Chapter 1 BASIC CONCEPTS

MULTIPLE CHOICE QUESTIONS

1. Which of the following compounds has the highest % age of oxygen by weight? **(LHR 05)**

(a) $CH_3–OH$ (b) $C_2H_5–OH$ (c) HCOOH (d) H_2O

2. Formula mass of $MgSO_4$ is g/mole: **(GRW 06)**

(a) 150 (b) 120 (c) 130 (d) 140

3. Electrometer is also called: **(LHR 07)**

(a) Voltmeter (b) Avometer (c) Ion collector (d) Galvanometer

4. In combustion analysis H_2O vapors are absorbed by: **(LHR 07, 14, FSD 08)**

(a) 50% KOH (b) $Mg(ClO_4)_2$ (c) NaOH (d) $MgCl_2$

5. Height of peak in mass spectrum shows: **(LHR 08)**

(a) Number of isotopes (b) Mass number

(c) Relative abundance (d) Number of protons

6. The volume occupied by 1.4 g of N_2 at S.T.P is: **(SGD 09, 11, LHR 10, GRW 08)**

(a) 2.24 dm^3 (b) 22.4 dm^3 (c) 1.12 dm^3 (d) 112 dm^3

7. Molecular mass of $CaCO_3$ is: **(LHR 09)**

(a) 100 (b) 90 (c) 120 (d) 106

8. Percentage of oxygen in water is: **(LHR 09)**

(a) 80% (b) 88.89% (c) 8.8% (d) 9.8%

9. A limiting reactant is one which: **(MTN 10, GRW 09)**

(a) Is taken in lesser quantity in grams as compared to other reactants

(b) Is taken a lesser quantity in volume as compared to other Reactants

(c) Give maximum amount of product (d) Gives minimum amount of product

10. Tin has isotopes: **(LHR 11)**

(a) 7 (b) 9 (c) 11 (d) 5

11. Empirical formula of glucose is: **(GRW 11)**

(a) CHO (b) $C_2H_4O_2$ (c) CH_2O (d) $C_6H_{12}O_6$

12. The mass of CO_2 containing 8 grams of oxygen (O_2) in grams is: **(GRW 11)**

(a) 32 (b) 22 (c) 16 (d) 11

13. 1 amu is equal to: **(LHR 11)**

(a) 1.661×10^{27} kg (b) 1.661×10^{-26} kg (c) 1.661×10^{-24} kg (d) 1.661×10^{-24} g

14. Cadmium has isotopes: **(LHR 10)**

(a) 9 (b) 16 (c) 17 (d) 18

15. An ordinary microscope can measure size of object up to: **(FSD 07)**

(a) 100nm (b) 200 nm (c) 400 nm (d) 500 nm

16. How many times a hemoglobin molecule is heavier than hydrogen atom? **(FSD 10)**

(a) 38000 times (b) 58000 times (c) 68000 times (d) 88000 times

17. Isotopes are sister atoms of same element with similar chemical properties but different: **(RWP 09)**

(a) Atomic number (b) Atomic volume
(c) Atomic weight (d) Atomic structure

18. The volume occupied by 28 g of N_2 at STP is: **(RWP 10)**

(a) 22.414 dm^3 (b) 2.2414 dm^3 (c) 224.14 dm^3 (d) 1.12 dm^3

19. One mole of SO_2 contains. **(SGD 09)**

(a) 6.02×10^{23} atom of oxygen (b) 18.1×10^{23} molecules of SO_2
(c) 6.02×10^{23} atoms of sulphur (d) 4 grams atom of SO_2

20. The pressure of vapors maintained in ionization chamber of mass spectrometer during isotopic analysis is: **(SGD 10)**

(a) 10^3 torr (b) Around 10^{-5} torr (c) Around 10^{-7} torr (d) 10^{-9} torr

21. 18.02 g of H_2O sample has: **(MTN 07)**

(a) 1 mole of Hydrogen atoms (b) ½ mole of oxygen atom
(c) 6.922×10^{23} moles of H_2O (d) 6.022×10^{23} Molecules of H_2O

22. The percentage of Nitrogen in NH_3 is: **(MTN 07)**

(a) $\frac{14}{34} \times 100$ (b) $\frac{14}{17} \times 100$ (c) $\frac{3}{17} \times 100$ (d) $\frac{28}{34} \times 100$

23. NH_3 burns in O_2 according to the following reaction: **(MTN 07)**

$$4NH_{3(g)} + 3O_{2(g)} \rightleftharpoons 2N_{2(g)} + 6H_2O_{(g)}$$

(a) Its show that 1 mole of NH_3 will produce ½ moles of N_2
(b) 1 mole of NH_3 will produces 6 mole of N_2
(c) For the complete reaction 2 moles of NH_3 and 20 g of O_2 are required
(d) Fr the complete reaction, 2 moles of NH_3 and 40 g of O_2 are required

24. Molecular formula is equal to: **(MTN 09)**

(a) n × empirical formula (b) n × compound formula
(c) n × atomic formula (d) n × structural formula

25. The number of atoms present in 0.5 moles of Na is: **(MTN 09)**

(a) 1.0×10^{23} (b) 6.02×10^{23} (c) 2.04×10^{23} (d) 3.01×10^{23}

26. The atomicity of NH_3 is: **(MTN, DGK 08, BWP 11)**

(a) One (b) Two (c) Three (d) Four

27. Water absorber used in combustion analysis is: **(MTN 09)**

(a) 50% KOH (b) 50% NaOH (c) Lime water (d) Mg $(ClO_4)_2$

28. The number of isotopes of oxygen is: **(BWP 08, 09)**

(a) One (b) Two (c) Four (d) Three

29. A limiting reactant is that one which: **(BWP 10)**

(a) Gives least number of moles of product (b) Gives greatest number of moles of product
(c) Is left behind after completion of reaction (d) Is most costly substances as compared to others

30. Atoms of which one of the following element have independent existence: **(BWP 10)**

(a) Flourine (b) krypton (c) Oxygen (d) Nitrogen

31. Dempster's mass spectrometer was designed for the identification of isotopes of the elements which were available in: **(DGK 08)**

(a) Gaseous state (b) Liquid state (c) Solid state (d) Plasma state

32. One of the substances is used to absorb CO_2 gas in combustion analysis which is that substance:

(a) 50% KOH (b) Al_2O_3 (c) $Mg(ClO_4)_2$ (d) SiO_2 **(DGK 10)**

33. Number of molecules in one dm^3 of H_20 is close to: **LHR 13, DGK 10)**

(a) 6.022×10^{23} (b) $18 \times 6.022 \times 10^{23}$ (c) $55.5 \times 6.022 \times 10^{23}$ (d) $\frac{18}{24} \times 10^{23}$

34. The volume occupied by 32 g of O_2 at S.T.P is: **(DGK 11)**

(a) 22.414 dm^3 (b) 2.241 dm^3 (c) 224.414 dm^3 (d) 0.224 dm^3

35. Silver has isotopes: **(LHR 10)**

(a) 2 (b) 16 (c) 17 (d) 18

36. The number of molecules in one gram atom of CO_2 is: **(GRW 10)**

(a) 6.02×10^{23} (b) 6.02×10^{22} (c) 6.02×10^{27} (d) 6.02×10^{24}

37. Mass of electron is: **(LHR 11)**

(a) 9.1095×10^{31} kg (b) 9.1095×10^{-31} kg (c) 9.1095×10^{-27} kg (d) 9.1095×10^{-31} g

38. The number of moles of CO_2 which contain 8.0 gram of oxygen is: **(LHR, GRW 12, 14)**

(a) 0.25 (b) 0.50 (c) 1.0 (d) 1.50

39. How many isotopes are present in palladium? **(LHR 13)**

(a) Four (b) Five (c) Six (d) Seven

40. The chemical analysis in which all the elements present in a compound are identified: **(FSD 10)**

(a) Quantitative analysis (b) Qualitative analysis

(c) Gravimetric analysis (d) none of these

41. Which of the following element can exist in monoatomic form **(MTN 11)**

(a) Oxygen (b) Chlorine (c) Nitrogen (d) Helium

ANSWER KEY

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

Chapter 2 EXPERIMENTAL TECHNIQUES IN CHEMISTRY

MULTIPLE CHOICE QUESTIONS

1. In paper chromatography, the point to which the solvent rises to maximum extent is called: **(GRW 07)**
(a) Eluent (b) Chromatogram
(c) Solvent front (d) Base line

2. Which one of the following substances is used as decolorizing agent: **(GRW 08, 09,LHR 14)**
(a) Animal charcoal (b) Conc. H_2SO_4
(c) $CaCl_2$ (d) Silica gel

3. The iodine present in water can be separated by which one of the following techniques: **(GRW 08)**
(a) Sublimation (b) Chromatography
(c) Filtration (d) Solvent extraction

4. Chromatography in which the stationary phase is liquid is called: **(LHR 07)**
(a) Adsorption chromatography (b) Partition chromatography
(c) Column chromatography (d) None of these

5. Rate of filtration can be increased using: **(LHR 08, 11)**
(a) Desiccator (b) Chromatographic tank
(c) Cold finger (d) Suction flask

6. A component having small value of K (distribution coefficient) mostly remains in: **(LHR 08)**
(a) Stationary phase (b) Mobile phase
(c) Chromatographic tank (d) None of these

7. Direct conversion of solid into vapors is called: **(GRW 09)**
(a) Crystallization (b) Sublimation
(c) Distribution (d) Vaporization

