_3 unpaired electron pair is not present while in NCl_3 a unpaired electron pair is present.

37. The concentration unit will independent from temperature
(a) weight volume percentage
(b) molarity
(c) normality
(d) molality

38. Which of the following compounds have more than one hybridization for carbon?
I. $CH_3CH_2CH_2CH_3$
II. $CH_3-CH=CH-CH_3$
III. $CH_2=CH-CH=CH_2$
IV. $H-C\equiv C-H$
(a) II. (b) III and IV
(c) I and IV (d) II and III

39. The general reactivity order of carbonyl compounds for nucleophilic addition reactions is
(a) $H_2C=O > RC=O > Ar_2C=O > RCHO > ArCHO$
(b) $H_2C=O > RCHO > ArCHO > R_2C=O > Ar_2C=O$
(c) $ArCHO > Ar_2C=O > RCHO > R_2C=O > H_2C=O$
(d) $Ar_2C=O > R_2C=O > ArCHO > RCHO > H_2C=O$

40. Oxidation of toluene with CrO_3 in the presence of $(CH_3CO)_2O$ forms product *A* which reacts with aqueous NaOH to give
(a) 2, 4-diacetyl toluene
(b) C_6H_5COONa
(c) $(C_6H_5CO)_2O$
(d) C_6H_5CHO

41. The IUPAC name of the following compound is $CH_3-CH=CHCH_2-\underset{\underset{NH_2}{|}}{CH}-CH_2COOH$

(a) 5-amino-2-heptenoic acid
(b) β-amino-δ-heptenoic acid
(c) 5-amino-hex-2-ene carboxylic acid
(d) 3-amino-5-heptenoic acid

42. pH of 10 M HCl solution is
(a) 1 (b) 0
(c) 2 (d) less than zero

43. The number of geometrical isomers of $[Pt(NH_3)_2Cl_2]$ are
(a) 3 (b) 4
(c) 2 (d) 1

44. Which of the following oxide cannot act as reductant?
(a) ClO_2 (b) SO_2
(c) NO_2 (d) CO_2

45. Which of the following molecule/ion is paramagnetic?
(a) CN^- (b) CO
(c) NO (d) O_2^{2-}

46. Maximum explosive is
(a) NCl_3 (b) PCl_3
(c) $AsCl_3$ (d) All of these

47. The purest form of iron is
(a) white cast iron (b) grey cast iron
(c) wrought iron (d) steel

48. The solubiulity of AgCl is 1.8×10^{-3} g/L at 25°C. The solubility product of AgCl will (Ag = 108, Cl = 35.5)
(a) 1.57×10^{-10} (b) 1×10^{-10}
(c) 3.24×10^{-6} (d) 1×10^{-6}

49. Reaction $(CH_3)_2CO \xrightarrow{Na/C_2H_5OH} (CH_3)_2CHOH$ is called
(a) Rosenmund reduction
(b) Bubo-Blanc reduction
(c) Sabatier and Senderens reduction
(d) Clemmensen reduction

50. Ethyl amine reacts with nitrous acid to give
(a) ethyl nitrite (b) ethyl alcohol
(c) nitro ethane (d) acetic acid

Answer – Key

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