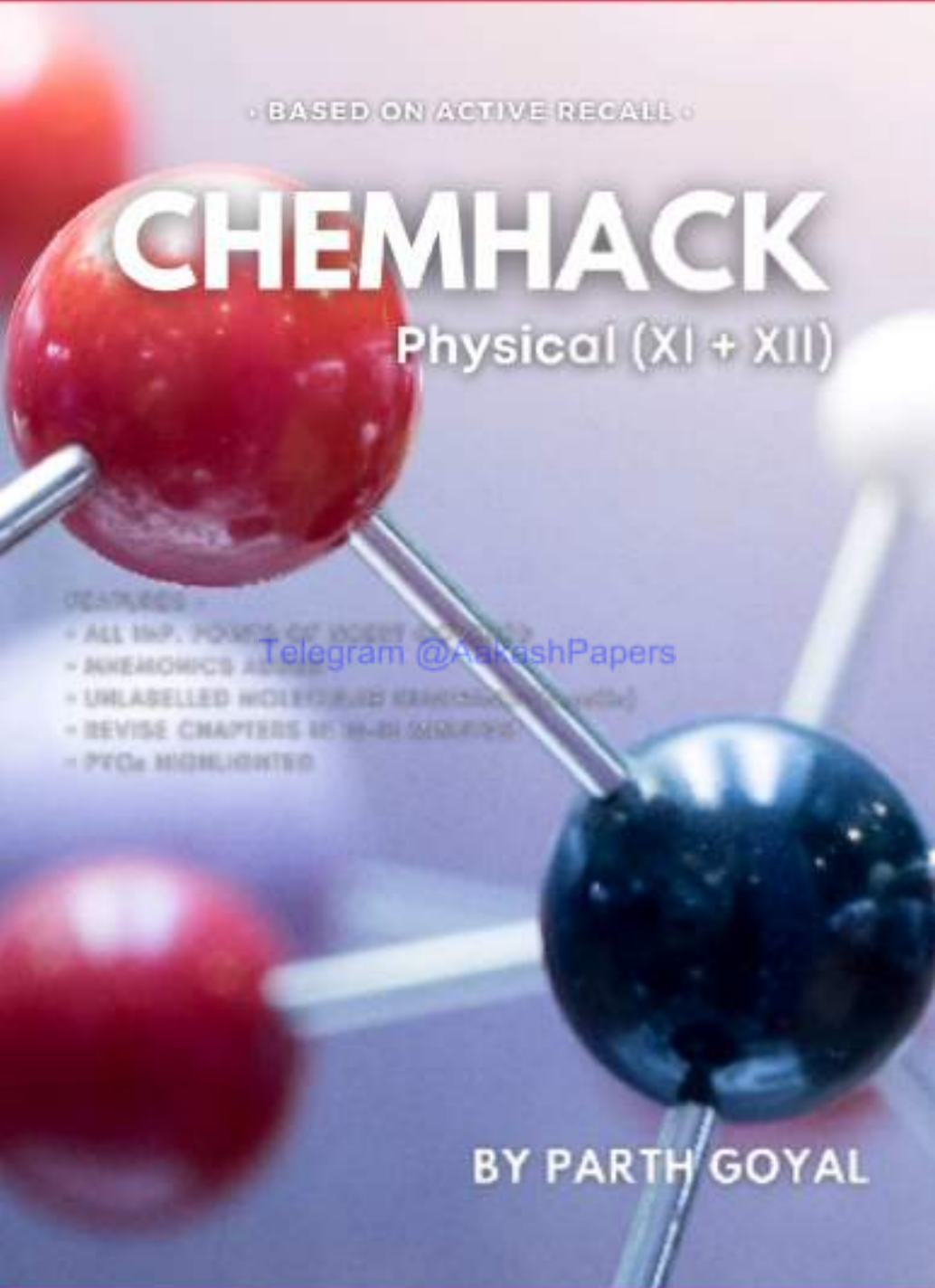
· BASED ON ACTIVE RECALL ·
CHEMHACK
Physical (XI + XII)
Telegram @AakashPapers
BY PARTH GOYAL

CHEMHACK

Physical (XI + XII)

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PARTH GOYAL

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A LETTER FROM THE AUTHOR

Hi,

First of all, take a deep breath, relax, and realise it, you really have a CHEM "HACK" in you hands right now! You are soon going to outperform in chemistry in every aspects that you can ever imagine!

I am a MBBS Student (a NEET Ranker, AIR 223 in NEET 2019), and I made this book during my 2nd Year MBBS. I have guided thousands of NEET aspirants and this book is the result of all their love and affection towards me. Making this book was a dream for me, and now it is a reality!

So how do I got this idea of "CHEMHACK" ? Let me tell you the whole story -

It all was accidently discovered by me. I was horrible at learning theoretical subjects which involves "rattafication". They used to be the hardest subject for me, as my memory was not good and I used to forget things faster. One day my teacher said me to make Assertion/Reason questions from NCERT for preparation for AIIMS entrance. I initially found this idea boring and time consuming. But one day I thought, why not to make other kind of questions which are easier to make and less time consuming. I tried the idea, and it came out to be the best thing I ever did for myself!

I did this for biology and my marks improved a lot. Then I thought, why not to try the same method for theoretical parts of other subjects like chemistry? After starting doing this, my chemistry marks also increased! I got so much time left that I cleared JEE also with NEET! Yes it is true! I scored 99.45%ile in JEE Mains & AIR 5364 in JEE Adv!

Later I come to know that I was using a modern scientifically proven study technique, i.e. active recall. You can learn about it from some of the videos of my Youtube channel named "Parth Goyal". :)

Using CHEMHACK, you can revise even big chapters of chemistry (that too quality revision) in just 15-20 min without leaving a single imp point. Yes it saves that much amount of time! Thousands of students have used my this techniques and got selection, you will find many on my Instagram stories, @parth_vegan.

Using this, you will cover whole NCERT and will also not have to waste time reading useless big paragraphs of NCERT. I have invested almost 6-8 hrs in each and every chapter of chemhack, making it the best possible revision material available, covering each and every single important point of NCERT. With these chemhacks, you will be able to increase your marks in NEET, JEE & school exams to such a great extent that you can't even imagine!

But my plans for you don't end here! After you will get selected in MBBS or IIT/NIT, do ping me once on my Instagram or Facebook. I have a vision of doing something revolutionary in the field of healthcare, and will need your help in it! Together, we will doing some really big things and make our nation proud! The plan will be disclosed to you after your selection! :)

With lot's of love & happy wishes
- Parth Goyal

FEATURES OF THE CHEMHACK BOOK

1) All Imp. points of NCERT Covered – All the important facts and diagrams of NCERT are covered. Only theory not important from an exam point of view is omitted.

2) Mnemonics : Funny mnemonics and short tricks added wherever needed

3) DigaQs : These questions will make your diagram practice super-duper! Chemhack contains all important molecular structures.

4) Essence of Chemhack (Active Recall) : Instead of reading NCERT theory again and again for revision (which is a boring process to be true), asking questions from it is better because it will make you more focused and make the revision process fun and faster!

5) PYQs highlighted by mentioning "JEE" beside them

6) Internal linking in PDF so that you can easily switch between answers and questions just by clicking on the coloured "ANSWERS" & "QUESTIONS" button. Also in Index you can visit any chapter just by clicking on its name.

7) Short questions so that revision can be fast – small reduction in no of words in each question successively will save a lot of time and will cause bullet-train superfast revision!

How to Use ?

You can use this book for **revision (that too in an active recall manner, that's why they are best!)** & also after reading NCERT for **question practice.**

Contents

CHEMHACK

Physical (XI + XII)

Chapter 1

SOME BASIC CONCEPTS OF CHEMISTRY

INTRODUCTION

1. Name 2 life saving drugs effective in cancer therapy -
2. _____ is used for helping AIDS victims
3. _____ have definite volume but not definite shape
4. Properties of a compound are different from its constituent elements. T/F
5. Physical properties can be measured or observed without changing the identity or the composition of the substance. T/F
6. Name the 7 SI base units.
7. Prefix used for 10^{-15} is -
8. Prefix used for 10^{-12} is -
9. Prefix used for 10^{-9} is -
10. Prefix used for 10^{-6} is -
11. SI unit of mass is gram. T/F
12. Write relation between °F and °C scale

SIGNIFICANT FIGURES

13. Accuracy/Precision refers to the closeness of various measurements for the same quantity
14. What is Accuracy ?
15. All non-zero digits are significant. T/F
16. Zeros preceding the first non-zero digit are significant. T/F
17. Zeros between two non-zero digits are not significant. T/F
18. Zeros at the end or right of a number are significant, provided they are on the right side of the decimal point. T/F
19. Significant figures in e(Euler Number) is -
20. According to significant figures, 2.5 x 2.50 =
21. According to significant figures, 1.5 x 7.0 =

STOICHIOMETRY

22. Law of conservation of mass was given by -
23. Law of Definite proportions given by -

ANSWERS

24. Law of multiple proportions given by -
25. "Equal volumes of all gases at the same temperature and pressure should contain an equal number of molecules." This statement was given by -
26. 1 amu = _____ kg
27. Define mole
28. Mass % =
29. Mole fraction =
30. Molarity =
31. Molality =
32. Molarity changes with change in temperature. T/F

ANSWERS

ANSWERS

• INTRODUCTION

1. Cisplatin and taxol
2. AZT (Azidothymidine)
3. Liquid
4. T
5. T
6. m, kg, sec, Ampere, Kelvin, mole, candela
7. Femto
8. Pico
9. Nano
10. Micro
11. F
12. $°F = (9/5)°C + 32$

• SIGNIFICANT FIGURES

13. Precision
14. Accuracy is the agreement of a particular value to the true value of the result
15. T
16. F
17. F
18. T
19. ∞
20. 6.2
21. 1.0×10^2

• STOICHIOMETRY

22. Antoine Lavoisier
23. Joseph Proust
24. Dalton
25. Avogadro
26. $166. \times 10^{-24}$ kg
27. One mole is the amount of a substance that contains as many particles or entities as there are atoms in exactly 12 g of Carbon-12 isotope
28. (Mass of solute/mass of solution) x 100
29. No. of moles of solute/(Moles of solute + Moles of solvent)
30. No. of moles of solute/Volume of solution in litres
31. No. of moles of solute/Mass of solvent in kg
32. T

Chapter 2

STRUCTURE OF ATOM

INTRODUCTION

1. Cathode rays originate from cathode. T/F
2. Charge to mass ratio was determined by the scientist -
3. Oil drop experiment was devised by the scientist -
4. Neutron was discovered by the scientist -
5. Charge of electron is -
6. Mass of electron is -
7. Mass of proton is -
8. Rutherford gold foil was _____ atoms thick
9. Define isobars
10. All the isotopes of a given element show same chemical behaviour. T/F
11. The radius of nucleus are usually expressed in terms of _____ unit
12. Define wave number
13. SI unit of wave number is
14. Wavelength of visible spectrum of light varies from _____ nm to _____ nm
15. What is a black body ?
16. Planck constant value -
17. Work function is equal to -
18. Planck's law -
19. Photoelectric effect equation -
20. Balmer series is described by the formula -
21. Rydberg constant value -
22. The name of respective series for n_f = 1, 2, 3, 4, 5, 6 is -
23. Which series of transitions in the spectrum of H atom falls in visible region ? (NEET)