8. Which of the following is purified by sublimation: **(LHR 09)**
(a) Naphthalene (b) Benzoic acid
(c) Ammonium chloride (d) All of these

9. Substance that does not show the process of sublimation is: **(GRW 11)**
(a) $K_2Cr_2O_7$ (b) Iodine
(c) Naphthalene (d) NH_4Cl

10. Solvent extraction is an equilibrium process and is controlled by: **(FSD 07, 09, SGD 09, 11, RWP 08, 11, LHR 10, GRW 14)**
(a) Distribution law (b) The amount of solvent used
(c) Law of mass action (d) The amount of solute

11. Which is not used as drying agent in vacuum desiccator is: **(LHR 14)**
(a) P_2O_5 (b) $CaCl_2$
(c) $MgCl_2$ (d) Silica gel

12. Which chemical do not undergo sublimation? **(MTN 07, FSD 08)**
(a) $KMnO_4$ (b) Naphthalene
(c) NH_4Cl (d) Iodine

13. Iodine dissolves in water in the presence of KI due to formation of which one of the following species? **(BWP 11, FSD 10, LHR 13)**
(a) I_2 (b) I^-
(c) I_3^- (d) I_4

14. The most common solvent used in solvent extraction is: **(FSD 11)**
(a) Acetone (b) Ethanol
(c) Rectified spirit (d) Diethyl ether

15. Which of the following substance shows the property of sublimation? **(SGD 10, BWP 08)**
(a) Sodium chloride (b) Ammonium chloride
(c) Copper chloride (d) Acetic acid

16. In paper chromatography, the mobile phase is usually: **(RWP 08)**

(a) Liquid ammonia (b) Water
(c) Organic liquid (d) None of these

17. The comparative rate at which the solutes move in paper chromatography depends on: **(RWP 09, MTN 08, LHR 12, GRW 12, 14)**

(a) The size of paper (b) R_f values of solutes
(c) Temperature of the experiment (d) Size of the chromatographic tank used

18. When hot saturated solution is cooled very slowly we get: **(RWP 10, DGK 11)**

(a) Medium size crystals (b) Large size crystals
(c) Premature crystallization of the substance (d) No crystals

19. Chromatography is the process which involves the distribution of a solute between: **(MTN 07)**

(a) Two mobile phases (b) A stationary phase and a mobile phase
(c) Two stationary and two mobile phases (d) Two stationary phases

20. In CCl_4 solvent, I_2 shows: **(MTN 07)**

(a) Blue colour (b) Brown colour
(c) Pink colour (d) Purple colour

21. The drying Agents used in vacuum desiccator are: **(MTN 08)**

(a) $CaCl_2$ (b) Silica gel
(c) Both a and b (d) None

22. The ratio of the solute in organic phase to that in aqueous phase is called: **(MTN 08, 10, BWP 08)**

(a) Rate constant (b) Equilibrium constant
(c) Distribution coefficient (d) Arrhenius constant

23. When an organic compound which is volatile or thermally unstable it is separated by: **(MTN 09)**

(a) Crystallization (b) Sublimation
(c) Solvent extraction (d) Chromatography

24. Iodine can be purified by process of: **(MTN 09)**

(a) Evaporation (b) Saponification
(c) Sublimation (d) Crystallization

25. Insoluble particles can be separated from a liquid by: **(MTN 11)**

(a) Sublimation (b) Solvent extraction
(c) Filtration (d) Crystallization

26. Repeated extraction using small portion of solvent are more: **(DGK 08)**

(a) Accurate (b) Efficient
(c) Slow (d) Rapid

27. The chromatography in which stationary phase is liquid is called: **(DGK 08)**

(a) Partition chromatography (b) Column chromatography
(c) Adsorption chromatography (d) All of these

28. In chromatography the stationary phase: **(DGK 10, FSD 08)**

(a) Is a solid (b) Is a liquid
(c) May be liquid or gas (d) May be solid or liquid

29. The drying agents used in vacuum desiccator are: **(LHR 12)**

(a) AgCl (b) NH_4Cl
(c) $CaCl_2$ (d) $AlCl_3$

30. Gooch crucible is made of: **(LHR 14)**

(a) Clay (b) Asbestos
(c) Porcelain (d) Iron

31. Solvent extraction is a process: **(LHR 14)**

(a) Exothermic (b) Endothermic
(c) Equilibrium (d) Non-equilibrium

32. Purity of a substance is checked by:

(a) Crystallization (b) Sublimation
(c) Solvent extraction (d) Chromatography

ANSWER KEY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
c	a	d	b	d	a	b	d	a	a	c	a	c	d	b
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
C	b	b	b	d	c	c	d	c	c	b	a	d	c	c
31	**32**													
C	d													

Chapter 3 GASES

MULTIPLE CHOICE QUESTIONS

1. The ideal gas constant R, when expressed in dm^3 atm. $mol^{-1}.K^{-1}$ units have a value of: **(GRW 05)**

(a) 0.0821 (b) 1.0821 (c) 82.21 (d) 82.1

2. Calorie is equivalent to: **(GRW 05)**

(a) 0.4184 J (b) 41.84 J (c) 4.184 J (d) 10.418 J

3 The density of a gas can be determined by formula: **(GRW 06, FSD 11)**

(a) $d = \frac{PM}{RT}$ (b) $d = \frac{RT}{PM}$ (c) $d = \frac{PMR}{T}$ (d) $d = \frac{PMT}{R}$

4. Which gas has highest diffusion rate? **(LHR 06)**

(a) SO_2 (b) Cl_2 (c) NH_3 (d) CO_2

5. Mathematically Boyle's law is shown as: **(LHR 07)**

(a) PT = K (b) VT = K (c) $\frac{P}{T} = K$ (d) PV = K

6. Absolute zero is equal to: **(GRW 07)**

(a) 273°C (b) –273°C (c) 0°C (d) 273 K

7. If the values of 'a' and 'b' in Van der Waal's equation are close to zero for a gas, then the gas is:

(a) Ideal (b) Non-ideal (c) highly polar (d) Liquefied easily **(LHR 08)**

8. The constant factor in Charles's law is: **(GRW 08)**

(a) Volume (b) temperature (c) Pressure (d) all of these

9. Which gas will diffuse more rapidly: **(GRW 09)**

(a) CO_2 (b) NH_3 (c) HCl (d) SO_2

10. Normal human body temperature is: **(LHR 11)**

(a) 37°C (b) 98.6°C (c) 37°F (d) 273 K

11. Partial pressure of oxygen in human lungs in torr is: **(MTN 07, DGK 08, GRW 11, 08, LHR 12)**

(a) 161 (b) 116 (c) 159 (d) 760

12. The molar volume of CO_2 is maximum at: **(LHR, SGD 10, RWP 09)**

(a) S.T.P (b) 127°C and 1 atm (c) 0°C and 2 atm (d) 273K

13. The order of rate of diffusion of gases NH_3, SO_2, Cl_2 and CO_2 is:

(a) $NH_3 > SO_2 > Cl_2 > CO_2$ (b) $NH_3 > CO_2 > SO_2 > Cl_2$

(c) $Cl_2 > SO_2 > CO_2 > NH_3$ (d) $NH_3 > CO_2 > Cl_2 > SO_2$

14. Plasma is conductor of electricity: **(MTN 08, FSD 09)**

(a) Bad (b) Poor (c) Good (d) None

15. To calculate the pressure and volume of a real gas under the non-ideal conditions, alternate kinetic equation has been developed. This is known as: **(FSD 10)**

(a) General gas equation (b) Arrhenius equation

(c) Clausius Clapeyron equation (d) van der Waal's equation

16. If absolute temperature of a gas is doubled and pressure is reduced to one half, the volume of the gas will: **(SGD 09, RWP 10, MTN, BWP, DGK 11)**

(a) Remain unchanged (b) Increase four times

(c) Reduce to ¼ (d) Be doubled

17. Pressure remaining constant, at which temperature the volume of a gas will become twice of what it is at 0°C. **(RWP 08)**

(a) 546°C (b) 200°C (c) 546 K (d) 273 K

18. One torr is equal to: **(RWP 08)**

(a) One atmosphere (b) One Pascal (c) One mm of Hg (d) 76 cm of Hg

19. S.I unit of pressure is: **(RWP 09)**

(a) Torr (b) mm Hg (c) Nm^{-2} (d) Pound $inch^{-2}$

20. The spreading of fragrance of scent in air is due to: **(SWL 15, RWP 11)**

(a) Effusion (b) Diffusion (c) Osmosis (d) Density.

