1. What is inert pair effect?

In the heavy elements of p-block, electrons in the p-orbital only participate in bond formation without ns^2 electrons is known as inert pair effect.

2. What is auto reduction?

Some of the ores gives the crude metal by simple roasting without using any reducing agents is known as auto reduction. Example. $HgS\,(s) + O_2\,(g) \longrightarrow Hg\,(l) + SO_2\uparrow$

3. What is calcination?

Calcination is the process in which the concentrated ore is strongly heated in the absence of air. During this process moisture, volatile organic matter are removed and the ore become porous. Eg.,

$PbCO_3 \xrightarrow{\Delta} PbO + CO_2\uparrow$

4. What is interhalogen compounds?

Each halogen combines with another halogen to form several compounds known as interhalogen compounds. Eg. ClF,ClF_3,BrCl

5. What is Holmes signal?

In a ship, a pierced container with a mixture of calcium carbide and calcium phosphide, liberate phosphine and acetylene when thrown into sea. The liberated phosphine catches fire and ignites acetylene . These burning gases serves as a signal to the approaching ships. This is known as Holmes signal.

6. What are interstitial compounds?

An interstitial compound is compound that is formed when an atom which is small enough sits in an interstitial place in a metal lattice. Eg. TiC, $ZrH_{1.92}$, Mn_4N.

7. What is metamerism?

Compounds having similar molecular formula but differs by the alkyl group attached to a oxygen atom in ether is known as metamerism. Eg. Molecular formula $C_4H_{10}O$ and structural formula are $CH_3CH_2OCH_2CH_3$, $CH_3OCH_2CH_2CH_3$, $CH_3OCH(CH_3)CH_3$

8. What is linkage isomerism?

This type of isomer arises when an ambidentate ligand bonded to a central metal atom/ion through either of its two different donar atoms. Eg. $[Co(NH_3)_5NO_2]Cl_2$ and $[Co(NH_3)_5ONO]Cl_2$

9. What is ionisation isomerism?

The coordination compounds having same molecular formula gives different ions when dissolved in water is known as ionisation isomerism. Eg. $[Co(H_2O)_5Cl]SO_4$ and $[Co(H_2O)_5SO_4]Cl$

10. What is coordination isomerism?

The interchange of one or more ligands between the cationic and anionic coordination entities results in different isomers. Eg. $[Co(NH_3)_6][Cr(CN)_6]$ and $[Cr(NH_3)_6][Co(CN)_6]$

11. What is hydrate isomerism? (solvate isomerism)

The exchange of water (solvent molecule) in the crystal lattice with a ligand in the coordination entity gives different isomers. Eg. $[Cr(H_2O)_4Cl_2]Cl.2H_2O$ and $[Cr(H_2O)_5Cl]Cl_2.H_2O$

12. What is crystal field splitting energy?

After the splitting of degenerate levels, the energy difference between e_g and t_{2g} orbitals is known as crystal field splitting energy.

13. What is crystal field stabilization energy (CFSE)?

CFSE is defined as the energy difference of electronic configurations in the ligand field (E_{LF}) and the isotropic field (E_{iso}) $\text{CFSE}\ (\Delta E_o) = \{E_{LF}\} - \{E_{iso}\}$

14. What is coordination number? What is coordination number in bcc?

Coordination number is defined as the number of nearest neighbours that an atom has is a unit cell. The coordination number of bcc is 8.

15. What is impurity defect?

The defects in ionic solid is by adding impurity ions is known as impurity defect. Eg. In AgCl crystal $CdCl_2$ added as impurity.

16. What is radius ratio?

The ratio of radius of cation and anion is known as radius ratio. Radius ratio = r_{C+}/r_{A-}

17. What is Packing fraction (efficiency)?

$$\left\{\begin{matrix}\text{Packing fraction}\\ \text{(or) efficiency}\end{matrix}\right\} = \frac{\left\{\begin{matrix}\text{Total volume occupied by}\\ \text{spheres in a unit cell}\end{matrix}\right\}}{\text{Volume of the unit cell}} \times 100$$

18. What are molecular solids? Explain the types of molecular solids.

If the neutral molecule occupies in the lattice points of crystal, it is known as molecular solids. The neutral molecules are held together in crystal by either Vanderwaals force or dipole – dipole interaction or by both. The types are.