BOHR MODEL

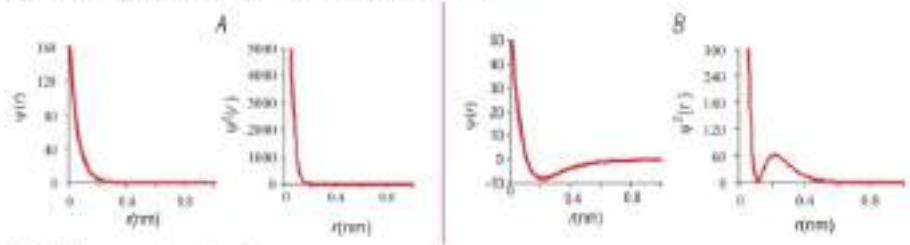
24. According to Bohr, the angular momentum of an electron in a given stationary state can be expressed as -
25. r_n =
26. E_n =
27. velocity V_n =
28. $K.E_n$ =

29. $P.E_n$ =
30. frequency' in =
31. (Wave number)$_H$ =
32. Time taken to complete one revolution is proportional to which powers of n & Z ?
33. Total number of spectral lines obtained in H atom (when electron jump from n_2 to n_1) equal to -
34. The Bohr model could not explain the ability of atoms to form molecules by chemical bonds. T/F
35. Splitting of spectral lines in the presence of magnetic field is called -
36. Splitting of spectral lines in the presence of electric field is called -
37. Bohr was able to explain the occurrence of Zeeman and Stark effect. T/F
38. Describe Heisenberg's Uncertainty Principle and write its equation

QUANTUM MECHANICAL MODEL OF ATOM

39. When an electron is in any energy state, the wave function corresponding to that energy state contains all information about the electron. T/F
40. The energy of electrons in atoms is not quantized. T/F
41. The number which identifies the shell is -
42. Azimuthal quantum number is also called _____ or _____
43. _____ identifies the three dimensional shape of the orbital.
44. For n = 3, tell the possible values of l.
45. For any subshell l _____ values of m are possible.
46. _____ number refers to the orientation of spin of electrons.
47. Spin angular momentum of the electron is a vector quantity. T/F
48. _____ gives information about the spatial orientation of the orbital with respect to standard set of co-ordinate axis. (NEET)
49. For l = 2, m can be -
50. Subsidiary quantum number also determine the energy of the orbital to some extent. T/F
51. What is the total no. of orbitals associated with n = 3 ?
52. A 4s orbital have _____ number of nodes
53. Boundary surface diagrams enclose the area where probability of finding electrons is ____ %.
54. Electron is located further away from the nucleus as the principal quantum number increases. T/F
55. There is no simple relation between the values of m (-l, 0 and +l) and the x, y and z directions. T/F
56. Maximum no. of electrons in a subshell l = (NEET)
57. Total no. of nodes =
58. Angular nodes =
59. Radial nodes =

Digit 1 Identify which one is plot of 1s and which one is of 2s



60. What are angular nodes ?

61. Angular momentum of the electron in an orbital = (NEET)

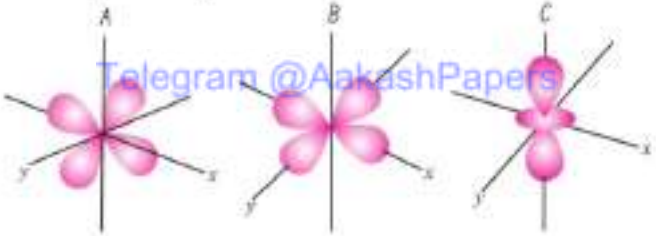
62. Spin angular momentum of the electron =

63. Spin multiplicity =

64. No. of sub shells in nth shells =

65. No. of orbitals in nth shell =

Digit 2 This is the boundary surface diagram of -



ENERGIES OF ORBITALS

66. What is the main reason for having different energies of the subshells in multi-electron species ?

67. In general, the repulsive interaction of the electrons in the outer shell with the electrons in the inner shell are more important. T/F

68. Despite the shielding of the outer electrons from the nucleus by the inner shell electrons, the attractive force experienced by the outer shell electrons increases with increase of nuclear charge. T/F

69. p-orbital electron spends more time close to the nucleus in comparison to s orbital. T/F

70. The Zeff experienced by the electron increases with increase of azimuthal quantum number (l). T/F

71. If two orbitals have same value of (n + l), then how will we decide when one is lower in energy ?

72. Energies of the orbitals in the same subshell decrease with increase in the atomic number (Zeff). T/F

73. In the H atom, 4s have less energy than 3d. T/F

74. Energy of 2s orbital of hydrogen atom is greater than that of 2s orbital of lithium. T/F

FILLING OF ORBITALS

75. Aufbau principle is based on - (3)
76. Write order of filling orbitals till 7s orbital
77. What is Pauli Exclusion Principle ? (NEET)
78. The maximum number of electrons in the shell with principal quantum number n is equal to -
79. What is Hund's Rule ?
80. What are valence electrons ?
81. Write electronic configuration of Cr.
82. Write electronic configuration of Cu
83. Fully filled orbitals and half filled orbitals have extra stability T/F
84. Causes of stability of completely filled and half filled subshells are - (2)

ANSWERS

• INTRODUCTION

1. T
2. J.J. Thomson
3. R.A. Millikan
4. Chadwick
5. -1.6×10^{-19} C
6. 9.1×10^{-31} kg
7. 1.67×10^{-27} kg
8. 1000
9. atoms with same mass number but different atomic number
10. T
11. fermi
12. V/λ
13. m^{-1}
14. 400-750
15. The ideal body which emits and absorbs radiations of all frequencies, is called a black body
16. 6.626×10^{-34} Js
17. $h\nu_0$
18. $E = h\nu$
19. $h\nu = h\nu_0 + mv^2/2$
20. $\bar{\nu} = 109,677 \left(\frac{1}{2^2} - \frac{1}{n^2}\right)$ cm^{-1}
21. 109677 cm^{-1} or 2.18×10^{-18} J
22. Lyman, Balmer, Paschen, Bracket, Pfund, Humphrey
23. Balmer

• BOHR MODEL

24. $mvr = nh/2\pi$
25. $r_n = a_0 n^2/Z$ where $a_0 = 52.9$ pm
26. -2.18×10^{-18} (Z^2/n^2)
27. $2.18 \times 10^6 (Z/n)$
28. 2.18×10^{-18} (Z^2/n^2)
29. 4.36×10^{-18} (Z^2/n^2)
30. $\nu = 3.29 \times 10^{15} \left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$ Hz
31. $\bar{\nu} = 1.09677 \times 10^7 \, Z^2 \left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$ m^{-1}
32. n^3/Z^2
33. $l_{n2} - n_1/n_2 - n_1 + 1/2$
34. T
35. Zeeman effect
36. Stark effect
37. F
38. It states that it is impossible to determine simultaneously the exact position and exact momentum or velocity of an electron

$$\Delta x \cdot \Delta p_x \geq \frac{h}{4\pi} \quad \text{or} \quad \Delta x \cdot \Delta v_x \geq \frac{h}{4\pi m}$$

• QUANTUM MECHANICAL MODEL OF ATOM

39. T
40. F
41. Principal quantum number
42. orbital angular momentum or subsidiary quantum number
43. Azimuthal quantum number
44. $l = 0, 1, 2$
45. $2l + 1$
46. Spin quantum number
47. T
48. Magnetic orbital quantum number
49. +2, +1, 0, -1, -2
50. T

51. Total no. of orbitals = n^2. Hence $3^2 = 9$

52. 3

53. 90%

54. T

55. T

56. 4l + 2

57. n - l

58. l

59. n - l - 1

60. Nodal planes passing through origin which have zero probability of electrons

61. $(h/2\pi)\sqrt{[l(l+1)]}$

62. $(h/2\pi)\sqrt{[s(s+1)]}$

63. 2s + 1

64. n

65. n^2

• ENERGIES OF ORBITALS

66. Mutual repulsion among the electrons

67. T

68. T

69. F

70. F

71. The one with lower value of n will have lower energy

72. T

73. F

74. T

• FILLING OF ORBITALS

75. Pauli's exclusion principle, the Hund's rule of maximum multiplicity and the relative energies of the orbitals

76. 1s, 2s, 2p, 3s, 3p, 4s, 3d, 4p, 5s, 4d, 5p, 6s, 4f, 5d, 6p, 7s

[Trick - Remember this sequence - S SP SP SDP SDP SFDP SFDP (which implies - 1s(S) 2s2p(SP) 3s3p(SP) 4s3d4p(SDP) ....) Using this, you will not have to make that hard diagram of Order of filling every time]

77. No two electrons in an atom can have the same set of four quantum numbers

78. $2n^2$

79. pairing of electrons in the orbitals belonging to the same subshell (p, d or f) does not take place until each orbital belonging to that subshell has got one electron each i.e., it is singly occupied

80. electrons that are added to the electronic shell with the highest principal quantum number are called valence electrons

81. $[Ar]\ 3d^5\ 4s^1$

82. $[Ar]\ 3d^{10}\ 4s^1$

83. T

84. Causes of stability of completely filled and half filled subshells are

(i) Symmetrical distribution of electrons

(ii) exchange energy

• DigaQs

DigaQ. 1

A - 1s

B - 2s

DigaQ. 2 - Boundary surface diagrams of 3d orbitals

A - d_{yz}

B - $d_{x^2-y^2}$

C - d_{z^2})

Chapter 3

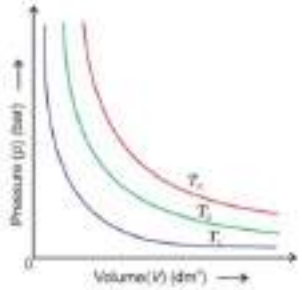
STATES OF MATTER

INTERMOLECULAR FORCES

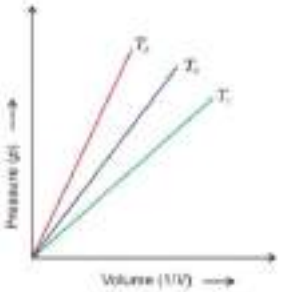
1. The intermolecular forces include the electrostatic forces that exist between the two oppositely charged ions. T/F
2. Ion-dipole forces are also van der waals forces. T/F
3. Name the 3 types of van der Waals forces.
4. London forces are also called -
5. The interaction energy in London forces is inversely proportional to which power of r (distance between two interacting particles) ?
6. Dipole-dipole interaction energy between stationary polar molecules (as in solids) is proportional to _____ between rotating polar molecules is proportional to _____
7. Polar molecules can interact through London forces also. T/F
8. In dipole-induced dipole, interaction energy is proportional to -
9. Energy of hydrogen bond varies between ____ to ____ kJ/mol
10. Molecules also exert repulsive forces on one another. T/F

THE GASEOUS STATE

11. Describe Boyle's Law.
12. Arrange the T_1, T_2 and T_3 in decreasing order

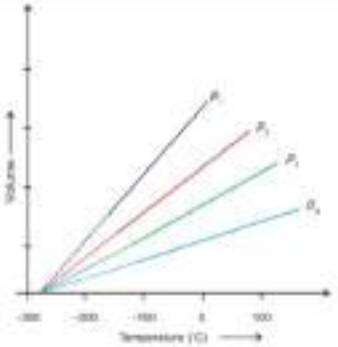


13. Arrange the T_1, T_2 and T_3 in decreasing order



14. Gay Lussac's Law give relationship between _____-_____
15. Charle's Law give relationship between _____-_____
16. Avogadro Law give relationship between _____-_____
17. _____ scale is also called thermodynamic scale of temperature.