21. The value of R (in $Nm\ K^{-1}\ mol^{-1}$) is: **(MTN 08)**

(a) 8.214 (b) 8.314 (c) 0.0321 (d) 62.4

22. Which of the following will have the same number of moles at S.T.P? **(MTN 08)**

(a) 280 cm^3 of CO_2 and 280 cm^3 of N_2O (b) 11.2 dm^3 of O_2 and 32 g of O2

(c) 44 g CO_2 and 11.2 dm^3 of CO (d) 28.0g N_2 and 5.6 g O_2 of oxygen

23. The absolute zero is: **(MTN 09)**

(a) Attainable (b) May be attainable

(c) Un attainable in gaseous state (d) My not be attainable

24. Standard temperature: **(MTN 09)**

(a) 0°C (b) 75°C (c) 273°C (d) 100°C

25. The colour of NO_2 gas is: **(BWP 08)**

(a) Yellow (b) Green (c) Brown (d) Blue

26. Pilots feel uncomfortable breathing in unpressurized cabins: **(BWP 08)**

(a) Due to high pressure of CO_2 (b) Due to low pressure of O_2

(c) Due to fatigue (d) Due to low pressure of CO_2

27. Plasmas are found in everything from sun to: **(DGK 08)**

(a) Atoms (b) Molecules (c) Electrons (d) Quarks

28. Which gas will diffuse more rapidly among the following? **(DGK 10)**

(a) N_2 (b) H_2 (c) CO (d) NH_3

29. Which gas diffuses most rapidly? **(LHR 06)**

(a) HCl (b) NH_3 (c) SO_2 (d) CO_2

ANSWER KEY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
a	c	a	c	d	b	a	c	b	a	c	b	b	c	d
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	
b	c	c	c	b	b	a	c	a	c	b	d	B b	b	

Chapter 4 LIQUIDS & SOLIDS

MULTIPLE CHOICE QUESTIONS

1. Which one is the example of cubic crystals?
(a) Graphite (b) Sugar (c) Borax (d) Diamond

2. The boiling point of the halogens:
(a) Increase down the group (b) Decrease down the group
(c) Remains constant (d) can't be predicted

3. Vapor pressure of a liquid in a closed container depends upon:
(a) Surface area of container (b) Temperature
(c) Amount of liquid (d) All of these

4. A crystal system in which all the axes and angles are unequal is called:
(a) Tetragonal system (b) Monoclinic system
(c) Triclinic system (d) Cubic system

5. At Murree hills water boils at:
(a) 98°C (b) 100°C (c) 0°C (d) 50°C

6. Coordination number of Na^+ ion in NaCl is:
(a) One (b) Two (c) Four (d) Six

7. Water may boil at 120°C when external pressure is: **(LHR 14)**
(a) 369 torr (b) 700 torr (c) 760 torr (d) 1489 torr

8. Crystals formed due to London forces of interaction are:
(a) Ionic (b) Covalent (c) Molecular (d) Metallic

9. Forces which are preset between ions and water molecules are
(a) Dipole-induced dipole forces (b) Dipole-dipole forces
(c) Ion dipole forces (d) London dispersion forces

10. How many allotropic forms are present in carbon? Three
(a) Two (b) Three (c) Four (d) Five

11. Transition temperature of tin is
(a) 95.5°C (b) 13.2°C (c) 0°C (d) 128.5°C

12. The crystal of diamond is:
(a) Ionic (b) Covalent (c) Molecular (d) Metallic

13. Liquid hydrocarbon is:
(a) Methane (b) Propane (c) Ethane (d) Hexane

14. The example of hexagonal system is: **(LHR 11)**
(a) Sulphur (b) NaCl (c) Graphite (d) Diamond

15. Hydrogen bonding is strongest in:
(a) Hl (b) HBr (c) HCl (d) HF

16. Allotropy is the property of: **(GRW 11)**
(a) Element (b) Compound (c) Mixture (d) Ions

17. Ice occupies more space than liquid water. **(LHR 10)**
(a) 9% (b) 10% (c) 11% (d) 12%

18. Structure of ice is:
(a) Tetrahedral (b) Octahedral (c) Cubic (d) Triclinic

19. In orthorhombic crystal, the unit cell dimensions are:
(a) $a = b \neq c \quad \alpha = \beta = \gamma = 90^o$ (b) $a \neq b \neq c \quad \alpha = \beta = \gamma = 90^o$
(c) $a \neq b \neq c \quad \alpha = \beta = \gamma \neq 90^o$ (d) $a \neq b \neq c \quad \alpha = \beta = \gamma \neq 90^o$

20. London dispersion forces are significant for:
(a) Polar molecules (b) Ionic solids (c) Metals (d) Non polar molecules

21. Which substance shows anisotropic behavior in electrical conductivity?
(a) Diamond (b) Graphite (c) KCl (d) Ice

22. The boiling points of higher alkanes are greater than those of lower alkanes due to the reasons that:
(a) Higher alkanes have greater number of atoms
(b) The polarizability of higher alkanes is greater
(c) Higher alkanes have zigzag structures
(d) Higher alkanes have greater hydrogen bonding

23. Water has maximum density at:
(a) 4°C (b) 0°C (c) 100°C (d) 10°C

24. K_2SO_4 and K_2CrO_4 are isomorphic solids and exist in:
(a) Cubic form (b) Orthorhombic form (c) Trigonal form (d) Tetragonal

25. The transition temperature of KNO_3 is:
(a) 13.2°C (b) 95.5°C (c) 128 °C (d) 32.02°C

26. The distillation of liquid under reduced pressure is called:
(a) Destructive distillation (b) Vacuum distillation
(c) Fractional distillation (d) Simple distillation

27. The structure of sodium chloride is:
(a) Body centered cube (b) Face centered cube
(c) Simple cube (d) None

28. The forces which are present between the ions and the water molecules are known as:
(a) Dipole induced forces (b) Ion-dipole forces
(c) Dipole-dipole forces (d) London dispersion forces

29. LiF is a crystalline substance and has:
(a) Ionic crystals (b) Metallic crystals
(c) Covalent crystals (d) Molecular crystals

30. Which of the following liquid has highest boiling point?
(a) HCl (b) HBr (c) H_2O (d) Br_2

31. The number of Na^+ ions which surround each Cl^- ion in the NaCl crystal is:
(a) 4 (b) 6 (c) 8 (d) 12

32. Liquids evaporate at every temperature. When the temperature becomes constant for a liquid then:
(a) Rate of evaporation is greater than the rate of condensation.
(b) The rate of condensation is greater than the rate of evaporation.
(c) The rate of condensation and evaporation becomes equal
(d) Depends upon the nature of the liquid

33. Ionic solid don't conduct the electrical current because:
(a) Ions do not have translatory motion (b) Free electrons are less
(c) The coordination number of the ion is very high
(d) Strong covalent bonds are present in their structure

34. Amorphous means:
(a) Ordered (b) Arranged (c) Shaped (d) Shapeless

35. Polarizability is measure of extent of distortion:
(a) Qualitative (b) Quantitative (c) Systematic (d) None of these

36. Heat change for one mole of a solid during converting into liquid is called:
(a) Molar heat of vaporization (b) Molar heat of sublimation
(c) Molar heat of fusion (d) Enthalpy change

37. Which of the following does not form a molecular crystal?
(a) Ice (b) Graphite (c) Iodine (d) Sugar

38. Evaporation causes:
(a) Cooling (b) Heating (c) Boiling (d) irritation

39. Diamond and graphite are example of:
(a) Isomorphism (b) Polymorphism (c) Isomerism (d) Allotropy

40. Dipole-induced dipole forces are also called:
(a) London dispersion forces (b) Debye forces
(c) Huckel forces (d) Electrostatic forces

41. The size of diameter of double helix of DNA is:
(a) 18-20 Å (b) 20-30 Å (c) 1-10 Å (d) 25-30 Å

42. Which statement is incorrect about tetragonal crystal system?
(a) $a = b \neq c$ (b) $a \neq b = c$ (c) $\alpha = \beta = \gamma = 90^o$ (d) None of these

43. Crystal system shown by diamond is:
(a) Cubic (b) Tetragonal (c) Monoclinic (d) Hexagonal

44. The strongest acid among halogen acids is:
(a) HF (b) HCl (c) HBr (d) HI

45. The number of Cl^- ions per unit cell of NaCl is:
(a) 8 (b) 6 (c) 4 (d) 2

46. How much more space is occupied by water on freezing:
(a) 9% (b) 8% (c) 7% (d) 6%

47. Boiling point of H_2O at Mount Everest would be:
(a) 98°C (b) 100°C (c) 101°C (d) 69°C

48. Allotropy is the property of:
(a) Compound (b) Element (c) Atoms (d) Mixture

49. Hydrogen bonding is maximum for:
(a) Ethanol (b) Water (c) Benzene (d) Diethyl ether

50. The existence of an element in more than one crystalline forms: **(LHR 12, 13)**
(a) Allotropy (b) Isotropy (c) Isomorphism (d) Polymorphism

51. Dry ice (Solid CO_2) is an example of solid: **(LHR 14)**
(a) Covalent (b) Molecular (c) Ionic (d) Metallic

52. Glycerine decomposes at its: **(LHR 14)**
(a) Melting point (b) Boiling point (c) Freezing point (d) Critical point

53. Which one is the following is a pseudo solid: **(LHR, GRW 14)**
(a) CaF_2 (b) NaCl (c) Borax (d) Glass

ANSWER KEY

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

Chapter 5 ATOMIC STRUCTURE

MULTIPLE CHOICE QUESTIONS

1. Maximum number of electrons in a subshell is given by: **(LHR 05, 14)**
(a) $2\ell + 1$ (b) $2\ell - 1$ (c) $2(2\ell + 1)$ (d) $2(2\ell - 1)$

2. An orbital can accommodate maximum electrons: **(LHR 14, GRW 06)**
(a) 10 (b) 14 (c) 6 (d) 2

3. How many times the mass of neutron is greater than that of electron? **(GRW 07)**
(a) 1480 (b) 2000 (c) 200 (d) 1840

4. Lyman Series is obtained when electron in an atom jumps from higher energy level to: **(GRW 07)**
(a) Ground level (b) 2nd level (c) 3rd level (d) 4th level