1. Non – polar molecular solids eg. Naphthalene, anthracene, etc.
2. Polar molecular solids eg. Solid CO_2, solid NH_3, etc.
3. Hydrogen bonded molecular solids eg. Solid ice (H2O), glucose, urea etc.

19. What is activation energy?

The excess amount of energy absorbed by the reactant molecules so that their energy becomes equal to threshold value is called activaton energy. Activation energy = Threshold energy – Average kinetic energy of the reaction.

20. What is pseudo first order reaction?

In a second order reaction, the amount of one of the reactant is taken in excess and the reaction becomes first order reaction which is known as pseudo first order reaction. Eg. Acidic hydrolysis of an ester.

21. What is common ion effect?

The dissociation of weak electrolyte is decreased by the addition of common ion is known as common ion effect. Eg. The dissociation of AgCl decreased by the addition of NaCl (the common ion is Cl^-)

22. What is buffer solution? What are the types of buffer solution? Give example.

The buffer solution is a mixture of solution consists of weak acid and its conjugate base or weak base and its conjugate acid. 1. Acidic buffer solution eg. $CH_3COOH + CH_3COONa$ 2. Basic buffer solution eg. $NH_4OH + NH_4Cl$

23. What is buffer action?

The ability of a solution to resists drastic changes in its pH upon addition of a small quantity of acid or base is called buffer action.

24. What is buffer capacity?

Buffer capacity is a term to measure buffering ability.

25. What is buffer index?

It is defined as the number of gram equivalents of acid or base added to 1 litre of the buffer solution to change its pH by unity.

26. What is salt hydrolysis?

In certain cases, the cation, anion or both react with water and the reaction is called salt hydrolysis.

27. What is solubility product?

The solubility product of a compound is defined as the product of the molar concentration of the constituent ions, each raised to the power of its stoichiometric co-efficient in a balanced equilibrium equation.

28. What is sacrificial protection (cathodic protection)?

The metal such as Mg or Zn which is corroded more easily than iron can be used as a sacrificial anode and the iron material acts as cathode. So iron is protected, but Mg or Zn is corroded.

29. What is corrosion?

The redox process which causes the deterioration of metal is called corrosion.

30. What is molar conductivity?

The conductivity of a solution which contain one mole of electrolyte is known as molar conductivity.

31. What is equivalent conductivity?

The conductivity of a solution which contain one gram equivalent of electrolyte is known as equivalent conductivity.

32. What is peptisation?

By the addition of suitable electrolytes, the precipitated particles can be brought into colloidal state and this process is called peptisation.eg. AgCl precipitate dispersed by the addition of HCl.

33. What is catalyst poison?

Certain substances when added to a catalysed reaction decreases or completely destroys the activity of catalyst and they are known as catalytic poisons. Eg. In the Haber's process H_2S acts as catalyst poison to the catalyst iron.

34. What is promoters?

In a catalysed reaction the presence of a certain substances increases the activity of a catalyst which is called promoters. Eg. In the Haber's process molybdenum acts as promoter to Iron catalyst.

35. What is electrophoresis?

The migration of sol particles under the influence of electric field is called electrophoresis or cataphoresis.

36. What is electro osmosis?

The movement of dispersion medium under the influence of electric potential is called electro osmosis.

37. What is tanning of leather?

Skin and hides are protein containing positively charged particles which are coagulated by adding tannin to give hardened leather for further application. Chromium salts are used instead of tannin.

38. What is coagulation (precipitation)? Give various method of coagulation.

The flocculation and settling down of the sol particles is called coagulation. Various method of coagulation is 1. Addition of electrolyte, 2. Electrophoresis, 3. Mixing of oppositively charged sols, 4. Boiling.