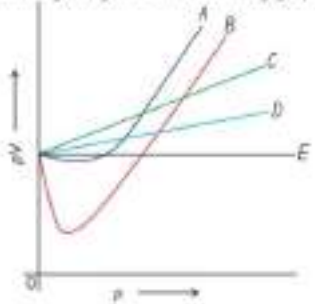
18. Arrange the p_1, p_2, p_3 and p_4 in increasing order



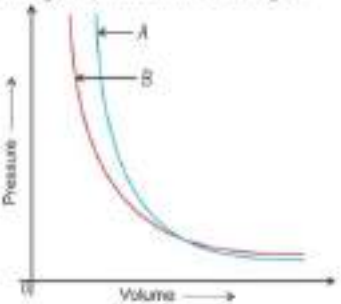
19. Word used for constant pressure –
20. Word used for constant volume –
21. All gases obey Charles' law at very high pressures and low temperatures. T/F
22. What does Standard Temperature and Pressure (STP) mean ? (NEET)
23. At STP, molar volume of ideal gas is –
24. At SATP, molar volume of ideal gas is –
25. R value in J/K mol unit equals to –
26. According to the kinetic theory of gases, there is no force of attraction between the particles of a gas. T/F
27. Collisions of gas molecules are perfectly inelastic. T/F
28. At any particular time, different particles in the gas have different speeds and hence different kinetic energies. T/F
29. Graham's law of diffusion is – (NEET)
30. Arrange the R.M.S. speed, average speed and most probable speed in increasing order – (NEET)
31. R.M.S. speed of ideal gas = (NEET)
32. Average speed of ideal gas = (NEET)
33. Most probable speed of ideal gas = (NEET)

REAL GASES

34. Identify the gases in the following graph.



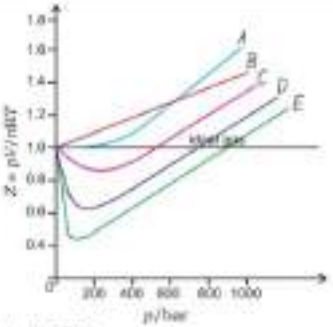
35. Identify the plot for ideal and real gas.



36. The pressure exerted by real gas is lower than the pressure exerted by the ideal gas. T/F
37. Write van der Waals equation.
38. nb in V – nb represents –
39. 'a' in the real gas eq. is a measure of – (NEET)

40. 'a' is dependent on temperature and pressure. T/F

41. Label the gases H2, N2, O2, CO2, CH4 in the following graph.



42. At high pressure all the gases have Z < 1. T/F

43. At intermediate pressures, most gases have Z < 1. T/F

44. Gases show ideal behavior when volume occupied is large/small and pressure is high/low. (NEET)

45. The temperature at which a real gas obeys ideal gas law over an appreciable range of pressure is called _____ or _____

46. Boyle point of a gas depends upon its nature. T/F

47. Above their Boyle point, real gases show positive deviations from ideality. T/F

48. Boyle temp. =

49. Z is called -

50. Z = Videal/ Vreal. T/F

LIQUEFACTION OF GASES

51. What is critical temperature ?

52. What is critical volume ?

53. What is critical pressure ?

54. If process is carried out at the critical temperature, substance always remains in one phase. T/F

55. The term fluid is used for liquids only. T/F

56. What is vapour ?

LIQUID STATE

57. Process of vaporisation is temperature dependent. T/F

58. At 1 atm pressure, boiling temperature is called -

59. If pressure is 1 bar, then the boiling point is called -

60. What is boiling temperature ?

61. Standard boiling point of the liquid is slightly higher than the normal boiling point. T/F

62. The standard boiling point of water is -

63. Since water boils at low temperature on hills, _____ is used for cooking food. (NEET)

64. In autoclaves, the boiling point of water is increased by -

65. At critical temperature, the surface separating the gas and liquid phase disappears. T/F

66. Liquids tend to have minimum number of molecules at their surface. T/F

67. Fire polishing of glass use the principle of _____

ANSWERS 1 ANSWERS 2

68. Surface tension is independent of temperature. T/F
69. Stronger the intermolecular forces, more the viscosity. T/F
70. Force of viscosity is equal to -
71. SI unit of coefficient of viscosity is -
72. CGS unit of coefficient of viscosity is -
73. Viscosity of liquids decreases as the temperature rises. T/F

ANSWERS

• INTERMOLECULAR FORCES

1. F
2. F
3. London forces, dipole-dipole forces, and dipole-induced dipole forces
4. Dispersion forces
5. r^6
6. $1/r^3$, $1/r^6$
7. T
8. $1/r^6$
9. 10-100
10. T

• THE GASEOUS STATE

11. at constant temperature, the pressure of a fixed amount (i.e., number of moles of) of gas varies inversely with its volume
12. $T_3 > T_2 > T_1$
13. $T_3 > T_2 > T_1$
14. P, T
15. V, T
16. V, n
17. Kelvin
18. $p_1 < p_2 < p_3 < p_4$
19. Isobar
20. Isochore
21. F
22. 273.15 K (0°C) temperature and 1 bar (i.e., exactly 10^5 pascal) pressure.
23. 22.7
24. 24.7
25. 8.314
26. T
27. F
28. T
29. Rate of diffusion is inversely proportional to square root of molecular mass, i.e. $r_1/r_2 = \sqrt{(M_2/M_1)}$
30. R.M.S > Average > Most Probable
31. $\sqrt{(3RT/M)}$
32. $\sqrt{(8RT/\pi M)}$
33. $\sqrt{(2RT/M)}$

• REAL GASES

34. Plot of pV vs p for real gas and ideal gas
    - A - CO
    - B - CH4
    - C - H2
    - D - He
    - E - ideal gas

35. Plot of p vs V for real gas and ideal gas
    - A - real gas
    - B - ideal gas
36. T
37. $\left(p + \frac{an^2}{V^2}\right)(V - nb) = nRT$
38. Volume of the molecules themselves
39. Magnitude of intermolecular attraction
40. F
41. Variation of compressibility factor for some gases
    - A - N2
    - B - H2
    - C - O2
    - D - CH4
    - E - CO2

42. F
43. T
44. Large, low
45. Boyle temperature or boyle point
46. T
47. T
48. a/Rb
49. Compressibility factor
50. F, Z = Vreal/ Videal

• LIQUEFACTION OF GASES

51. The highest temperature at which liquid CO2 is observed
52. Volume of one mole of the gas at critical temperature
53. Pressure at critical temperature
54. T
55. F, it is used for both liquid and gases
56. A gas below the critical temperature

• LIQUID STATE

57. T
58. Normal boiling point
59. Standard boiling point
60. The temperature at which vapour pressure of liquid is equal to the external pressure
61. F
62. 99.6°C
63. Pressure cooker
64. Increasing the pressure by using a weight covering the vent
65. T
66. T
67. Surface tension
68. F
69. T
70. F = $\eta A(du/dz)$
    η = coefficient of viscosity
    A = area of contact
    (du/dz) = velocity gradient
71. Pa s
72. Poise
73. T

Chapter 4

THERMODYNAMICS

INTRODUCTION

1. Energy and matter exchange in _____ system.
2. Only _____ can be exchanged in closed system.
3. State variables and state functions are the same thing. T/F
4. What are state variables ?
5. The state of the surroundings can never be completely specified. T/F
6. U is a state function. T/F (NEET)
7. First law of thermodynamics - (NEET)
8. What is a reversible process ?
9. W_{rev} =
10. H is a state function. T/F (NEET)
11. Write relation between ΔH, ΔU and ΔnRT.
12. Define extensive property.
13. Mole fraction is an intensive property. T/F
14. Volume is an intensive property. T/F
15. Write relation between C_p and C_v

ENTHALPY CHANGE

16. What is the standard state of a substance ?
17. What is the standard enthalpy of formation ?
18. Reference state of S is -
19. Reference state of C is -
20. The unit for $\Delta_f H^\circ$ is -
21. Enthalpy is an extensive/intensive quantity
22. $\Delta_f H^\circ$ in terms of bond enthalpy equals to -
23. The above statement is an approximation. T/F
24. The statement in Q.22 is only valid when the reactants and products are in gaseous state. T/F
25. $\Delta_f H^\circ$ in terms of enthalpy of bond formation equals to -
26. Solubility of most salts in water increases with rise of temperature. T/F

ANSWERS

SPONTANEITY

27. A spontaneous process is an irreversible process and may only be reversed by some external agency. T/F
28. The higher the temperature, the more will be the entropy. T/F
29. The higher the temp at which a particular value of heat is supplied, the more will be the change in entropy. T/F
30. When a system is in equilibrium, the change in entropy will be zero. T/F
31. Heat is the measure of average chaotic motion of particles in the system. T/F
32. Which one quantity among ΔU and ΔS discriminate between reversible and irreversible processes ?
33. Write relation between ΔG, ΔH and $T\Delta S$.
34. The term which is given to represent the energy which is not available to do useful work is -
35. $\Delta_r G^\theta$ =
36. If ΔS(sys) is +ve, the reaction must be spontaneous. T/F
37. If ΔS(total) is +ve, the reaction must be spontaneous. T/F
38. If ΔS(sys) is -ve, the reaction can be spontaneous. T/F

ANSWERS

ANSWERS

• INTRODUCTION

1. Open
2. Energy
3. T
4. their values depend only on the state of the system and not on how it is reached
5. T
6. T
7. $\Delta U = Q + W$
8. A process or change is said to be reversible, if a change is brought out in such a way that the process could, at any moment, be reversed by an infinitesimal change. A reversible process proceeds infinitely slowly by a series of equilibrium states such that system and the surroundings are always in near equilibrium with each other
9. $-2.303\ nRT\ \log(V_f/V_i)$
10. T
11. $\Delta H = \Delta U + \Delta n_g RT$
12. property whose value depends on the quantity or size of matter present
13. T
14. F
15. $C_p - C_v = R$

• ENTHALPY CHANGE

16. The standard state of a substance at a specified temperature is its pure form at 1 bar.
17. The standard enthalpy change for the formation of one mole of a compound from its elements in their most stable states of aggregation (also known as reference states) is called Standard Molar Enthalpy of Formation
18. Rhombic sulphur
19. Graphite
20. KJ/mol
21. Extensive
22. Σ bond enthalpies of reactant - Σ bond enthalpies of product
23. T
24. T
25. Σ enthalpies of bond formation of product - Σ enthalpies of bond formation of reactant
26. T

• SPONTANEITY

27. T
28. T
29. F
30. T
31. F, Temperature should come in the sentence instead of heat
32. ΔS
33. $\Delta G = \Delta H - T\Delta S$
34. $T\Delta S$
35. $-RT\ln K$
36. F
37. T
38. T

Chapter 5
EQUILIBRIUM

INTRODUCTION

1. It is possible to reach equilibrium in open systems. T/F
2. Henry's Law states that -
3. In solid $\rightleftharpoons$ liquid equilibrium, the temperature at which the two states co-exist is called -
4. For the reaction $a A + b B \rightleftharpoons c C + d D$, K_c is written as -
5. For gases $K_p = K_c$ always. T/F
6. While calculating the value of K_p, pressure is expressed in atm. T/F
7. The value of equilibrium constant is dependent on the initial concentrations of the reactants and products. T/F
8. If $K_c >$ ____ it means reaction proceeds to completion
9. If $K_c <$ ____ it means reaction proceeds rarely
10. If $Q_c > K_c$, the reaction will proceed in the direction of reactants/products
11. Write relationship between reaction quotient Q and gibbs energy G.