5. When 6d orbital is complete, the entering electron goes into: **(LHR 07, SGD 09, RWP 10, MTN, DGK 11)**
(a) 7f (b) 7s (c) 7p (d) 7d

6. Lyman series occur in: **(SGD 10, LHR 07)**
(a) Visible region (b) U.V. region (c) I.R. region (d) None of these

7. $\frac{e}{m}$ value for positive rays is maximum for: **(LHR 08 13, GRW 09, MTN 07)**
(a) Hydrogen (b) Helium (c) Oxygen (d) Nitrogen

8. According to Bohr's atomic model, radius of second orbit of hydrogen atom is: **(LHR 08)**
(a) 0.529 Å (b) 2.116 Å (c) 4.0 Å (d) 5.0 Å

9. Lines of Paschen series are produced when electrons jump from higher orbits to --------- orbit.
(a) 1st (b) 2nd (c) 3rd (d) 4th **(GRW 08)**

10. The electronic configuration of an atom is $1s^2, 2s^2, 2p^4$. The number of unpaired electrons in this atom is: **(GRW 08)**
(a) 0 (b) 2 (c) 4 (d) 6

11. Negative charge on cathode rays we established by: **(GRW 09)**
(a) William Crook (b) J. Perrin (c) R.A Millikan (d) Hittrof

12. An orbital which is spherical and symmetrical is: **(LHR 09)**
(a) s-orbital (b) p-orbital (c) d-orbital (d) f-orbital

13. Angstrom is the unit of: **(LHR 09)**
(a) time (b) length (c) mass (d) frequency

14. Mass of electron is: **(LHR 11)**
(a) 9.1095×10^{31} kg (b) 9.1095×10^{-31} kg
(c) 9.1095×10^{-27} kg (d) 9.1095×10^{-31} g

15. Neutron was discovered by: **(LHR 11)**
(a) Chadwick (b) C.D. Anderson (c) Rutherford (d) Goldstein

16. Bambardment of α-particles on Beryllium (Be) atom, emits neutron and this process is called:
(a) Natural radioactivity (b) Artificial radioactivity **(GRW 11)**
(c) Pauli's exclusion principle (d) Hund's rule

17. Balmer series in hydrogen spectrum lies in the region: **(FSD 07, GRW 11)**
(a) Ultraviolet (b) Visible (c) Infrared (d) Microwave

18. The value of Planck's constant is: **(LHR 10)**
(a) 6.62×10^{-34} J.s (b) 6.62×10^{-27} J.s (c) 6.62×10^{-21} J.s (d) 6.62×10^{-31} J.s

19. Properties of waves are: **(FSD 09)**
(a) Wave length (b) Wave number (c) Frequency (d) All

20. Which equation correctly represents the Heisenberg's uncertainty principle? **(FSD 10)**
(a) $\Delta x\, \Delta P = \frac{h}{4\pi}$ (b) $\Delta x\, \Delta P > \frac{h}{4\pi}$ (c) $\Delta x\, \Delta P \geq \frac{h}{4\pi}$ (d) $\Delta x\, \Delta P \leq \frac{h}{4\pi}$

21. $^{65}_{29}Cu + ^{1}_{0}n \longrightarrow ^{66}_{29}Cu$ + "x" What is "x" **(LHR 14, BWP 11, FSD 10)**

(a) Electrons (b) Protons (c) Beta rays (d) Gamma ray

22. The number of neutrons present in $^{39}_{19}K$ is: **(MTN 07, DGK 10, FSD 11)**

(a) 39 (b) 18 (c) 20 (d) 19

23. When 4s orbital is complete, the electron goes into: **(SGD 10)**

(a) 4p (b) 3d (c) 4d (d) 4f

24. The limiting line of Balmer series lies in the region: **(SGD 11)**

(a) Visible (b) U.V. (c) Near I.R (d) Far I.R

25. Which of the following orbitals is dumb bell shaped? **(RWP 08)**

(a) s-orbital (b) p-orbital (c) d-orbital (d) f-orbital

26. Free neutron decays into a proton with the emission of an electron and a _____: **(RWP 08)**

(a) Positron (b) Neutrino (c) Beta Particle (d) Helium nucleus

27. The mass of an oxygen atom is: **(RWP 10)**

(a) 2.657×10^{-23} g (b) 2.657×10^{23} g (c) 16 g (d) 32 g

28. The electrons occupying an orbital are distinguished by: **(MTN 07)**

(a) Magnetic quantum number (b) Principal quantum number
(c) Azimuthal quantum number (d) Spin quantum number

29. The mass of proton is (in kg): **(MTN 08)**

(a) $+1.6 \times 10^{-19}$ (b) -1.6×10^{-19} (c) 1.672×10^{-27} (d) 9.1×10^{-31}

30. Bohr's model of atom is contradicted by: **(MTN 08)**

(a) Photo electric effect (b) Pauli's exclusion principle
(c) Heisenberg's uncertainty principle (d) Aufbau principle

31. K-series X-Rays have wavelength: **(MTN 09)**

(a) Longer (b) Smaller (c) Same (d) Different

32. What is the value of (n + *l*) for the 3s sub-shell? **(MTN 09)**

(a) 2 (b) 1 (c) 5 (d) 3

33. Cathode rays consist of: **(MTN 09)**

(a) Electrons (b) Protons (c) Neutrons (d) Nucleons

34. The d-subshell consists of: **(MTN 09)**

(a) 5-orbitals (b) 6-orbitals (c) 7-orbitals (d) 10-orbitals

35. Orbitals having same energy are called: **(MTN 10, BWP 09)**

(a) Hybrid orbitals (b) Valence orbitals (c) d-orbitals (d) Degenerate orbitals

36. Positive rays were discovered by: **(MTN 11)**

(a) J.J. Thomson (b) Rutherford (c) William Crooks (d) E. Goldstein

37. Mass of one mole of electron is: **(MTN 11)**

(a) 0.55 mg (b) 0.184 mg (c) 1.673 mg (d) 1.008 mg

38. For the p sub shell the azimuthal quantum number "*l*" is: **(BWP 08)**

(a) 2 (b) 3 (c) zero (d) 1

39. If an electron is free from the attraction of nucleus then its energy is: **(BWP 08)**

(a) Negative (b) Positive (c) Zero (d) None of these

40. In discharge tube experiment, the pressure of gas was maintained at: **(BWP 10)**

(a) 760 torr (b) 0.1 torr (c) 0.01 torr (d) 10 torr

41. Splitting of spectral lines when atoms are subjected to strong magnetic field is called:

(a) Zeeman effect (b) Stark effect **(BWP 10, 11)**
(c) Compton effect (d) Photoelectric effect

42. Which one of the following series lies in ultraviolet region: **(DGK 08)**

(a) Lyman (b) Balmer (c) Paschen (d) Brackett

43. The shape of 'p' orbitals is: **(DGK 08)**

(a) Double dumb-bell (b) Spherical (c) Dumb-bell (d) Complicated

44. Value of Rydberg's constant is: **(DGK 10)**

(a) $1.7904 \times 10^{7}\ m^{-1}$ (b) $1.9768 \times 10^{7}\ m^{-1}$
(c) $1.09678 \times 10^{7}\ m^{-1}$ (d) $1.6 \times 10^{7}\ m^{-1}$

45. When the Azimuthal quantum number is 3 then 'm' can have **(DGK 11)**

(a) 5 values (b) 7 values (c) 2 values (d) 3 values

46. Total number of spectral regions in sunlight spectrum is: **(LHR 10)**

(a) 4 (b) 6 (c) 7 (d) 8

ANSWER KEY

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

Chapter 6 CHEMICAL BONDING

MULTIPLE CHOICE QUESTIONS

1. Which of the following molecules has a coordinate covalent bond? (LHR 05)
(a) HCl (b) NaCl (c) NH_4Cl (d) $AlCl_3$

2. The angle formed in sp hybridization is: (GRW 06)
(a) 120° (b) 180° (c) 109.5° (d) 107.5°

3. Ionic compounds are mostly obtained by the combination of group: (GRW 07)
(a) 3 and 5 (b) 2 and 5 (c) 4 and 8 (d) 1 and 7

4. Dipole moment of CO_2 is: (GRW 07)
(a) 1.84D (b) Zero D (c) 0.95 D (d) 2.2 D

5. In sp^2 hybridization, the orbitals are oriented at an angle of: (LHR 07)
(a) 109.5° (b) 120° (c) 180° (d) 0°

6. Which of the following species has unpaired electron in anti bonding molecular orbitals? (MTN 08, 10, BWP, LHR 08)
(a) H_2 (b) He_2 (c) O_2^{+2} (d) N_2^{-2}

7. A molecular orbital can contain maximum electrons equal to: (LHR 08)
(a) One (b) Two (c) Three (d) Four

8. Carbon dioxide and methane have dipole moment value: (GRW 08)
(a) Zero and 1.85. D (b) 1.70 D and 1.80 D (c) Both have zero (d) None of these

9. Nobel gases have maximum stability and least reactive because: (GRW 07)
(a) They are very safe (b) Their valence shells are complete
(c) They are gases (d) They are present in zero group

10. Which species has unpaired electron in anti-bonding molecular orbits? (GRW 09)
(a) O_2^{+2} (b) N_2^{2-} (c) B_2 (d) F_2