39. What is active centres?

The surface of a catalyst is not smooth. It bears steps, cracks and corners. Hence the atoms on such locations of the surface are co-ordinatively unsaturated. So, they have much residual force of attraction. Such sites are called active centres.

40. What is Tyndall effect?

When light passes through colloidal solution, it is scattered in all directions. This effect is called Tyndall effect.

41. What is Brownian movement? Give the reason for it.

The zigzag movement of colloidal particle when viewed through ultra microscope is known as Brownian movement. This happened due to continuous bombardment of molecule of dispersion medium on colloidal particle.

42. What is ultrafiltration?

The colloidal solution passes through an ordinary filter paper. In ultrafiltration, the membranes are made by using collodion cellophane or visiking. The separation of sol particles from electrolyte by filtration through an ultrafilter is called ultrafiltration.

43. What is collodion?

Collodion is 4% solution of nitrocellulose in a mixture of alcohol and water.

44. Give Freundlich adsorption equation

$$\log \frac{x}{m} = \log K + \frac{1}{n} \log p$$

X = amount of adsorbate m = weight of adsorbent p = pressure k and n = Freundlich constants

45. What is saponification?

The alkaline hydrolysis of fats or edible oils gives glycerol and soap. The reaction is known as saponification.

46. What is anomers?

One of the hydroxyl group in glucose reacts with aldehyde group to form cyclic structure. This results in the conversion of the achiral aldehyde carbon into a chiral one leading to the possibility of two isomers. These two isomers differ only in the configuration of C1 carbon. These isomers are called anomers.

47. What is mutarotation?

The specific rotation of pure α- and β- (D) glucose are 112^0 and 18.7^0 respectively. However when a pure form any one of these sugars is dissolved in water, slowly interconversion of α-D glucose and β-D glucose via open chain form occurs until equilibrium is established giving a constant specific rotation $+53^0$. This phenomenon is called mutarotation.

48. What are epimers? and What is epimerisation?

Sugar differing configuration at an asymmetric centre is known as epimers. The process by which one epimer is converted into other is called epimerisation.

49. What is invert sugar?

On hydrolysis sucrose yields equal amount of glucose and fructose units. Sucrose($+66.6^0$) and glucose($+52.5^0$) are dextrorotatory compounds while fructose is levo rotatory(-92.4^0). During hydrolysis of sucrose the optical rotation of the reaction mixture changes from dextro to levo. Hence, sucrose is also called as invert sugar.

50. What is peptide bond?

The carbonyl group of the first amino acid react with the amino group of second amino acid to give an amide linkage between these amino acids. This amide linkage is called peptide bond.

51. What is zwitter ion?

In aqueous solution the proton from carbonyl group can be transferred to the amino group of an amino acid leaving these groups with opposite charges. These ions with both charges is known as zwitter ions.

52. What is isoelectric point?

The carboxyl group can lose a proton and become negatively charged or the amino group can accept a proton to become positively charged depending upon the pH of the solution. At a specific pH the net charge of an amino acid is neutral and this pH is called isoelectric point.

53. What is denaturation of proteins?

Each protein has a unique three-dimensional structure formed by interactions such as disulphide bond, hydrogen bond, hydrophobic and electrostatic interactions. These interactions can be disturbed when the protein is exposed to a higher temperature, certain chemicals such as urea, alteration of pH, ionic strength etc., It leads to the loss of three-dimensional structure partially or completely. The process of a losing its higher order structure without losing the primary structure is called denaturation.

54. What are hormones?

Hormone is an organic substance that is secreted by one tissue, it limits the blood stream and induces physiological response in other tissues. It is an inter cellular signalling molecule. Eg. Peptide or steroid

55. How are hormones are classified according to they act as?

1. Endocrine hormones: acts on cells distant from the site of their release. Eg. Insulin
2. Paracrine hormones: act only on cells close to the cell that released them. Eg. Interleukin-I
3. Autocrine hormones: act on the same cell that released them. Eg. Interleukin-2

56. What is vulcanization (cross linking) of rubber?

Natural rubber is mixed with 3-5% sulphur and heated at 100-150oC causes cross linking of the cis-1,4-polyisoprene chains through disulphide (-S-S-) bonds. In sulphur rubber made with about 1 to 3% sulphur is soft and stretchy. When 3 to 10% sulphur is used the resultant rubber is somewhat harder but flexible.