FACTORS AFFECTING EQUILIBRIUM

12. Le Chatelier's principle is only applicable to chemical equilibrium and not to physical equilibrium. T/F
13. Referring the exothermic reaction, $CO(g) + 3H2(g) \rightleftharpoons CH4(g) + H2O(g)$
    (i) if we increase the pressure, reaction will go backward/forward/no change
    (ii) if we add a inert gas at constant pressure, reaction will go backward/forward/no change
    (iii) if we add a inert gas at constant volume, reaction will go backward/forward/no change
    (iv) if we increase temperature, reaction will go backward/forward/no change
14. A catalyst changes the equilibrium constant. T/F
15. If a reaction has an exceedingly small K, a catalyst would be of little help. T/F

IONIC EQUILIBRIUM

16. The electrostatic forces between two charges are directly proportional to dielectric constant of the medium. T/F
17. $NH3$ is a lewis acid/lewis base
18. Strong acids have strong conjugate bases. T/F
19. K_w is temperature dependent. T/F
20. Change in pH with temperature is often ignored. T/F
21. Larger the value of K_a, the stronger the acid. T/F
22. Write relation between K_a, K_b and K_w

ANSWERS

23. Higher order ionization constants are smaller than the lower order ionization constants. T/F
24. As the size of A increases down the group, H-A bond strength decreases. T/F
25. As the electronegativity of A increases, H-A bond strength increases. T/F
26. Salt of CH_3COOMa produces a solution of basic pH. T/F
27. Formula for salt hydrolysis pH =
28. What is a buffer solution ? Given one example (NEET)
29. Solubility formula -
30. The solubility of salts of weak acids increases at lower pH. T/F

ANSWERS

ANSWERS

• INTRODUCTION

1. F
2. the mass of a gas dissolved in a given mass of a solvent at any temperature is proportional to the pressure of the gas above the solvent
3. Melting point
4. $K_c = [C]^c[D]^d/[A]^a[B]^b$
5. F
6. F, it is expressed in bar
7. F
8. 10^3
9. 10^{-3}
10. Reactants
11. $\Delta G = \Delta G^\circ + RT\ln Q$

• FACTORS AFFECTING EQUILIBRIUM

12. F
13. $CO(g) + 3H2(g) \rightleftharpoons CH4(g) + H2O(g)$
    (i) forward
    (ii) backward
    (iii) no change
    (iv) backwards
14. F
15. T

• IONIC EQUILIBRIUM

16. F
17. Lewis base
18. F
19. T
20. T
21. T
22. $K_a \times K_b = K_w$
23. T
24. T
25. F
26. T
27. $pH = 7 + 1/2pK_a - pK_b/2$
28. The solutions which resist change in pH on dilution or with the addition of small amounts of acid or alkali are called Buffer Solutions.
    Example - Blood
29. $S^{(x+y)} = K_{sp}/x^x.y^y$
30. T

Chapter 6

REDOX REACTIONS

1. Define Oxidation.
2. Define Reduction.
3. Reducing agent donate the electrons. T/F
4. Oxidation is gain of electrons. T/F
5. $Cu + Zn^{2+} \rightarrow Zn + Cu^{2+}$ T/F
6. Arrange Cu, Ag, Zn in order of electron releasing tendency. (NEET)
7. In superoxides, oxidation no. of O is -
8. Oxidation no. of O in OF_2 and O_2F_2 is -
9. In peroxide, oxidation no. of O is -
10. Oxidation no. of H in LiH is -
11. In all its compounds, oxidation no. of F is -1. T/F
12. Oxidation state denotes the oxidation number of the compound T/F
13. Define oxidising agent.
14. Define reducing agent.
15. $P_4 + OH^- + H_2O \rightarrow$
16. $S_8 + OH^- \rightarrow$
17. $Cl_2 + OH^- \rightarrow$
18. $F_2 + OH^- \rightarrow$

19. Which of the following will not show disproportionation reaction. ClO^-, ClO_2^-, ClO_3^-, ClO_4^-
20. Write the net ionic equation for the reaction of potassium dichromate(VI), $K_2Cr_2O_7$ with sodium sulphite, Na_2SO_3, in an acid solution to give chromium(III) ion and the sulphate ion.
21. Permanganate(VII) ion, MnO_4^- in basic solution oxidises iodide ion, I^- to produce molecular iodine (I_2) and manganese (IV) oxide (MnO_2). Write a balanced ionic equation to represent this redox reaction.
22. Salt bridge contains -
23. What is the function of salt bridge ?
24. What is Standard Electrode Potential ?
25. A negative E° means that the redox couple is a weaker reducing agent than the H^+/H_2 couple. T/F

ANSWERS

ANSWERS

1. Loss of electron(s) by any species
2. Gain of electron(s) by any species
3. F
4. F
5. F
6. Zn > Cu > Ag
7. -½
8. +2 in OF2 and +1 in O2F2
9. -1
10. -1
11. T
12. F, oxidation number denotes the oxidation state of the compound
13. A reagent which can increase the oxidation number of an element in a given substance
14. A reagent which lowers the oxidation number of an element in a given substance
15. $PH_3 + H_2PO_2^-$
16. $S^{2-} + S_2O_3^{2-}$
17. $ClO^- + Cl^-$
18. $F^- + OF_2 + H_2O$
19. ClO_4^-
20. $Cr_2O_7^{2-}(aq) + 3SO_3^{2-}(aq) + 8H^+(aq) \rightarrow 2Cr^{3+}(aq) + 3SO_4^{2-}(aq) + 4H_2O(l)$
21. $6I^-(aq) + 2MnO_4^-(aq) + 4H_2O(l) \rightarrow 3I_2(s) + 2MnO_2(s) + 8OH^-(aq)$
22. U-tube containing a solution of KCl or NH_4NO_3 usually solidified by boiling with agar agar and later cooling to a jelly like substance
23. To make the both half cells electrically neutral (as e- will flow from one beaker to another, it will cause development of electric potential opposite of the current flow direction. To break this potential, salt bridge is used)
24. If the concentration of each species taking part in the electrode reaction is unity (if any gas appears in the electrode reaction, it is confined to 1 atmospheric pressure) and further the reaction is carried out at 298K, then the potential of each electrode is said to be the Standard Electrode Potential
25. F

Chapter 7
THE SOLID STATE

INTRODUCTION

1. _____ solid usually consists of a large number of small crystals, each of them having a definite characteristic geometrical shape.
2. Crystalline solids are short range. T/F
3. What does long range order mean ?
4. Ex. of crystalline solids - (2)
5. _____ have short range order
6. What does short range order mean ?
7. Glass is a supercooled liquid. T/F (NEET)
8. The structure of amorphous solid is similar to that of liquid. T/F
9. Ex. of amorphous solids - (3)
10. Crystalline solids have a sharp melting point. T/F
11. On heating amorphous solid becomes crystalline at some temperature. T/F
12. Amorphous solids have a tendency to flow. T/F
13. _____ are called pseudo solids or supercooled liquids.
14. Crystalline solids are isotropic in nature. T/F
15. Amorphous solids are anisotropic in nature. T/F

CLASSIFICATION OF CRYSTALLINE SOLIDS

16. 4 categories of crystalline solids are -
17. Types of molecular solids are - (3)
18. The atoms and molecules in non polar molecular solids are held together by _____ forces.
19. Non polar molecular solids conduct electricity. T/F
20. Molecules in polar molecular solid are held together by _____ forces.
21. Polar molecular solids conduct electricity. T/F
22. Most of the polar molecular solids are gases or liquids under room temperature and pressure. T/F
23. Ex. of non polar molecular solids - (2)
24. Ex. of polar molecular solids - (2)
25. Hydrogen bonded molecular solids conduct electricity. T/F
26. Ionic solids are electrical conductors in solid state. T/F
27. _____ are an orderly collection of positive ions surrounded by and held together by a sea of free electrons.
28. Covalent bonds are strong and directional in nature. T/F

29. Network solids do not conduct electricity except -

30. Graphite is a good solid lubricant. T/F

31. Lustre and colour in metals is also because of the presence of free electrons in them. T/F

CRYSTAL LATTICE

32. Number of three dimensional lattices are - (NEET)

33. What happens in an End-centred unit cell ?

34. Name all the 7 primitive unit cells

35. SnO2, TiO2 are examples of _____ crystal system.

36. Rhombic sulphur, KNO3, BaSO4 are ex. of _____ crystal system.

37. Hexagonal crystal system examples - (3)

38. CaCO3 is also called -

39. HgS is also called -

40. Monoclinic sulphur is an example of _____ crystal system.

41. Triclinic crystal examples - (2)

42. $\alpha = \beta = \gamma$ in which crystal systems ? (4) (NEET)

43. $a \neq b \neq c$ in which crystal systems ? (3)

44. $a = b = c$ in which crystal systems ? (2)

UNIT CELL & PACKING

45. Total no. of atoms in BCC unit cell -

46. Total no. of atoms in FCC unit cell - (NEET)

47. Coordination no. in one dimensional close packed arrangement is -

48. Square close packing in two dimensions have coordination no. -

49. Hexagonal close packing in two dimensions have coordination no. -

50. The voids in 2d hexagonal close packing are square in shape. T/F

51. If the no. of closed packed spheres are N, that the no. of tetrahedral and octahedral voids are -

52. Fcc and ccp structure are same. T/F

53. ABAB... pattern is actually hcp/ccp structure

54. ABCABC.... pattern is actually hcp/fcc structure

55. Mg and Zn have hcp/ccp structure. (NEET)

56. Ex. of fcc structure - (2)

57. Coordination no. in hcp is - (NEET)

58. Coordination no. in ccp is -

59. Packing efficiency in ccp is -

60. Packing efficiency in hcp is -
61. Packing efficiency in BCC is - (NEET)
62. Packing efficiency in simple cubic lattice -
63. Write density of unit cell formula
64. The number of carbon atoms per unit cell of diamond unit cell is - (NEET)

IMPERFECTIONS IN SOLIDS

65. 3 types on point defects are -
66. Stoichiometric defects have defects in the stoichiometry of the solid T/F
67. Stoichiometric defects are also called _____ or _____ defect
68. 2 types of intrinsic defects are -
69. Vacancy defects increase the density of the substance T/F
70. Interstitial defects increase the density of the substance T/F
71. Frenkel and Schottky defectes are shown by ionic/non-ionic solids
72. Frenkel defects create a _____ at its original site and _____ at its new locations. (NEET)
73. Dislocation defect is - (NEET)
74. Frenkel defects change the density of the solid T/F (NEET)
75. Frenkel defect is shown by [illegible] (NEET)

76. Frenkel defect is seen in - (4) (NEET)
77. Schottky defects decrease the density of the material T/F (NEET)
78. Random and unequal no. of cation and anions are missed in Schottky defect T/F (NEET)
79. _____ is a vacancy defect in ionic solids. (NEET)
80. There is one schottky defect per ___ ions
81. Schottky defect is seen in - (4)
82. _____ shows both frenkel and schottky defects
83. Ex. of impurity defect - (2)
84. Metal excess defect is shown by - (2)
85. The anionic sites occupied by unpaired electrons are called _____
86. Excess of Na in NaCl results in _____ colour of the crystal
87. Excess of Li makes LiCl crystal colour _____ and excess of K make KCl crystal colour _____
88. Ex. of Metal excess defect due to the presence of extra cations -
89. Ex. of metal deficiency defect - (NEET)
90. ZnO on heating turns _____ colour