11. Octet rule is not followed in the formation of: (FSD 11, GRW 09, 12)
(a) NF_3 (b) CF_4 (c) CCl_4 (d) PCl_5

12. The most stable elements are: (LHR 09)
(a) Halogens (b) Lithium family (c) Noble gases (d) None of these

13. The hybridization of carbon in C_2H_4 is: (GRW 09, LHR 14)
(a) sp (b) sp^2 (c) sp^3 (d) not hybridized

14. Positive ions are called: (LHR 09)
(a) Cations (b) Anions (c) Molecules (d) Hydrated ions

15. Total number of bonds in C_2H_4 molecule is: (LHR 11)
(a) Six (b) Four (c) Five (d) Eight

16. The S.I unit of dipole moment is: (LHR 10, 11)
(a) Joule (b) Debye (c) Coulomb meter (d) Nm^{-2}

17. Ionic, covalent and co-ordinate covalent bond are present in: (GRW 11)
(a) SO_2 (b) NH_4Cl (c) C_2H_2 (d) H_2O

18. The highest electronegative element in the periodic table is: (FSD, GRW 11)
(a) Oxygen (b) Nitrogen (c) Chlorine (d) Fluorine

19. Bond angle between H-S-H bonds is: (LHR 10)
(a) 105.5° (b) 107.5° (c) 92° (d) 95°

20. S.I Unit of dipole moment is: (LHR 10)
(a) pm (b) Debye (c) mC (d) All

21. The amount of energy released by absorbing electron in the valence shell is: (MTN 08, 09, GRW 10)
(a) Ionization energy (b) Electron affinity (c) Electro-negativity (d) Atomization energy

22. The number of electrons shared in SF_6: (GRW 10)
(a) 4 (b) 12 (c) 6 (d) 8

23. Which of hydrogen halides has highest % of ionic character? **(FSD 07, 09, RWP 09, 11, LHR 13)**
(a) HCl (b) HBr (c) HF (d) HI

24. The geometry of $BeCl_2$ is: **(FSD 07)**
(a) Linear (b) Plane triangular (c) Tetrahedral (d) None of these

25. Orbitals having same energy are called: **(FSD 08)**
(a) Hybrid orbitals (b) Degenerate orbitals (c) Valence orbitals (d) Molecular orbitals

26. The four equivalent sp^3 hybrid orbitals in space are at angels of: **(FSD 08)**
(a) 120° (b) 107.5° (c) 109.5° (d) 104.5°

27. Which has unpaired electrons in anti-bonding molecular orbitals? **(FSD 08, SGD 11)**
(a) N_2^{-2} (b) O_2^{+2} (c) B_2 (d) F_2

28. The geometry of ethane is: **(FSD 09, LHR 13)**
(a) Tetrahedral (b) Trigonal planar (c) Linear (d) V-shaped

29. The paramagnetic property of oxygen is well-explained on the basis of: **(SGD 09)**
(a) VSEPR theory (b) VB theory (c) MO theory (d) None of these

30. The bond order of N_2 according to MO theory is: **(SGD 09)**
(a) Zero (b) 1 (c) 2 (d) 3

31. Which of the following compound has a co-ordinate covalent bond? **(DGK, SGD 10)**
(a) NH_4Cl (b) NaCl (c) HCl (d) $AlCl_3$

32. The carbon atom in C_2H_4 is: **(SGD 10)**
(a) sp^3 hybridized (b) sp^2 hybridized (c) sp hybridized (d) dsp^2 hybridized

33. The molecule which can not form co-ordinate covalent bond with H^+ ion is: **(SGD 11)**
(a) NH_3 (b) H_2O (c) PH_3 (d) CH_4

34. Which of the following species has configuration of Neon? **(RWP 08)**
(a) Na^+ (b) Ca^{+2} (c) Cl^- (d) None of these

35. The hybridization of carbon in CH_4 is: **(RWP 08)**
(a) sp (b) sp^2 (c) sp^3 (d) dsp^3

36. M.O.T was proposed by: **(DGK 11, RWP 10)**
(a) Moseley (b) Werner (c) Kossel (d) Mullikan

37. The number of bonds in Nitrogen molecule is: **(RWP 10)**
(a) One sigma and one Pi (b) One sigma and two Pi
(c) Three sigma only (d) Two sigma and one Pi

38. The geometry of ethane is: **(RWP 11)**
(a) Tetrahedral (b) Trigonal planner (c) Linear (d) V-shaped

39. In Al_2O_3 the ratio between the ions is: **(MTN 07)**
(a) 1:2 (b) 2:1 (c) 2:3 (d) 3:2

40. VSEPR theory was proposed by: **(MTN 07)**
(a) Nylholm and Gillespie (b) Kossel (c) Lewis (d) Sidgewick

41. O_2 molecule is paramagnetic because: **(MTN 07)**
(a) Bonding electrons are equal to the anti-bonding electrons
(b) Bonding electrons are more than anti-bonding electrons
(c) Bonding electrons are less than anti-bonding electron
(d) It contains unpaired electrons

42. NH_3 has a net dipole moment, but BF_3 has zero dipole movement because: **(MTN 07)**
(a) B is less electronegative than N (b) F is more electronegative than N
(c) BF_3 is pyramidal while NH_3 is planar (d) NH_3 is pyramidal while BF_3 is trigonal planar

43. The number of bonds in oxygen molecule is: **(MTN 08)**
(a) One sigma and one Pi-bond (b) Two sigma bonds
(c) Two pi-bonds (d) None of these

44. Which of the following molecule has zero dipole moment? **(MTN 09, SWL 15)**
(a) NH_3 (b) $CHCl_3$ (c) H_2O (d) BF_3

45. When two atoms form a bond, energy is: **(MTN 09)**
(a) Released (b) Absorbed (c) Not changed (d) None of these

46. Maximum electronegativity is of: **(MTN 09)**
(a) N (b) F (c) O (d) Cl

47. The bond energy of hydrogen molecule is KJ/mole: **(BWP 08)**
(a) 436 (b) 440 (c) 420 (d) 460

48. **The value of dipole moment of CS_2 is:** **(BWP 09)**
(a) 0.12D (b) Zero (c) 1.61 D (d) 0.95 D

49. **The nature of bond in diamond is:** **(BWP 10)**
(a) Electrovalent (b) Covalent (c) Metallic (d) Co-ordinate covalent

50. **Octet rule is not followed in formation of:** **(BWP 10)**
(a) NF_3 (b) CF_4 (c) CCl_4 (d) PCl_5

51. **The shielding effect is responsible for:** **(BWP 11)**
(a) The decrease in nuclear attractive influence over the valence electrons
(b) The increase in nuclear attractive influence over the valence electrons
(c) The decrease repulsion between nucleus and inner electrons
(d) The increase in attraction between nucleus and inner electrons.

52. **The elements having low ionization energy are:** **(DGK 08)**
(a) Non-metal (b) Metals (c) Semi-metal (d) Metalloids

53. **Which of the following is not isoelectronic with rest of the three?** **(DGK 08)**
(a) K^+ (b) Na^+ (c) Cl^- (d) S^{-2}

54. **Which of the hydrogen halides has the highest percentage of acid character:** **(DGK 09)**
(a) HCl (b) HBr (c) HF (d) Hl

55. **The four equivalent sp^3 hybrid orbitals in space are at an angel of:** **(DGK 09)**
(a) 120° (b) 107.5° (c) 104.5° (d) 109.5°

56. **Total number of sigma bonds in Ethyne (CH≡CH) are:** **(DGK 10)**
(a) Five (b) Three (c) Two (d) Four

57. **Bond formed by mutual sharing of electrons is called:** **(LHR 12)**
(a) Ionic bond (b) Covalent bond (c) Co-ordinate covalent bond (d) All of these

58. **Formation of chemical bond takes place when:** **(LHR 13)**
(a) Energy is absorbed (b) Forces of repulsion overcome forces of attraction
(c) Forces of attraction are equal to forces of repulsion
(d) Forces of attraction overcome forces of repulsion

ANSWER KEY

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

Chapter 7 THERMOCHEMISTRY

MULTIPLE CHOICE QUESTIONS

1. Spontaneous reactions are: **(LHR 05)**
(a) Reversible (b) Irreversible (c) Non irreversible (d) None of these

2. The standard heat changes occur at: **(BWP 08, GRW 06)**
(a) 25°C and 2 atm (b) 298 K and 1 atm
(c) 25°C and 1 mm hg (d) 273 K and 1 atm

3. $H^+ + OH^- \rightarrow H_2O$ the change in enthalpy for reaction is called: **(LHR 06)**
(a) Heat of reaction (b) heat of formation
(c) Heat of neutralization (d) Heat of combustion

4. The net change in energy in a chemical reaction is same whether it takes place directly or indirectly. It is called: **(RWP 11, GRW 07, BWP 10)**
(a) Henry's law (b) Charlie's law (c) Hess's law (d) Graham's law

5. The enthalpy change when one mole of substance is completely burnt in excess of oxygen is called: **(LHR 07)**
(a) Enthalpy of atomization (b) Enthalpy of neutralization
(c) Enthalpy of Combustion (d) Enthalpy of formation

6. Enthalpy change for the reaction: $CH_{4(g)} + 2O_{2(g)} \rightarrow CO_{2(g)} + 2H_2O_{(l)}$ is called enthalpy of: **(LHR 08)**
(a) Formation (b) Combustion (c) Neutralization (d) Atomization

7. Standard enthalpies are measured at: **(FSD 11, LHR 09)**
(a) 273 K (b) 298K (c) 373 K (d) All of these

8. The exothermic process is: **DGK 10, GRW, LHR 11)**
(a) Evaporation (b) Sublimation (c) Respiration (d) Boiling

9. A state function which describes together the internal energy and the product of pressure and volume is called: **(GRW 11)**
(a) Enthalpy (b) Internal energy (c) Work (d) Free energy

10. The total heat content of system is called: **(LHR 10)**
(a) Entropy (b) Enthalpy (c) Temperature (d) Internal energy

11. Whenever a reaction is exothermic, then it means that: **(GRW 10)**
(a) The heat is transferred from surroundings to the system
(b) The heat content of the reactant is greater than product
(c) The heat content of the reactants is less than those of products
(d) The heat is transferred from system to the surroundings.