57. What is Analgesics(non-narcotic)? Give example.

Analgesics reduce the pain without causing impairment of consciousness. Eg. Paracetamol, Aspirin

58. What is Opioids(Narcotic Analgesics)?give example.

The drug which relieve pain and produce sleep is known as Opioids. Eg. Morphine, codeine

59. What is Anaesthetics? Give its classification with examble.

It cause loss of sensation temporarily. 1. Local anaesthetics: It causes loss of sensation in the area in which it is applied without losing counsciousness. Eg. Proacaine 2. General anaesthetics: cause a controlled and reversible loss of consciousness. Eg. Propofol

60. What is antacids? Give example.

Neutralise the acid in the stomach that causes acidity. Eg. Milk of magnesia, sodium bicarbonate, Aluminium hydroxide, calcium bicarbonate, ranitidine.

61. What is antihistamines? Give example.

It provide relief from the allergic effects. Eg. Cetirizine, levocetrizine

62. What is antibiotics (antimicrobials)? Give example.

Bacteria and virus exhibit some chemical which inhibits growth and metabolism of other micro organism. Such chemical is known as antibiotics. Eg. Pencillins, ampicillin

63. What is antiseptic? Give example.

When it is applied to living tissue it will stop or slowdown the growth of microorganisms. Eg. Hydrogen Peroxide, providone-iodine

64. What is disinfectants? Give example.

When it is generally used on inanimate objects, stop or slowdown the growth of microorganisms. Eg. Chlorine compounds, alcohol, hydrogen peroxide.

65. What is antifertility drugs? Give example.

These are synthetic hormones that suppresses ovulation/ fertilisation. Eg. Ethynylestradiol, menstranol.

66. What is preservatives? Give example.

Preservatives are capable of inhibiting, retarding or arresting the process of fermentation, acidification or other decomposition of food by growth of microorganisms. Eg. Benzoic acid, sorbic acid, vinegar,

67. What is antioxidant? Give example.

Antioxidants are substances which retard the oxidative deteriorations of food. Food containing fats and oils is easily oxidised and turn rancid. Eg. BHT, BHA

68. What is sugar substituents? Give example.

Those compounds that are used like sugars for sweetening, but are metabolised without the influence of insulin are called sugar substituents. Eg. Sorbitol, Mannitol

69. What is artificial sweetening agents? Give example.

Synthetic compound which imprint a sweet sensation and possess no or negligible nutritional value are called artificial sweeteners. Eg. Saccharin, sucralose,

70. What is TFM(Total Fatty Matter)?

It is defined as the total amount of fatty matter that can be separated from a sample after splitting with mineral acids. Higher the TFM quantity in the soap better is its quality.

71. What is auto ionisation of water?

Pure water itself has a little tendency to dissociate. i.e., one water molecule donates a proton to an another water molecule. This known as auto ionisation of water.

72. What is ionic product of water?

In the equilibrium reaction of auto ionisation of water the product of concentration of hydroxyl ions and hydronium ions is known as ionic product of water. At room temperature its value is $K_w=[H_3O^+]\,[OH^-]=1x10^{-14}$.

73. Define pH.

It is defined as the negative logarithm of base 10 of the molar concentration of the hydronium ions present in solution. $pH = -\log_{10}[H_3O^+]$

74. What is enzyme?

In all living systems, the biochemical reactions are catalysed by enzyme.

75. What is conjugate acid – base pairs?

The species that remains after the donation of a proton is a base (Base1) and is called the conjugate base of the Bronsted acid (Acid1). In other words, chemical species that differ only by a proton are called acid – base pairs.

76. Give Arhenius equation.

$k=Ae^{-\left(\frac{E_a}{RT}\right)}$ k = rate constant A= frequency factor Ea = activation energy R=gas constant T = temperature.