ANSWERS 2 ANSWERS 3

ELECTRICAL PROPERTIES

91. Conductivities in metal range between ____ to ____ ohm/m.
92. Conductivity in insulators range between ___ to ___ ohm/m.
93. Conductivity in semiconductors range between ___ to ___ ohm/m.
94. Metals conduct electricity in solid as well as molten state. T/F
95. Electrical conductivity of semiconductors increases with rise in temperature. T/F
96. Ex. of intrinsic semiconductors - (2)
97. n-type semiconductor are made by doping - (2) (NEET)
98. p-type semiconductors are made by doping - (3) (NEET)
99. Solar cell is a diode. T/F
100. Typical compounds of groups 13-15 combinations are - (3)
101. _____ semiconductors have very fast response and have revolutionised the design of semiconductor devices.
102. Examples of groups 12-16 compounds are - (4)
103. Metal oxides which behave like metals are - (3)
104. _____ is like metallic copper in its conductivity and appearance.
105. Oxides which show metallic or insulating properties depending on temperature are - (4)

MAGNETIC PROPERTIES

106. Magnetic moment of electron originate from - (2)
107. 1 Bohr magneton = _____ $A\text{-}m^2$
108. Paramagnetism is lost in the absence of a magnetic field. T/F
109. In paramagnetism, the substance is magnetized in the opposite direction. T/F
110. Ex. of paramagnetic substances - (4)
111. Paramagnetism is due to -
112. Diamagnetic substances are weakly repelled by a magnetic field. T/F
113. Ex. of diamagnetic substances - (3)
114. Substances are weakly repelled by a magnetic field in diamagnetism because -
115. Ex. of ferromagnetic oxide is -
116. Ex. of ferromagnetic metals - (4)
117. In solid state, the metal ions of ferromagnetic substances are grouped together into small regions called -
118. Ex. of antiferromagnetic substance - (1)
119. Difference between ferromagnetic and ferrimagnetic substances are -
120. Ex. of ferrimagnetic substance - (3)
121. Ferrimagnetic substances become paramagnetic on heating. T/F

ANSWERS 3

ANSWERS

• INTRODUCTION

1. Crystalline
2. F
3. It means that there is a regular pattern of arrangement of particles which repeats itself periodically over the entire crystal
4. NaCl, quartz
5. Amorphous solids
6. A regular and periodically repeating pattern is observed over short distances only
7. T
8. T
9. Glass, rubber and plastics
10. T
11. T
12. T
13. Amorphous solids
14. F
15. F

• CLASSIFICATION OF CRYSTALLINE SOLIDS

16. molecular, ionic, metallic and covalent solids
17. Non polar, polar and hydrogen bonded molecular solids
18. Weak dispersion forces or London forces
19. F
20. Dipole-dipole forces
21. F
22. T
23. H_2, Cl_2
24. HCl, SO_2
25. F
26. F
27. Metals
28. T
29. Graphite
30. T
31. T

Property	Crystalline solids	Amorphous solids
Shape	Definite characteristic geometrical shape	Irregular shape
Melting point	Melt at a sharp and characteristic temperature	Gradually soften over a range of temperature
Cleavage property	When cut with a sharp edged tool, they split into two pieces and the newly generated surfaces are plain and smooth	When cut with a sharp edged tool, they cut into two pieces with irregular surfaces
Heat of fusion	They have a definite and characteristic heat of fusion	They do not have definite heat of fusion
Anisotropy	Anisotropic in nature	Isotropic in nature
Nature	True solids	Pseudo solids or super cooled liquids
Order in arrangement of constituent particles	Long range order	Only short range order.

• CRYSTAL LATTICE

32. 14

33. one particle is present at the centre of any two opposite faces besides the ones present at its corners.

34. Cubic, Tetragonal, Orthorhombic, Hexagonal, Rhombohedral, Monoclinic and Triclinic

35. Tetragonal

36. Orthorhombic

37. Graphite, ZnO, CdS

38. Calcite

39. Cinnabar

40. Monoclinic

41. $K_2Cr_2O_7$, $CuSO_4 \cdot 5H_2O$, H_3BO_3

42. Cubic, Tetragonal, Orthorhombic, Rhombohedral

43. Orthorhombic, Monoclinic, Triclinic

44. Cubic, Tetragonal

Crystal system	Possible variations	Axial distances or edge lengths	Axial angles	Examples
Cubic	Primitive, Body-centred, Face-centred	$a = b = c$	$\alpha = \beta = \gamma = 90°$	NaCl, Zinc blende, Cu
Tetragonal	Primitive, Body-centred	$a = b \neq c$	$\alpha = \beta = \gamma = 90°$	White tin, SnO_2, TiO_2, $CaSO_4$
Orthorhombic	Primitive, Body-centred, Face-centred, End-centred	$a \neq b \neq c$	$\alpha = \beta = \gamma = 90°$	Rhombic sulphur, KNO_3, $BaSO_4$
Hexagonal	Primitive	$a = b \neq c$	$\alpha = \beta = 90°$, $\gamma = 120°$	Graphite, ZnO, CdS,
Rhombohedral or Trigonal	Primitive	$a = b = c$	$\alpha = \beta = \gamma \neq 90°$	Calcite ($CaCO_3$), HgS (cinnabar)
Monoclinic	Primitive, End-centred	$a \neq b \neq c$	$\alpha = \gamma = 90°$, $\beta \neq 90°$	Monoclinic sulphur, $Na_2SO_4 \cdot 10H_2O$
Triclinic	Primitive	$a \neq b \neq c$	$\alpha \neq \beta \neq \gamma \neq 90°$	$K_2Cr_2O_7$, $CuSO_4 \cdot 5H_2O$, H_3BO_3

• UNIT CELL & PACKING

45. 2

46. 4

47. 2

48. 4

49. 6

50. F

51. Tetrahedral - 2N, octahedral - N

52. T

53. Hcp

54. Fcc

55. Hcp

56. Cu, Ag

57. 12

58. 12

59. 74%

60. 74%

61. 68%

62. 52.4%

63. density $= \frac{z.m}{a^3} = \frac{z.M}{a^3 N_A}$

64. B

• IMPERFECTIONS IN SOLIDS

65. (i) stoichiometric defects
(ii) impurity defects
(iii) non-stoichiometric defects
66. F
67. Intrinsic or thermodynamic defects
68. Vacancy and interstitial
69. F
70. T
71. Ionic
72. Vacancy defect, interstitial defect
73. Frenkel defect
74. F
75. T
76. ZnS, AgCl, AgBr, AgI
77. T
78. F
79. Schottky defect
80. 10^{16}
81. NaCl, KCl, CsCl and AgBr
82. AgBr
83. SrCl2 and NaCl, CdCl2 and AgCl
84. NaCl, KCl
85. F-centres
86. Yellow
87. Pink, violet
88. ZnO
89. FeO
90. Yellow

• ELECTRICAL PROPERTIES

91. 10^{4}-10^{7}
92. 10^{-20}-10^{-10}
93. 10^{-6}-10^{4}
94. T
95. T
96. Si, Ge
97. P or As
98. B, Al, Ga
99. T
100. InSb, AlP, GaAs
101. GaAs
102. ZnS, CdS, CdSe and HgTe
103. TiO, CrO2 and ReO3
104. ReO3
105. VO, VO2, VO3 and TiO3

• MAGNETIC PROPERTIES

106. (i) orbital motion
(ii) spin around its axis
107. $9.27 \times 10^{-24}\ Am^2$
108. T
109. F
110. O2, Cu2+, Fe3+, Cr3+
111. Presence of unpaired electrons
112. T
113. H2O, NaCl and C6H6
114. Lenz law
115. CrO2
116. Fe, Co, Ni, Gd
117. Domains
118. MnO
119. In ferromagnetic substance, all domains get oriented in the direction of magnetic field & in ferrimagnetic substance, domains in the substance are aligned in parallel & anti-parallel direction in unequal numbers.
120. Fe3O4 (magnetite) and ferrites like MgFe2O4 and ZnFe2O4
121. T

Chapter 8
SOLUTIONS

INTRODUCTION

1. German silver is mixture of - (3)
2. Bronze is a mixture of - (2)
3. ____ ppm of fluoride ions prevents tooth decay
4. ____ ppm of fluoride ions mottling of teeth
5. In chloroform mixed with nitrogen gas, what is the physical state of solute and solvent ?
6. ____% (v/v) solution of _____ is used as antifreeze in cars for cooling the engine. (NEET)
7. Unit commonly used in medicine and pharmacy is -
8. Define Volume percentage (V/V).
9. Define Mass by volume percentage (w/V).
10. Define ppm
11. Define Molarity
12. Molality(m) = Moles of solute/Mass of solution in kg T/F
13. Molality is dependent on temperature. T/F (NEET)
14. Molarity is independent of temperature. T/F (NEET)

SOLUBILITY & VAPOUR PRESSURE

15. A polar solvent dissolves a nonpolar solute very easily. T/F
16. Some solute particles in solution collide with the solid solute particles and get separated out of solution. This process is known as -
17. With rise in temperature, solubility can decrease. T/F
18. Higher the value of KH, higher is the solubility at a given pressure. T/F
19. Why are aquatic species more comfortable in cold waters rather than in warm waters ?
20. When dissolved in a solution, the gas molecules are converted to liquid phase. T/F
21. Write Henry Law
22. Write Raoult's law.
23. Henry law is a special case of Raoult's law. T/F

IDEAL & NON-IDEAL SOLUTIONS

24. The 2 important properties of ideal solutions are - (NEET)
25. Ex. of ideal solutions are - (2) (NEET)

26. Vapour pressure of non-ideal solution can be higher than predicted. T/F
27. The solutions which show negative deviation have stronger solute-solute and solvent-solvent interaction than solute-solvent interaction. T/F (NEET)
28. Ethanol and acetone mixture show positive/negative deviation. (NEET)
29. NCERT ex. of positive deviation are - (2) (NEET)
30. NCERT ex. of negative deviation are - (2) (NEET)
31. Phenol-aniline & $CHCl_3$-acetone show negative deviation because -
32. What are azeotropes ?
33. Solutions which show large negative deviations from Raoult's law form maximum boiling azeotrope/minimum boiling azeotrope. (NEET)
34. Azeotrope of HNO_3-water has ___% HNO_3 and ___% water with a boiling point of ____ K

COLLIGATIVE PROPERTIES

35. What are colligative properties ?
36. Freezing point and boiling point are colligative properties. T/F
37. Equation of relative lowering of vapour pressure -
38. Equation of elevation of boiling point -
39. Eq. of depression of freezing point -
40. Eq. of osmotic pressure -
41. Cryoscopic constant is -
42. Ebullioscopic constant is -
43. Unit of Kf is -
44. Kf (in terms of M, T, $\Delta_{fus}H$) =
45. Kb (in terms of M, T, $\Delta_{vap}H$) =
46. Process of flow of the solvent is called -
47. Technique of osmotic pressure for determination of molar mass is particularly useful for molecules like - (2)
48. Membranes used in reverse osmosis are made up of -
49. Van't Hoff factor, i = Abnormal molar mass/Normal molar mass. T/F
50. Pure water can be obtained from sea water by - (NEET)
51. If the molality of the dilute solution is doubled, the value of Kf becomes half. T/F (NEET)

ANSWERS 1 ANSWERS 2

ANSWERS

• INTRODUCTION

1. Cu, Zn, Ni
2. Cu, Sn
3. 1 ppm
4. 15 ppm
5. Solute - Liquid, Solvent - Solid
6. 35%, ethylene glycol
7. w/V
8. Volume % = (Volume of the component/Total volume of solution) x 100
9. mass of solute dissolved in 100 mL of the solution
10. Number of parts of the component x 10^n/ Total number of parts of all components of the solution
11. Molarity = Moles of solute/Volume of solution in litre
12. F
13. F
14. F