12. At constant volume q_v is equal to: **(MTN 07, FSD 08)**
(a) ΔH (b) ΔE (c) ΔP (d) ΔV

13. The value of ΔH being very small, the term Δ (PV) can be neglected, for the process involving:
(a) Liquid and gas (b) Liquid and solids **(FSD 10)**
(c) Solids and gases (d) None of these

14. In a Bomb calorimeter, the reaction are carried out at constant: **(SGD 10)**
(a) Pressure (b) Work (c) Volume (d) None of these

15. Whenever a reaction is endothermic, than it means that: **MTN 07, DGK 09)**
(a) Heat is transferred from surrounding to the system
(b) Heat is transferred from system to the surrounding
(c) Heat content of the products is greater than those of the reactant
(d) Heat content of the reactants is greater than those of the products

16. The number of fundamental ways for transferring energy into or out of system is: **(MTN 08)**
(a) One (b) Two (c) Three (d) Four

17. Work is product of force and: **(MTN 09)**
(a) Volume (b) Time (c) Displacement (d) Pressure

18. The enthalpies of all elements in their standard states are: **(MTN 10)**

(a) Unity (b) Zero (c) Always positive (d) Always negative

19. Which of the following is not a state function? **(MTN 11, LHR 14)**

(a) Pressure (b) Volume (c) Temperature (d) Heat

20. Born-Haber's cycle is used to determine the: **(DGK 08)**

(a) Combustion energy (b) Decomposition energy
(c) Lattice energy (d) Formation energy

ANSWER KEY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
b	b	c	c	c	b	b	c	a	b	b	b	b	c	c
16	**17**	**18**	**19**	**20**										
b	c	b	d	c										

Chapter 8 CHEMICAL EQUILIBRIUM

MULTIPLE CHOICE QUESTIONS

1. The value of pH and pOH of pure water at 25°C is approximately: **(LHR 05)**
(a) 14 (b) 7 (c) 1×10^{-14} (d) 1×10^{14}

2. Equilibrium constant for gaseous equilibrium is represented by: **(DGK 10)**
(a) K_a (b) K_c (c) K_x (d) K_p

3. Conjugate acid of a very strong base is relatively: **GRW 06)**
(a) Very strong acid (b) Weak acid (c) Very weak acid (d) strong acid

4. Molarity of pure water is: **(LHR 06, 12)**
(a) 1 (b) 18 (c) 55.5 (d) 6

5. The suppression of ionization of weak acid or a weak base by adding one of its own ions is known as: **(GRW 07)**
(a) Buffer action (b) Common ion effect (c) Buffer capacity (d) Ionization effect

6. By adding NH_4Cl to NH_4OH solution, the ionization of NH_4OH: **(LHR 08)**
(a) Increases (b) Decreases (c) Remain same (d) Increases 100 times

7. pH of tomato is:
(a) 1.2 (b) 4.2 (c) 7.2 (d) 9.2

8. When K_c value is small, the equilibrium position is: **(MTN 09, DGK 11, GRW 08)**
(a) Towards left (b) Towards right (c) Remains unchanged (d) None of these

9. A basic buffer solution can be prepared by mixing: **(GRW 08)**
(a) A strong acid and salt with weak base (b) Weak base and its salt with strong acid
(c) Strong base and its salt with weak acid (d) Weak acid and its salt with strong base

10. The pOH of solution is 4. The H^+ ions concentration of solution is: **(MTN 07, 08, GRW 09)**
(a) 4.0 moles/dm^3 (b) 10^{-10} moles/dm^3 (c) 0.4 moles/dm^3 (d) 4×10^4 moles/dm^3

11. The concentrations of reactants and products at equilibrium are: **(LHR 09)**
(a) Equal (b) Maximum (c) Minimum (d) Constant

12. The term pH was introduced by: **(GRW 11, LHR 11, 12, 13)**
(a) Henderson (b) Sorenson (c) Goldstein (d) Thomson

13. The relationship between K_p and K_c is given by: **(LHR 11)**
(a) $K_c = K_p$ (b) $K_c = K_p$ **Error!** (c) $K_p = K_c (RT)^{\Delta n}$ (d) $K_p = K_c (RT)^{-\Delta n}$

14. The solubility of $KClO_3$ in water is suppressed by adding: **(GRW 11)**
(a) $NaClO_3$ (b) NaCl (c) $KMNO_4$ (d) KCl

15. Law of mass action was derived by Guldberg and wage in: **(LHR 10)**
(a) 1909 (b) 1906 (c) 1846 (d) 1864

16. Ionization of hydrogen sulphide gas is suppressed by: **(GRW 10)**
(a) KCl (b) NaCl (c) HCl (d) NH_4Cl

17. The pH of human blood is: **(MTN 07, 08, GRW 10)**
(a) 7.0 (b) 4.0 (c) 6.5 (d) 7.4

18. The ionic product of water will increase if: **GRW 10, LHR 13)**
(a) H^+ ions are added (b) OH^- ion are added
(c) Temperature is increased (d) H^+ and OH^- ions are added in equal amount.

19. When HCl is added to H_2S aqueous solution, its ionization: **(MTN 09, LHR 14)**
(a) Increases (b) Remains constant (c) Decreases (d) First decreases then increases

20. Which of the following factor affects on equilibrium constant? **(MTN 08)**
(a) Change in temperature (b) Change in concentration
(c) Change in Pressure (d) Change in volume

21. Which one of the following salt dissolves in water to form a solution with pH greater than 7?
(a) NaCl (b) $CuSO_4$ (c) Na_2CO_3 (d) NH_4Cl **(MTN 09)**

22. pH of milk is 6.5, its pOH will be: **(MTN 09)**
(a) 14 (b) 7.5 (c) 7 (d) none of these

23. The unit of equilibrium constant K_c for the reaction $H_2 + I_2 \rightleftharpoons 2HI$ is: **(MTN 10)**
(a) $Mole^{-1}\ dm^3$ (b) $Mole^{-2}\ dm^3$ (c) $Mole\ dm^{-1}$ (d) None of these

24. Which of the following reactions will be favored to the forward direction at low pressure?
(a) $N_2 + O_2 \rightleftharpoons 2NO$ (b) $N_2 + 3H_2 \rightleftharpoons 2NH_3$ **(MTN 10)**
(c) $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ (d) $H_2 + I_2 \rightleftharpoons 2HI$

25. pH of a buffer can be calculated by using: **(MTN 11)**
(a) Moseley's equation (b) Henderson's equation
(c) De-Broglie's equation (d) Bohr's equation

26. In synthesis of ammonia by Haber's process. The optimum condition for pressure is: **(MTN 11)**
(a) 150-160 atm (b) 170-200atm (c) 200-300 atm (d) 300-350 atm

27. A solution has pOH = 12 it is: **(BWP 08)**
(a) A base (b) An acid (c) Neutral (d) None of these

28. In the reaction $N_2 + 3H_2 \rightleftharpoons 2NH_3$ the catalyst used is: **(BWP 08)**
(a) Fe (b) Ni (c) Pt (d) Pd

29. The value of equilibrium constant can predict: **(BWP 09)**
(a) The direction of reaction (b) The extent of reaction
(c) The effect of catalyst used (d) Both the direction and extent of reaction

30. The pH of 10^{-3} mol dm^{-3} of an aqueous solution of HCl is: **(BWP 10)**
(a) 3.0 (b) 2.7 (c) 2.0 (d) 1.5

31. Formation of NH_3 is an exothermic reaction. Low temperature favors forward reaction. However, in Haber's process temperature used is: **(BWP 10)**
(a) 200°C (b) 300°C (c) 400°C (d) 500°C

32. The unit of equilibrium constant (K_c) for the reaction: **(BWP 11)**
$N_2 + 3H_2 \rightleftharpoons 2NH_3$ $\Delta H = -92KJ\ mol^{-1}$ will be:
(a) Having no unit (b) Mole dm^{-3} (c) $Mole^{+2}\ dm^{-6}$ (d) $Mole^{-2}dm^{+6}$

33. When KCl is added to a saturated solution of $KClO_3$, the equilibrium is shifted to the: **(BWP 11)**
(a) Forward direction (b) Backward direction (c) Not affected (d) All of these

34. In which of the following reactions K_c and K_p will be equal: **(DGK 08)**
(a) $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ (b) $N_2 + 3H_2 \rightleftharpoons 2NH_3$
(c) $2SO_2 + O_2 \rightleftharpoons 2SO_3$ (d) $N_2 + O_2 \rightleftharpoons 2NO$