77. Give Debye – Huckel and Onsager equation.

$\Lambda_m = \Lambda_m^\circ - (A + B\,\Lambda_m^\circ)\sqrt{C}$ A and B = Debye constant

$A = \frac{82.4}{\sqrt{DT}\,\eta}$; $B = \frac{8.20 \times 10^{6}}{\sqrt{DT}}$ D = dielectric constant of the medium Ƞ = viscosity of the medium T = Temperature in kelvin

78. What is gangue?

Non metallic impurities, rocky materials and siliceous matter which are associated with ore, collectively known as gangue.

79. What is slag?

In smelting, the remaining gangue materials are removed as slag by reacting with flux.

80. What is roasting?

Roasting is oxidation of concentrated ore by heating with excess of oxygen in a suitable furnace below the melting point of the metal.

$2ZnS + 3O_2 \xrightarrow{\Delta} 2ZnO + 2SO_2\uparrow$

81. What is water gas equilibrium?

The equilibrium involved in the reaction between carbon dioxide and hydrogen, has many industrial application and is called water gas equilibrium.

$CO_2 + H_2 \rightleftharpoons CO + H_2O$ (நீர் வாயு)

82. What is amphiboles?

Double chain silicates are also called amphiboles. These silicates contains $[Si_4O_{11}]_n^{6n-}$ ions. In these silicates there are two different types of tetrahedra; 1. Those sharing 3 vertices 2. Those sharing only 2 vertices. Eg. Asbestos

83. What are inosilicates? What are its classification?

Silicate which contain 'n' number of silicate units linked by sharing two or more oxygen atoms are called inosilicates. They are further classified as 1. Chain silicates and 2.Double chain silicates.

84. What is lanthanoid contraction?

The steady decrease in atomic/ionic radius from La^{3+} to Lu^{3+} is known as lanthanoid contraction. This is because on increase in nuclear charge in one unit and the additional electron enters into antepenultimate shell. Due to random shielding of (n-2) f orbitals, contraction occurs in the second inner shell.

85. What are transition elements? Give any two of its properties.

Transition elements are an element whose atom has an incomplete d subshell or which can give rise to cations with an incomplete d sub shell. Eg. Fe, Cu, Ni. 1. Transition elements can form coordination compounds. 2. These shows variable valency.

86. Give the IUPAC name of coordination compound $Na_2[Ni(EDTA)]$.

Sodium-2,2',2",2'"-(ethan-1,2-diyldinitrilo)tetraacetatonickalate(II)

87. What are labile complexed and inert complexes?

In some cases, complexes undergo rapid ligand substitution; such complexes are called labile complexes.

Some complexes undergo ligand substitution very slowly, such complexes are called inert complexes.

88. What is stability constant (β)? Give its significance.

The stability of a coordination complex is a measure of its resistance to replacement of one ligand by another. Significance 1. It is used to measure the stability of coordination complex. 2. If the value of the stability constant is more, the stability of the coordination complex is also more.

89. Write the following for the coordination complex $[Fe(en)_2Cl_2]Cl$.

1. Oxidation number of Fe, 2. Hybridization and geometry, 3. Magnetic property, 4. Number of geometrical isomerism, 5. Is there any optical isomerism and 6. IUPAC name.

1. Oxidation number of Fe is +3
2. Hybridization = d^2sp^3 Geometry = Octahedral
3. Magnetic property = para magnetic
4. No. of geometrical isomerism = 2, cis and trans isomerism
5. Is there any optical isomerism = yes, cis isomer gives optical isomerism
6. IUPAC name = dichloridobis(ethan-1,2-diamine)Iron(III) Chloride.

90. Tabulise the relation ship between the radius ratio and crystal structure of ionic crystals

$\left(\frac{r_{C^+}}{r_{A^-}}\right)$	Coordination number	Structure	Example
0.155 – 0.225	3	Trigonal planar	B_2O_3
0.225 – 0.414	4	Tetrahedral	ZnS
0.414 – 0.732	6	Octahedral	NaCl
0.732 – 1.0	8	Cubic	CsCl

91. What is the role of adsorption in heterogeneous catalysis?

The adsorption of reactants on the surface decreases its activation energy and increases the rate of reaction.