• SOLUBILITY, VAPOUR PRESSURE

15. F
16. Crystallisation
17. T
18. F
19. Because solubility of O2 is more in cold water than warm water
20. T
21. $P = K_H X$
22. $p_1 = p^0_1 x_1$. Hence by using Dalton's law of partial pressure we arrive at equation
$P_t = p^0_1 x_1 + p^0_2 x_2$
23. F

• IDEAL & NON-IDEAL SOLUTIONS

24. $\Delta mixH = 0$, $\Delta mixV = 0$
25. n-hexane and n-heptane, bromoethane and chloroethane, benzene and toluene
26. T
27. F
28. Positive
29. Ethanol-acetone, CS2-acetone
30. Phenol-aniline, CHCl3-acetone
31. They form hydrogen bonds with each other
32. binary mixtures having the same composition in liquid and vapour phase and boil at a constant temperature
33. Maximum boiling azeotrope
34. 68%, 32%, 343.5 K

• COLLIGATIVE PROPERTIES

35. Properties which depend on the number of solute particles irrespective of their nature.
36. False, depression in freezing and elevation in boiling point are colligative properties, i.e. that change (ΔTb or ΔTf) is colligative property not the temp (Tb or Tf) itself. Same is true for vapour pressure.
37. $\Delta p_1/p_1 = i\, n_2/n_1$
38. $\Delta Tb = i\, Kb\, m$
39. $\Delta Tf = i\, Kf\, m$
40. $\pi(iP) = CRT$
41. Kf
42. Kb
43. K kg/mol
44. R x Molar mass of solvent x Tf2/1000 x $\Delta fusH$
45. R x Molar mass of solvent x Tb2/1000 x $\Delta vapH$
46. Osmosis

47. Biomolecules - proteins, polymers etc
48. Cellulose acetate
49. F
50. Reverse osmosis
51. F, it remains unchanged

Chapter 9
ELECTROCHEMISTRY

INTRODUCTION

1. The 2 types of electrochemical cells are -
2. Galvanic cell are also called -
3. _____ cell is a special type of Galvanic cell which contains Zn-Cu couple.
4. What is an electrolytic cell ?
5. Salt bridge is not required when -
6. Define Standard electrode potential.
7. Oxidation takes place at anode/cathode.
8. The direction of current flow is opposite to that of electron flow. T/F
9. Anode is kept on left/right while representing the galvanic cell.
10. $E_{cell} = E_{anode} - E_{cathode}$ T/F
11. Cu does not dissolve in HCl T/F
12. Cu is not oxidised in HNO_3 solution. T/F
13. Ex of inert electrodes - (2)
14. Describe Standard Hydrogen Electrode (SHE)
15. Write Nernst Equation.
16. Faraday constant value -
17. Eq relating ΔG and E_{cell} is -
18. E_{cell} is an intensive/extensive parameter.
19. Most reducing element in this world is -

CONDUCTANCE OF ELECTROLYTIC SOLUTION

20. Specific resistance is other name for -
21. SI unit of resistivity -
22. SI unit of conductance is -
23. Conductivity other name is -
24. SI unit of conductivity is -
25. The electrical conductance in a metal does not depend on the number of valence electrons per atom. T/F
26. The conductivity of a solution does not depend on its viscosity. T/F
27. Conductivity of metal decreases with increase of temperature. T/F
28. Conductivity of electrolytic solution decreases with increase of temperature. T/F

29. The electronic conductance in a metal depends on - (3)
30. The conductivity of electrolytic solutions depends on - (5)
31. Cell constant is equal to Area/length. T/F
32. Cell constant is denoted by symbol -
33. Molar conductivity =
34. Λ (S m^2 mol^{-1}) =
35. Λ_m (S cm^2 mol^{-1}) =
36. Molar conductivity is independent of the conc. of electrolyte. T/F
37. Both conductivity and molar conductivity change with the concentration of the electrolyte. T/F
38. Molar conductivity increases with decrease in concentration. T/F
39. Decrease in κ on dilution is more than compensated by increase in volume (which contains 1 mole of electrolyte). T/F
40. For strong electrolytes, equation relating Λ_m, Λ°_m and c is -
41. The value of A in the above asked equation depends upon -
42. All electrolytes of a particular type have the same value for 'A'. T/F
43. λ° of Na^+ is greater than K^+. T/F
44. λ° of Cl^- is greater than Br^-. T/F
45. Na and Mg is produced by electrolysis of their fused _____
46. Al is produced by electrolysis of Al_2O_3 in the presence of _____
47. Some of the electrochemical processes, although feasible, are so slow kinetically that at lower voltages these do not seem to take place and extra potential called _____ has to be applied.
48. During electrolysis of brine, Cl^- is oxidised instead of water due to overpotential of oxygen. T/F
49. During electrolysis of conc. H_2SO_4, which reaction occurs at anode ? (NEET)
50. During electrolysis of dil. H_2SO_4, which reaction occurs at anode ? (NEET)

BATTERIES

51. Leclanche cells are used commonly in _____ and _____
52. Anode in Leclanche cell is -
53. Cathode in Leclanche cell is -
54. The space between the electrodes is filled by a moist paste of _____ and _____
55. Reactions at anode -
56. Reactions at cathode -
57. NH_3 produced in the reaction form complex with _____ forming _____
58. Leclanche cells have a potential of nearly ___V.
59. Mercury cells have _____ as anode and a paste of _____ and _____ as cathode.

ANSWERS 1 ANSWERS 2

60. The electrolyte in mercury cell is a paste of _____ and _____
61. Reactions in mercury cells at anode and cathode are -
62. Overall reaction in mercury cell can be represented as -
63. Cell potential in mercury cells is _____ V.
64. 2 examples of secondary batteries -
65. Lead batteries have _____ made anode and _____ made cathode.
66. In lead batteries _____% solution of _____ is used as an electrolyte.
67. Reactions at anode and cathode in lead batteries are -
68. Overall reaction in lead battery is -
69. Overall reaction in Ni-Cd cell is -
70. Fuels like _____ are combusted in fuel cells to obtain electrical energy. (NEET)
71. _____ cell was used for providing electrical power in the Apollo space programme.
72. Rxns at anode and cathode in H2-O2 fuel cell is -
73. Catalysts like _____ or _____ are incorporated into the electrodes for increasing the rate of electrode reaction.
74. Fuel cells produce electricity with an efficiency of about ___%.

CORROSION

75. Corrosion of iron is called -
76. Anodic and cathodic reactions in rusting are -
77. H^+ in corrosion is believed to come from -
78. The overall reaction of rusting is -
79. Corrosion is prevented by covering the surface with chemicals like - (2)
80. Corrosion can also be prevented by covering with metals like - (2) (NEET)
81. A sacrificial electrode of another metal like ____ or ____ corrodes itself but saves the object.

ANSWERS

• INTRODUCTION

1. Electrolytic cell and Galvanic cell
2. Voltaic cell
3. Daniel
4. An electrolytic cell is an electrochemical cell that drives a non-spontaneous redox reaction through the application of electrical energy
5. Both the electrode dip in the same solution
6. When the concentrations of all the species involved in a half-cell is unity then the electrode potential is known as standard electrode potential
7. Anode
8. T
9. left
10. F
11. T
12. F
13. Pt, Au
14. The SHE consists of a platinum electrode coated with platinum black. The electrode is dipped in an acidic solution and pure H_2 gas is bubbled through it. The conc. of both the reduced and oxidised forms of H is maintained at unity. The pressure of H_2 gas is 1 bar and the conc. of H_+ ion in the solution is 1 M.
15. $E_{(cell)} = E^{\circ}_{(cell)} - \frac{RT}{nF} \ln Q$

$= E^{\circ}_{(cell)} - \frac{RT}{nF} \ln \frac{[C]^c [D]^d}{[A]^a [B]^b}$

16. 96487 C/mol
17. $\Delta G = -nFE_{cell}$
18. intensive
19. Li

• CONDUCTANCE OF ELECTROLYTIC SOLUTION

20. resistivity
21. Ω m
22. siemens
23. Specific conductance
24. S/m
25. F
26. F
27. T
28. F
29. The electronic conductance in a metal depends on
(i) the nature and structure of the metal
(ii) the number of valence electrons per atom
(iii) temperature
30. The conductivity of electrolytic solutions depends on -
(i) the nature of the electrolyte added
(ii) size of the ions produced and their solvation
(iii) the nature of the solvent and its viscosity
(iv) concentration of the electrolyte
(v) temperature
31. F
32. G*
33. K/c
34. $\Lambda_m (S\ m^2\ mol^{-1}) = \frac{\kappa\ (S\ m^{-1})}{1000\ L\ m^{-3} \times \text{molarity (mol } L^{-1})}$
35. $\Lambda_m (S\ cm^2\ mol^{-1}) = \frac{\kappa\ (S\ cm^{-1}) \times 1000\ (cm^3 / L)}{\text{molarity (mol / L)}}$
36. F
37. T
38. T

39. T

40. Debye-Huckel-Onsager equation

$\Lambda m = \Lambda^\circ m - A\sqrt{c}$ (A = Debye constant)

41. the charges on the cation and anion produced on the dissociation

42. T

43. F

44. F

45. Chlorides

46. Cryolite (Na_3AlF_6)

47. Overpotential

48. T

49. $2SO_4^{2-}(aq) \rightarrow (S_2O_8)^{2-}(aq) + 2e^-$

50. $2H_2O(l) \rightarrow O_2(g) + 4H^+(aq) + 4e^-$

• BATTERIES

51. Transistors and clocks

52. Zinc container

53. Carbon rod surrounded by powdered MnO_2 and carbon

54. NH_4Cl and $ZnCl_2$

55. Anode: $Zn(s) \rightarrow Zn^{2+} + 2e^-$

56. Cathode: $MnO_2 + NH_4^+ + e^- \rightarrow MnO(OH) + NH_3$

57. Zn^{2+}, $[Zn(NH_3)_4]^{2+}$

58. 1.5V

59. Zn-Hg amalgam, HgO and carbon

60. KOH and ZnO

61. Anode: $Zn(Hg) + 2OH^- \rightarrow ZnO(s) + H_2O + 2e^-$

Cathode: $HgO + H_2O + 2e^- \rightarrow Hg(l) + 2OH^-$

62. $Zn(Hg) + HgO(s) \rightarrow ZnO(s) + Hg(l)$

63. 1.35V

64. Lead storage battery and Ni-Cd battery

65. Pb grid of Lead packed with PbO_2

66. 38. H_2SO_4

67. Anode: $Pb(s) + SO_4^{2-}(aq) \rightarrow PbSO_4(s) + 2e^-$

Cathode: $PbO_2(s) + SO_4^{2-}(aq) + 4H^+(aq) + 2e^- \rightarrow PbSO_4(s) + 2H_2O(l)$