35. When HCl is passed through saturated solution of NaCl the solubility of NaCl is: **(DGK 10)**
(a) Increased (b) Decreased (c) Not affected (d) None of all

36. pH of rain water is:
(a) 5.0 (b) 6.0 (c) 6.2 (d) 7.0

37. The law of mass action was given by: **(SWL 15)**
(a) D.C Down and P.Waage (b) Gay-Lussaic and C.M Guldberg
(c) C.M Guldberg and P. Waage (d) Handerson and Le- Chatelier

ANSWER KEY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
a	d	b	c	b	b	b	a	b	b	d	b	c	d	d
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
c	d	c	c	a	c	b	d	c	b	c	b	a	d	a
31	**32**	**33**	**34**	**35**	**36**	**37**								
c	d	b	d	b	c	c								

Chapter 9 SOLUTIONS

MULTIPLE CHOICE QUESTIONS

1. Depression in the freezing point is directly proportional to: **(LHR 05)**
(a) Molarity of solution (b) Molality of solution (c) Molality of solvent (d) None

2. Molarity of solution is expressed in: **(GRW 07)**
(a) Moles/kg (b) $g.dm^{-3}$ (c) $dm^3. mole^{-1}$ (d) $mole. dm^{-3}$

3. The no. of moles of solute dissolved per dm^3 of solution is called: **(LHR 07)**
(a) Molarity (b) Molality (c) Normality (d) Mole fraction

4. Benzene – ether can form: **(LHR 07)**
(a) Ideal solution (b) Non- ideal solution (c) Buffer solution (d) None of these

5. In a mixture of 28 grams of N_2 and 96 grams of O_2 the mole fraction of N_2: **(LHR 08)**
(a) 1.1 (b) 0.51 (c) 0.25 (d) 0.11

6. Which salt dissolves in water to form a solution with a pH greater than 7. **(GRW 08)**
(a) NaCl (b) $CuSO_4$ (c) Na_2CO_3 (d) NH_4Cl

7. The number of moles of solute per kilogram of solvent is called: **(GRW 09)**
(a) Molality (b) Molarity (c) Mole-fraction (d) Normality

8. 0.1 molar of solute dissolved in 100g of the solvent will be: **(LHR 09, GRW 10)**
(a) 0.1 molar (b) 1.0 molal (c) 0.5 molal (d) none of these

9. Raoult's law is represented by: **(LHR 09)**
(a) $P = P^oX_1$ (b) $\Delta P = P^oX_2$ (c) $\frac{\Delta P}{P^o} = X_2$ (d) all of these

10. The amount of NaOH required to prepared 250 cm^3 of 1M solution in grams is: **(GRW 11)**
(a) 10 (b) 15 (c) 20 (d) 25

11. 10g NaOH dissolved per 250 cm^3 of solution has molarity: **(LHR 10)**
(a) 0.5 M (b) 1.0 M (c) 1.5 M (d) 2.0 M

12. The azeotropic mixture of solution showing positive deviation can be distilled at _____ boiling point. **(FSD 07)**
(a) Maximum (b) Minimum (c) No sharp (d) None of these

13. The hydration energy of Br^- ion is _____ than F^- ion: **(FSD 07)**
(a) Equal to (b) Smaller than (c) Greater than (d) None of these

14. The molal boiling point elevation depends upon. **(FSD 08)**
(a) Nature of solvent (b) Vapour pressure of solution (c) Nature of solute (d) pH of solution

15. Chemical used to protect a car by preventing the liquid in the radiator from freezing is: **(FSD 09)**
(a) Phenol (b) Ethylene glycol (c) KNO_3 (d) Methanol

16. Which is a Colligative property? **(FSD 10)**
(a) Change in vapour pressure of a solution (b) Change in free energy of a solution
(c) Heat of vapourization of solvent in the solution (d) Lowering of vapour pressure of a solution

17. The concentration of solute in the solution when it is in equilibrium with the solid substance at a particular temperature is called its: **(SGD 10)**
(a) Solubility (b) Molarity (c) Molality (d) Mole fraction

18. Molar concentration is called: **(RWP 08)**
(a) Active mass (b) Weight (c) Mass (d) None of these

19. An aqueous solution of potassium acetate (CH_3OOK) is: **(RWP 08)**
(a) Acidic (b) Basic (c) Neutral (d) Amphoteric

20. 2g of NaOH is dissolved in 500 cm^3 of solution. The molarity of the solution is: **(RWP 09)**
(a) 2.0 M (b) 1.0 M (c) 0.2 (d) 0.1 M

21. Which one of the following gives acidic solution when dissolved in H_2O? **MTN 07, RWP 11)**
(a) NaCl (b) Na_2SO_4 (c) NH_4Cl (d) CH_3COONH_4

22. **In a mixture of 7g of N_2 and 8g of O_2 the mole fraction of O_2 is:** **(MTN 07)**
(a) 1 (b) 0.2 (c) 0.5 (d) 0.2

23. **Cheese and butter are the example of solution of:** **(MTN 08)**
(a) Liquid in liquid (b) Solid in solid (c) Liquid in solid (d) Solid in liquid

24. **A solution containing 5.3 g of Na_2CO_3 dissolved per dm^3 is:** **(MTN 09)**
(a) 1.0 M (b) 0.1M (c) 0.5 M (d) 0.05 M

25. **Water of crystallization of $CuSO_4$ is:** **(MTN 09)**
(a) five (b) ten (c) two (d) six

26. **If we dissolve Na_2SO_4 in water then the solution is:** **(BWP 08)**
(a) Acidic (b) Basic (c) Neutral (d) All of these

27. **Solution containing relatively lower concentrations of solutes are called:** **(BWP 09)**
(a) Dilute solutions (b) Concentrated solutions
(c) Saturated solutions (d) Ideal solutions

28. **The critical solution temperature of phenol-water system is:** **(DGK 08)**
(a) 35.6°C (b) 49.5°C (c) 57.8°C (d) 65.9°C

29. **Which one of the following is an ideal solution:** **(DGK 10)**
(a) C_2H_5OH and H_2O (b) C_6H_6 and CCl_4 (c) $CHCl_3$ and $(CH_3)_2CO$ (d) H_2O and HCl

30. **The mass of Glucose required to prepare 1 dm^3 of 20% glucose solution is:** **(DGK 11)**
(a) 18g (b) 180g (c) 36g (d) 200g

ANSWER KEY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
b	d	a	a	c	c	a	b	d	a	b	b	b	a	b
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
d	a	a	b	d	c	c	c	d	a	c	a	d	b	d

Chapter 10 ELECTROCHEMISTRY

MULTIPLE CHOICE QUESTIONS

1. Reduction always takes place: **(LHR 05, 12)**
(a) At anode (b) At cathode
(c) At both electrodes (d) does not occur at electrodes

2. The electrolyte KOH is used in cell: **(GRW 06)**
(a) Lead accumulator (b) Ni – Cd cell
(c) Alkaline battery (d) Silver oxide battery

3. In the reaction $2Fe + 3Cl_2 \longrightarrow 2FeCl_3$: **(BWP 10, GRW 09, LHR 06)**
(a) Fe is reduced (b) Fe is oxidized
(c) Cl_2 is oxidized (d) None of these happens

4. Oxidation state of hydrogen in CaH_2 is: **(GRW 07)**
(a) +1 (b) −1 (c) +2 (d) zero

5. Cu metal can be purified in electrolytic cell by making the impure Cu as: **(GRW 07)**
(a) Anode (b) Cathode (c) Anode and Cathode (d) Depends upon nature of solution

6. Loss of electrons is called: **(LHR 07)**
(a) Oxidation (b) Reduction (c) Hydration (d) Dehydration

7. Fuel cells convert chemical energy into: **(GRW 07)**
(a) Heat energy (b) Light energy (c) Electrical energy (d) Mechanical energy

8. Electrolysis is used for: **(LHR 08)**
(a) Electroplating (b) Manufacture of sodium metal (c) Manufacture of Al (d) All of these

9. Nelson's cell and Down's cell are example of: **(FSD 09, GRW 08)**
(a) Electrochemical cell (b) Galvanic cell (c) Electrolytic cell (d) None of these

10. The oxidation number of Cr in $K_2Cr_2O_7$ is: **(GRW 09, 10, LHR 10,12,13)**
(a) +14 (b) +12 (c) +6 (d) +13

11. The electrolyte used in fuel cell is: **(LHR 09, DGK, GRW 10)**
(a) Aqueous NaCl (b) Molten NaCl (c) KOH (d) $NaNO_3$

12. Which one is not an electrolyte: **(LHR 11)**
(a) Aqueous NaCl (b) Aqueous $CuSO_4$ (c) Cu metal (d) H_2SO_4

13. Oxidation state of Mn is MnO_4^{2-} is **(LHR 10)**
(a) +4 (b) +6 (c) +5 (d) -6

14. In H_2O_2 the oxidation state of oxygen is: **(SGD 09, GRW 11)**
(a) +1 (b) -1 (c) +2 (d) -2

15. Electrode potential of S.H.E arbitrarily taken in volts is: **(GRW 11)**
(a) 0.00 (b) 1.00 (c) 0.01 (d) 0.50

16. Oxidation number of chromium in $K_2Cr_2O_7$ is: **(RWP 09, LHR 10)**
(a) 2 (b) 4 (c) 6 (d) 12

17. E.M.f of Zn-Cu cell is: **(LHR 10)**
(a) 0.0V (b) 0.5 V (c) 1.0V (d) 1.10V

18. The oxidation number of Mn in $KMnO_4$ is: **(FSD 07)**
(a) 3 (b) 5 (c) 7 (d) 9

19. The oxidation potential of (S.H.E) is: **(FSD 08)**
(a) 0.02V (b) 0.1V (c) 0.00V (d) 0.20V

20. The highest reduction potential in the electrochemical series is of F_2 and its value is: **(FSD 10)**
(a) +3.87V (b) -3.87V (c) +2.87 V (d) -2.87V