68. $Pb(s) + PbO_2(s) + 2H_2SO_4(aq) \rightarrow 2PbSO_4(s) + 2H_2O(l)$

69. $Cd(s) + 2Ni(OH)_3(s) \rightarrow CdO(s) + 2Ni(OH)_2(s) + H_2O(l)$

70. H_2, CH_4, CH_3OH

71. Fuel

72. Runs in H_2-O_2 fuel cell

Cathode: $O_2(g) + 2H_2O(l) + 4e^- \rightarrow 4OH^-(aq)$

Anode: $2H_2(g) + 4OH^-(aq) \rightarrow 4H_2O(l) + 4e^-$

73. Finely divided platinum or palladium

74. 70

• CORROSION

75. Rusting

76. Anode: $2Fe(s) \rightarrow 2Fe^{2+} + 4e^-$ Cathode: $O_2(g) + 4H^+(aq) + 4e^- \rightarrow 2H_2O(l)$

77. H_2CO_3 formed due to dissolution of CO_2 in air into water

78. $2Fe(s) + O_2(g) + 4H^+(aq) \rightarrow 2Fe^{2+}(aq) + 2H_2O(l)$

79. Paint, bisphenol

80. Sn, Zn

81. Mg, Zn

Chapter 10

CHEMICAL KINETICS

INTRODUCTION

1. For the reaction $2HI(g) \rightarrow H_2(g) + I_2(g)$, rate of reaction can be written as -
2. For a gaseous reaction at constant temperature, rate of reaction can also be expressed as -
3. Rate law for any reaction cannot be predicted by merely looking at the balanced chemical equation. T/F
4. Order of the reaction whose rate law is - Rate = $k[A]^2[B]^3$ is -
5. The reactions taking place in one step are called -
6. Unit of rate constant when reaction is 2nd order is -
7. What is the 'molecularity' of a reaction ?
8. $2HI(g) \rightarrow H_2(g) + I_2(g)$, this is a unimolecular/bimolecular reaction.
9. $KClO_3 + 6FeSO_4 + 3H_2SO_4 \rightarrow KCl + 3Fe_2(SO_4)_3 + 3H_2O$, this reaction is a 10th order reaction. T/F
10. Order of a reaction is not an experimental quantity. T/F
11. Molecularity can be zero but order cannot be zero. T/F
12. Order is applicable to elementary as well as complex reactions. T/F
13. For complex reactions molecularity has no meaning. T/F
14. For complex reactions, order is equal to the order of _____ step.
15. Molecularity of the _____ step is the same as the order of the overall reaction (NEET)

INTEGRATED RATE EQUATION

16. Draw conc vs time graph of zero order kinetics.
17. Order of reaction $C_2H_4(g) + H_2(g) \rightarrow C_2H_6(g)$ is -
18. Order of this reaction $2NH_3(g)$ [1130K/Pt catalyst] $\rightarrow N_2(g) + 3H_2(g)$ is -
19. Draw graph between log $([R_0]/[R])$ vs time for 1st order reaction.
20. Decomposition of N_2O_5 and N_2O are examples of -
21. Equation of zero order kinetics is -
22. Equation of first order kinetics is -
23. Half life for a zero order reaction is directly proportional to rate constant. T/F
24. Half life for zero order reaction =
25. Half life of first order reaction =
26. For zero order reaction $t_{1/2} \propto [R]_0$. For first order reaction $t_{1/2}$ is independent of $[R]_0$. T/F
27. Ex. of pseudo first order reaction are - (2)

TEMPERATURE DEPENDENCE OF THE RATE OF A REACTION

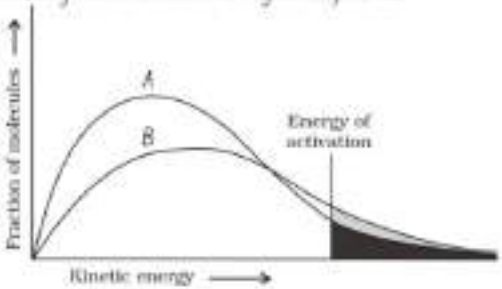
28. With rise in temperature by ___°C, the rate constant is nearly doubled.

29. Write Arrhenius equation.

30. Activation energy of a exothermic reaction, i.e. A → B is x and not the energy released from the reaction is y. Calculate the activation energy of the reaction B → A.

31. All the molecules in the reacting species do have the same kinetic energy. T/F

32. Identify the curve which is at higher temperature.



33. Write the relation between k1, k2, T1, T2 where k1 is the rate constant at temp T1 and k2 is the rate constant at temp T2.

34. The word catalyst can be used when the added substance reduces the rate of reaction. T/F

35. A catalyst alter Gibbs energy, ΔG of a reaction. T/F

36. Catalyst catalyses the forward as well as the backward reactions. T/F

37. What is collision frequency (Z) ?

38. Equation of rate given by collision theory of chemical reactions is –

39. _____ in the equation represents the fraction of molecules with energies equal to or greater than E_a.

40. $A = PZ\alpha b$ is only valid in ___ order _____ reactions.

41. An increase in the conc. of the reactant of a reaction leads to change in which factor of the equation $Rate = PZ\,e^{-E_a/RT}$? (NEET)

ANSWERS 1 ANSWERS 2

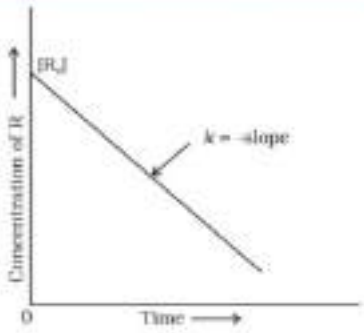
ANSWERS

• INTRODUCTION

1. $-\Delta[R]/2\Delta t = \Delta[P]/\Delta t = \Delta[Q]/\Delta t$
2. Rate of change of partial pressure
3. T
4. S
5. Elementary reactions
6. L/mol s
7. The number of reacting species (atoms, ions or molecules) taking part in an elementary reaction, which must collide simultaneously in order to bring about a chemical reaction is called molecularity
8. Bimolecular
9. F
10. F
11. F
12. T
13. T
14. Slowest step (Rate determining step)
15. Slowest step (RDS)

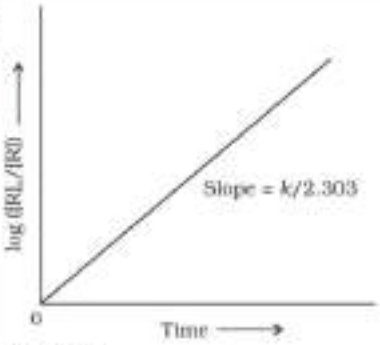
• INTEGRATED RATE EQUATION

16.



17. First order
18. Zero order

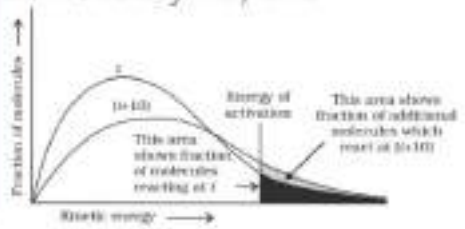
19.



20. First order
21. $[R] = [R_0] - kt$
22. $\ln [R]/[R_0] = -kt$
23. F
24. $[R_0]/2k$
25. 0.693/k
26. T
27. hydrolysis of cane sugar, hydrolysis of methyl acetate (Majorly hydrolysis reaction which use H2O)

• TEMPERATURE DEPENDENCE OF THE RATE OF A REACTION

28. 10°C
29. $K = A\,e^{-E_a/RT}$
30. x + y
31. F
32. Curve B is at a higher temperature



33. $\log\frac{k_2}{k_1} = \frac{E_a}{2.303R}\left[\frac{T_2 - T_1}{T_1T_2}\right]$

34. F

35. F

36. T

37. The number of collisions per second per unit volume of the reaction mixture

38. $K = PZab\, e^{-E_a/RT}$

39. $e^{-E_a/RT}$

40. 2nd order, elementary

41. Collision frequency (Z)

Chapter 11

SURFACE CHEMISTRY

ADSORPTION

1. The area of the interface depends on the size of the particles of the bulk phases. T/F
2. Under a very high vacuum of the order of ___ to ___ pascal, it is now possible to obtain an ultra-clean surface of the metals.
3. What is Adsorption ?
4. The substance which concentrate at surface is called _____ and the material on the surface of which the adsorption takes place is called _____
5. The process of removing an adsorbed substance from a surface on which it is adsorbed is called -
6. Water vapours are adsorbed/absorbed by anhydrous CaCl2 but adsorbed/absorbed by silica gel.
7. The term _____ is used to describe both the absorption and adsorption.
8. ΔH of adsorption is always negative. T/F (NEET)
9. 2 types of adsorption are -
10. Physisorption operates when _____ forces operate.
11. In chemisorption _____ bonds are formed.
12. Chemisorption involves a high/low energy of activation.
13. Activated adsorption is -
14. A physical adsorption at low temperature may pass into chemisorption as the temperature is increased. T/F
15. Chemisorption is highly specific. T/F
16. Differentiate between Physisorption and Chemisorption. (On 9 points)
17. van der Waals' forces are stronger near the critical temperatures. T/F
18. SO2 > CH4 > H2 in case of adsorption. T/F
19. Physical adsorption occurs readily at low temperature and increases with increasing temperature. T/F
20. Chemisorption is reversible. T/F
21. Freundlich gave the equation - (NEET)
22. K and n depends upon - (2)
23. There is an increase in physical adsorption with an increase in temp. T/F
24. The factor 1/n can have values between ___ and ___. (probable range ___ to ___) (NEET)
25. Freundlich isotherm fails at high pressure. T/F
26. It fails because -
27. Litmus solution when shaken with charcoal becomes colourless due to -
28. Precipitate of Mg(OH)2 attains blue colour when precipitated in presence of _____ reagent

ANSWERS 1 ANSWERS 2

29. Freundlich's equation for adsorption from solution phase is -

30. Froth-flotation process use adsorption principle. T/F

31. Silver halides have the property of adsorbing some dyes like - (2)

CATALYSIS

32. What are promoters ?

33. What are poisons ?

34. In Haber's process, _____ act as a promoter and ____ act as a catalyst

35. Write the rxn in Lead chamber process and the catalyst used

36. The heat of adsorption is utilised in enhancing the rate of the reaction. T/F

37. Catalytic activity increases from Group 5 to Group 9 metals with maximum activity being shown by groups 7-9. T/F

38. $CO + H_2$ (in presence of Ni) $\rightarrow$

39. $CO + H_2$ (presence of $Cu/ZnO-Cr_2O_3$) $\rightarrow$

40. $CO + H_2$ (presence of Cu) $\rightarrow$

41. Shape selective catalyst eg. - (1)

42. Zeolites are used in _____ industries.

43. Important zeolite used in petroleum industry is -

44. ZSM-5 converts _____ directly into _____ by dehydrating them

45. Enzymes are also synthesised in the laboratory. T/F

46. Cane sugar $\rightarrow$ Glucose + Fructose. Enzyme used is -

47. $C_6H_{12}O_6 \rightarrow C_2H_5OH + CO_2$. Enzyme used is -

48. Starch $\rightarrow$ Maltose, by enzyme -

49. Maltose $\rightarrow$ Glucose, by enzyme -

50. Urea is decomposed using enzyme -

51. Name the sources of enzyme invertase, zymase, diastase, maltase, urease.

52. The optimum temperature range for enzymatic activity is _____-_____K

53. Optimum pH is between pH values __-__

54. Amylase in presence of _____ ions are catalytically active.

55. Catalyst in ostwald's process is -

56. Catalyst in contact process is

COLLOIDS

CLASSIFICATION OF COLLOIDS

57. Colloidal particles diameter is in range between ____ to ____ (NEET)
58. Gas in solid and solid in solid are called -
59. Solid in gas and liquid in gas are called -
60. Liquid in solid is -
61. Gas in liquid is -
62. Solid in liquid is -
63. Gel ex - (2)
64. Solid sol ex - (2)
65. Whipped cream is ex of -
66. Draw table describing all the types of colloids with ex. (NEET)
67. If the dispersion medium is water, sol is called _____ or _____
68. If the dispersion medium is alcohol, sol is called _____
69. Lyophobic sols are reversible sols. T/F
70. Lyophilic sols are not stable. T/F
71. Lyophobic sols are irreversible sols. T/F
72. _____ sols need stabilising agents for their preservation
73. Sols are classified based on 'Type of Particles of the Dispersed Phase' as - (3)
74. Multimolecular colloids ex - (2)
75. Macromolecular colloids ex - (3)
76. Micelles are which type of colloid ?
77. The formation of micelles takes place only above a particular temperature called _____ and above a particular conc. called _____ (NEET)
78. For soaps, CMC is ____ to ____ mol L^{-1}

PREPARATION AND PURIFICATION OF COLLOIDS

79. $As_2O_3 + H_2S \rightarrow As_2S_3$(sol), by using which method ?
80. $SO_2 + H_2S$ on oxidation give ___ sol
81. $AuCl_3 + HCHO + H_2O \rightarrow$ Au(sol) by oxidation. T/F
82. $FeCl_3 + H_2O$ on _____ gives $Fe(OH)_3$ (sol)
83. Colloidal sols of which metals can be prepared by Bredig's Arc method ? (3)
84. _____ is defined as the process of converting a precipitate into colloidal sol
85. Electrolyte used for this purpose is called _____

ANSWERS 2 ANSWERS 3

86. Purification of colloidal solution is done by - (3)

87. Pores of filter paper can be reduced by impregnating with _____ solution

88. Usual collodion is ___% solution of _____ in a mixture of alcohol and ether.

89. How is ultra-filter paper prepared ?

90. Ultrafiltration is a fast process. T/F

PROPERTIES OF COLLOIDAL SOLUTIONS

91. Colligative properties aren't shown by colloids. T/F

92. Tyndall effect is observed under which 2 conditions?

93. Ultramicroscope provides information about the size and shape of colloidal particles. T/F

94. _____ set up an apparatus known as ultramicroscope. T/F

95. The color of the colloidal solution depends on the wavelength of light scattered by the dispersion medium. T/F

96. Brownian motion depends on - (2)

97. Small size means faster motion. T/F

98. Brownian motion is responsible for the stability of sols. T/F

99. Colloidal particles always carry an electric charge. T/F

100. Negatively charged metal sulphide sols ex - (3)

101. Positively charged oxides sol ex - (1)

102. Name all the positively and negatively charged sols.

103. When KI is added to the $AgNO_3$ solution, positively/negatively charged sol results. (NEET)

104. When $AgNO_3$ is added to KI, sol formed is - (NEET)

105. $FeCl_3$ added to excess hot water, sol formed is -

106. $FeCl_3$ added to NaOH, sol formed is -

107. The combination of the two layers of opposite charges around the colloidal particle is called -

108. The first layer of ions is firmly held while the second layer is mobile. T/F

109. This potential difference between the fixed layer and the diffused layer of opposite charges is called -

110. When electrophoresis is prevented by some suitable means, it is observed that the dispersion medium begins to move in an electric field. This phenomenon is termed -

111. Name the ways through which colloids are coagulated - (5)

112. A negative charge ion can precipitate a negatively charged colloid. T/F

113. Define the Hardy-Schulze rule. (NEET)

114. Flocculating power of Na^+, Ba^{2+}, Al^{3+} is in the order - (NEET)

115. The ability to bring coagulation depends upon - (2)

ANSWERS 3 ANSWERS 4

116. Define coagulation value.

117. 2 factors responsible for the stability of lyophilic sols are -

118. Lyophilic sols can protect the lyophobic sols. T/F

119. The protective power of lyophilic sols is expressed in terms of - (NEET)

EMULSIONS AND COLLOIDS AROUND US

120. O/W type of emulsions ex - (2)

121. W/O type of emulsions ex - (2)

122. Emulsifying agents for O/W emulsions are - (4)

123. Emulsifying agents for W/O emulsions are - (3)

124. The droplets in emulsions are often positively/negatively charged

125. _____ and _____ have styptic action

126. Humus acts as a protective colloid. T/F

127. _____ is a silver sol used as an eye lotion

128. Colloidal antimony is used to treat -

129. _____ is used for intramuscular injection

130. Milk of magnesia is used for -

131. Photographic plates are prepared by coating an emulsion of the light-sensitive _____ in _____ over glass plates or celluloid films

132. Rubber is obtained by coagulation of -

133. Almost all solids adsorb gases. T/F

ANSWERS

• ADSORPTION

1. T
2. 10^{-8} to 10^{-9}
3. The accumulation of molecular species at the surface rather than in the bulk of solid or liquid is termed adsorption
4. Adsorbate, adsorbent
5. Desorption
6. Absorbed, adsorbed
7. Sorption
8. T
9. Physisorption and chemisorption
10. van der Waal's force
11. Chemical bonds
12. High
13. Chemisorption
14. T
15. T
16. Physisorption and Chemisorption

Physisorption	Chemisorption
1. It arises because of van der Waals' forces.	1. It is caused by chemical bond formation.
2. It is not specific in nature.	2. It is highly specific in nature.
3. It is reversible in nature.	3. It is irreversible.
4. It depends on the nature of gas. More easily liquefiable gases are adsorbed readily.	4. It also depends on the nature of gas. Gases which can react with the adsorbent show chemisorption.
5. Enthalpy of adsorption is low (20-40 kJ mol^{-1}) in this case.	5. Enthalpy of adsorption is high (80-240 kJ mol^{-1}) in this case.
6. Low temperature is favourable for adsorption. It decreases with increase of temperature.	6. High temperature is favourable for adsorption. It increases with the increase of temperature.
7. No appreciable activation energy is needed.	7. High activation energy is sometimes needed.
8. It depends on the surface area. It increases with an increase of surface area.	8. It also depends on the surface area. It too increases with an increase of surface area.
9. It results into multimolecular layers on adsorbent surface under high pressure.	9. It results into unimolecular layer.

17. T
18. T
19. F, decrease with increasing temp
20. F
21. $x/m = kp^{1/n}$
22. I nature of adsorbent and the gas
    II surface area of adsorbent
23. F

24. 0-1 (10) to 0-5)
25. T
26. Experimental isotherms always seem to approach saturation at high pressure
27. Adsorption
28. Magnesium
29. $x/m = kC^{1/n}$
30. T
31. Eosin, fluorescein

• CATALYSIS

32. Promoters enhance the activity of a catalyst
33. Poisons decrease the activity of a catalyst
34. Mo, Fe
35. $SO_2 + O_2 \rightarrow SO_3$; Oxides of nitrogen (NO)
36. T
37. T
38. $CH_4 + H_2O$
39. CH_3OH
40. HCHO
41. Zeolites
42. Petrochemical industries
43. ZSM-5
44. Alcohols, gasoline
45. T
46. Invertase
47. Zymase
48. Diastase
49. Maltase
50. Urease
51. Sources of enzymes

Enzyme	Source	Enzymatic reaction
Invertase	Yeast	Sucrose → Glucose and fructose
Zymase	Yeast	Glucose → Ethyl alcohol and carbon dioxide
Diastase	Malt	Starch → Maltose
Maltase	Yeast	Maltose → Glucose
Urease	Soyabean	Urea → Ammonia and carbon dioxide
Pepsin	Stomach	Proteins → Amino acids

52. 298-310K
53. 5-7
54. Na_2
55. Platinised asbestos
56. Platinised asbestos and V_2O_5

• CLASSIFICATION OF COLLOIDS

57. 10^{-9} to 10^{-6} m
58. Solid sol
59. Aerosol
60. Gel
61. Foam
62. Sol
63. Cheese, jellies
64. Pumice stone, foam rubber
65. Foam

66. Types of colloids

Dispersed phase	Dispersion medium	Type of colloid	Examples
Solid	Solid	Solid sol	Some coloured glasses and gem stones
Solid	Liquid	Sol	Paints, cell fluids
Solid	Gas	Aerosol	Smoke, dust
Liquid	Solid	Gel	Cheese, jellies
Liquid	Liquid	Emulsion	Milk, hair cream, butter
Liquid	Gas	Aerosol	Fog, mist, cloud, insecticide sprays
Gas	Solid	Solid sol	Pumice stone, foam rubber
Gas	Liquid	Foam	Froth, whipped cream, soap lather

67. Aquasol, hydrosol
68. Alcosol
69. F
70. F
71. T
72. Lyophobic sols
73. I. Multimolecular colloids
II. Macromolecular colloids
III. Associated colloids
74. Gold sol, sulphur sols
75. Starch, cellulose, proteins
76. Associated colloids
77. Kraft temperature (Tk), Critical micelle concentration (CMC)
78. 10^{-4} to 10^{-3}

• PREPARATION AND PURIFICATION OF COLLOIDS

79. Double decomposition
80. Sol
81. F, reduction
82. Hydrolysis
83. Gold, silver, platinum
84. Peptization
85. Peptizing agent
86. Dialysis, Electro-dialysis, Ultrafiltration
87. Collodion
88. 4%, nitrocellulose
89. by soaking the filter paper in a collodion solution, hardening by formaldehyde and then finally drying it
90. F

• PROPERTIES OF COLLOIDAL SOLUTIONS

91. F
92. (i) The diameter of dispersed particles is not much smaller than the wavelength of the light used
(ii) The refractive indices of the dispersed phase and the dispersion medium differ greatly in magnitude
93. F
94. Zsigmondy
95. F
96. Size of particles and viscosity of solution
97. T
98. T
99. T
100. As_2S_3, Sb_2S_3, CdS
101. TiO_2

QUESTIONS 3 QUESTIONS 4

102. Positively and negatively charged sols

Positively charged sols	Negatively charged sols
Hydrated metallic oxides, e.g., $Al_2O_3.xH_2O$, $CrO_3.xH_2O$ and $Fe_2O_3.xH_2O$, etc.	Metals, e.g., copper, silver, gold sols.
Basic dye stuffs, e.g., methylene blue sol.	Metallic sulphides, e.g., As_2S_3, Sb_2S_3, CdS sols.
Haemoglobin (blood)	Acid dye stuffs, e.g., eosin, congo red sols.
Oxides, e.g., TiO_2 sol.	Sols of starch, gum, gelatin, clay, charcoal, etc.

103. Positively

104. AgI/I-

105. Fe2O3.xH2O/Fe3+

106. Fe2O3.xH2O/OH-

107. Helmholtz electrical double layer

108. T

109. electrokinetic potential or zeta potential

110. Electroosmosis

111. Electrophoresis, mixing two oppositely charged sols, boiling, dialysis, addition of electrolytes

112. F

113. the greater the valence of the flocculating ion added, the greater is its power to cause precipitation

114. Al3+ > Ba2+ > Na+

115. Magnitude and charge of ion

116. The minimum conc. of an electrolyte in mmol/L required to cause precipitation of a sol in 2 hours

117. charge and solvation

118. T

119. Gold number

• EMULSIONS & COLLOIDS AROUND US

120. Milk and vanishing cream

121. Butter and cream

122. Proteins, gums, natural and synthetic soaps

123. Heavy metals salts of fatty acids, long chain alcohols, lampblack

124. Negatively

125. Alum and ferric chloride

126. T

127. Argyrol

128. Kalazar

129. Colloidal gold

130. Stomach disorders

131. AgBr, gelatin

132. Latex

133. T

"No matter how hard it is, no matter how hard it gets, in the end, you are going to make it."

- Parth Goyal

PARTH

About the Author

This book is written by Parth Goyal, who is currently a MBBS Student, and himself cleared NEET with AIR 225 & JEE with 99.[illegible] This book is based on the same idea as the highly successful book of Parth Goyal named "BI CHEAT". Parth Goyal has guided thousands of students to achieve their dream colleges, and this book is the result of all the love and affection that he get through his students.