21. Percentage of H_2SO_4 used in lead accumulator is: **(FSD 11)**
(a) 40% (b) 25% (c) 30% (d) 50%

22. Cathode in NICAD cell is: **(MTN 09, FSD 11,LHR 14)**
(a) Ag_2O (b) NiO_2
(c) Cd (d) Zn

23. According to classical concept, oxidation involves: **(SGD 10)**
(a) Addition of oxygen (b) Removal of hydrogen
(c) Increase in oxidation state (d) All of above

24. In Na_2O_2, the oxidation state of oxygen is: **(SGD 11)**
(a) -2 (b) +2 (c) -1 (d) +1

25. The extraction of Na-metal by electrolysis of fused NaCl is carried out in: **(RWP 08)**
(a) Down's cell (b) Fuel cell (c) Nelson's cell (d) Voltaic cell

26. When one metal is deposited on the surface of the other by the process of electrical current, it is called: **(RWP 09, 11)**
(a) Electrolysis (b) Electrolytic refining (c) Electroplating (d) Electrolytic

27. Sulphur has the highest state in: **(BWP, RWP 10)**
(a) SO_2 (b) SO_3 (c) H_2S (d) H_2SO_3

28. The cell in which electrical energy is converted into chemical energy is called: **(MTN 07)**
(a) Galvanic cell (b) Electrolytic cell (c) Fuel cell (d) Daniel cell

29. In rusting of iron shown by the reaction $4Fe + 3O_2 \longrightarrow 2F_2O_3$, Iron is: **(MTN 07)**
(a) Precipitated (b) Reduced (c) Hydrolyzed (d) Oxidized

30. Electrochemical series is the arrangement of the electrodes in: **(MTN 07)**
(a) Increasing order of reduction potentials (b) Decreasing order of reduction potentials
(c) Increasing order of oxidation reduction potential (d) there is not fixed arrangement

31. When aqueous NaCl is electrolyzed, which of the following get discharged at cathode: **(MTN 08)**
(a) H^+ (b) Na^+ (c) OH (d) Cl^-

32. The oxidation number of chromium in Cr_2O_3 is: **(MTN 08)**
(a) +3 (b) +4 (c) +6 (d) +12

33. Gain of electrons is called: **(MTN 09)**
(a) Oxidation (b) Reduction (c) Dissociation (d) Electrolysis

34. A decrease in oxidation number is called: **(MTN 09)**
(a) Oxidation (b) Reduction (c) Neutralization (d) e.m.f

35. Electrolysis is the process in which a chemical reaction takes place at the expense of: **(MTN 10)**
(a) Chemical energy (b) Electrical energy (c) Heat energy (d) Solar energy

36. Those cells which cannot be recharged are called: **(BWP 09)**
(a) Primary cell (b) Secondary cell (c) Tertiary cell (d) None of these

37. Fuel cell converts chemical energy into: **(BWP 11)**
(a) Heat energy (b) Electrical energy (c) Magnetic energy (d) Sound energy

38. Which one of the following cells is used for the extraction of Na metal: **(DGK 08)**
(a) Nelson's cell (b) Galvanic cell (c) Down's cell (d) All of these cells

39. Oxidation state of carbon in glucose ($C_6H_{12}O_6$) is: **(DGK 11)**
(a) Zero (b) One (c) Two (d) Four

40. The oxidation number of nitrogen in HNO_3 is: **(DGK 11)**
(a) +3 (b) -3 (c) -5 (d) +5

41. The best reducing agent is: **(DGK 11)**
(a) F^{-1} (b) Cl^{-1} (c) Br^{-1} (d) I^{-1}

42. Galvanic cells which cannot be re-charged are called: **(GRW12)**
(a) Diffused cells (b) Secondary cells (c) Tertiary cells (d) Primary cells

43. Oxidation number of oxygen in OF_2 is: **(LHR 14)**
(a) Zero (b) -1/2 (c) +2 (d) -1

ANSWER KEY

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

Chapter 11 REACTION KINETICS

MULTIPLE CHOICE QUESTIONS

1. Larger the surface area of the reactant molecules:
(a) Lower will be the rate of reaction (b) Higher will be the rate of reaction
(c) The rate of reaction remains unaffected (d) The rate may increase or decrease

2. In zero order reaction, the rate is independent of:
(a) Temperature of reaction (b) Concentration of reactants
(c) Concentration of product (d) None of these

3. The order of reaction of $O_3 + NO \longrightarrow NO_2 + O_2$ is:
(a) One (b) Two (c) Three (d) Zero

4. Decomposition of nitrogen pentaoxide has order of reaction:
(a) Zero (b) First (c) Second (d) Third

5. A substance which retards the rate of reaction is called:
(a) Inhibitor (b) Activator (c) Oxidant (d) Auto-Catalyst

6. The minimum amount of energy required for an effective collision is called:
(a) Activation energy (b) Internal energy (c) Translational energy (d) None

7. The catalyst used for the reaction $HCOOH \longrightarrow H_2+CO_2$ is:
(a) Copper (b) Alumina (c) Silica (d) Iron

8. Sugar solution hydrolyses to glucose and fructose in the presence of enzyme:
(a) Urease (b) Invertase (c) Zymase (d) None

9. When a reaction proceeds in sequence of steps, the overall rate is determined by:
(a) Faster step (b) Slowest step
(c) Molecularity of all steps (d) Order of different step

10. A substance which makes the catalyst more effective is called: **(LHR 10, 11)**
(a) Inhibitor (b) Retarder (c) Promoter (d) Auto Catalyst

11. If 75% of any given amount of radioactive element disintegrates in 60 minutes the half life of radioactive element is: **(LHR 10)**
(a) 20 minutes (b) 30 minutes (c) 40 minutes (d) 25 minutes

12. with increase of 10°C temperature, the rate of reaction becomes double. This increase in rate of reaction is due to:
(a) Decrease in the activation energy of reaction
(b) Decrease in number of collision between the molecules
(c) Increase in activation energy of reactants (d) Increase in number of effective collision

13. The unit of rate constant for zero order reaction is:
(a) dm^3S^{-1} (b) mole $dm^{-3}s^{-1}$ (c) $dm^3\ mol^{-1}s^{-1}$ (d) mole S^{-1}

14. If the rate equation of reaction 2 A + B → Product
Rate = k $[A]^2$ [B] and A is present in large excess, then order of reaction is:
(a) 1 (b) 2 (c) 3 (d) None of these

15. The half life period of $^{14}_{6}$Cis 5760 years. 100mg of sample of $^{14}_{6}$C will reduce to 25mg in:
(a) 11520 years (b) 2880 years (c) 57600 years (d) 5760 years

16. The energy of activated complex is:
(a) Greater than the reactants and products (b) Less than the reactants and products
(c) Equal to the products (d) Equal to the reactants

17. Indicate the enzyme which catalyses the following:
$C_6H_{12}O_6 \longrightarrow 2C_2H_5OH+2CO_2$
(a) Diastase (b) Zymase (c) Urease (d) Invertase

18. The rate of chemical reaction depends upon the nature of reactants because?

(a) Some of the reactants have high boiling point (b) Some of the reactants are colored
(c) Energy of activation differs from one reaction to another
(d) Some of the reactants are solid at room temperature

19. Which of following is an example of homogenous catalysis?

(a) Formation of ghee from oil (b) Formation of SO_3 in contact process
(c) Hydrolysis of ester (d) Formation of NH_3 in Haber process

20. In zero order reaction the rate is independent of:

(a) Temperature of reaction (b) Concentration of products
(c) Concentration of reactants (d) None of these

21. Hydrolysis of Tertiary butyl bromide has order of reaction:

(a) First order (b) Pseudo first order (c) Second order (d) Third order

22. A substance which decreases the efficiency of a catalyst is called:

(a) Promoter (b) Activator (c) Poison (d) Auto catalyst

23. Photo chemical reactions are:

(a) First order (b) Third order (c) Second order (d) Zero order

24. The rate of chemical reaction is independent of:

(a) Molecularity (b) Temperature
(c) Nature of reactants (d) Concentration of reaction

25. The unit of rate constant for zero order reaction:

(a) mol dm^{-3} s^{-1} (b) $mol^{-1}dm^3$ s^{-1} (c) dm^3s^{-1} (d) mol s^{-1}

26. The energy of activation for a reaction by using catalyst is:

(a) Increased (b) Decreased (c) Not changed (d) Moderate

27. Specific rate constant is equal to rate of reaction when concentrations of reactants are: (LHR 14)

(a) Zero (b) Four (c) Three (d) Unity

28. The equation $K = Ae^{-Ea/RT}$ is called:

(a) Rate law (b) Rate equation (c) Arrhenius equation (d) General gas equation

ANSWER KEY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
b	b	b	b	a	a	a	b	b	c	b	d	b	a	a
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**		
a	b	c	c	c	b	c	d	a	a	b	d	c		