92. Give the classification of buffer solution with example.

1. Acidic buffer solution eg. $CH_3COOH + CH_3COONa$
2. Basic buffer solution eg. $NH_4OH + NH_4Cl$

93. Give the method of Galvanic cell notation.

$$Zn\ (s)|Zn^{2+}(aq)\|Cu^{2+}(aq)|Cu\ (s)$$

In the above notation, a single vertical bar (|) represents a phase boundary and the double vertical bar (||) represents the salt bridge.

The anode half cell is written on the left side of the salt bridge and the cathode half cell on the right side.

The anode and cathode are written on the extreme left and extreme right, respectively.

The emf of the cell is written on the right side after cell diagram.

94. What is intercalation?

During discharge of the lithium-ion battery, the Li+ ions produced at the anode move towards cathode through the non-aqueous electrolyte. When a potential greater than the emf produced by the cell is applied across the electrode, the cell reaction is reversed and now the Li+ ions move from cathode to anode where they become embedded on the porous graphite electrode. This is known as intercalation.

95. What is electrochemical series? How this series is used to determine the capacity of corrosion?

The standard aqueous electrode potential at 298K for various metal-metal ion electrodes are arranged in the decreasing order of their standard reduction potential value is called electrochemical series. It is a measure of the oxidising tendency of the species. The greater the value, greater is the tendency to accept electron undergo reduction, lesser is the tendency to undergo corrosion.

96.What is Helmholtz electrical double layer?

The surface of colloidal particle adsorbs one type of ion due to preferential adsorption. This layer attracts the oppositely charged ions in the medium and hence at the boundary separating the two electrical double layers are setup. This is called as Helmholtz electrical double layer.

97. What is the role of salt bridge in Galvanic cells?

Salt bridge is an inverted U tube containing a agar-agar gel mixed with the inert electrolyte such as KCl, Na_2SO_4,etc. The ions of inert electrolyte do not react with other ions present in the half cells and they are not either oxidised or reduced at the electrolytes. The solution in the salt bridge cannot get poured out, but through which the ions can move into or out of the half cells. Thus half cells are joined and circuit closed.

98. What is emulsification?

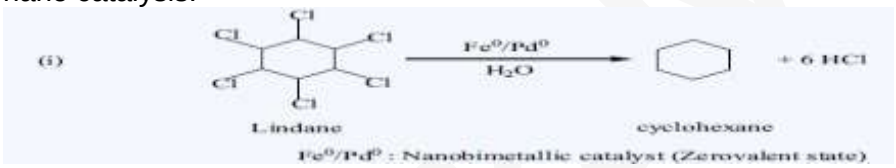
The process of preparation of emulsion by the dispersal of one liquid in another liquid is called Emulsification.

99. What is deemulsification?

Emulsion can be separated into two separate layers. This process is known as Deemulsification.

100. What is nano catalysis? Give example.

The reaction in which the catalyst used are metallic nano particles, metal oxides, etc. is known as nano catalysis.



101. Give two examples for enzyme catalysis.

1) The peptide glycyl L-glutamyl L-lyrosin is hydrolysed by an enzyme called pepsin.
2) The enzyme diastase hydrolyses starch into maltose

$$2(C_6H_{10}O_5)_n + nH_2O \rightarrow nC_{12}H_{22}O_{11}$$

102. What is flocculation value?

The precipitation power of electrolyte is determined by finding the minimum concentration required to cause precipitation of a sol in 2 hours. This value is called flocculation value. The smaller the value greater will be precipitation.

103. What are the names of the ester which gives odour in the following.

1. Odour of banana 2. Odour of orange 3. Odour of pine apple 4. Odour of apricot.

S.No	Ester	Flavour
1	Amyl acetate	Banana
2	Ethyl butyrate	Pineapple
3	Octyl acetate	Orange
4	Isobutyl formate	Raspberry
5	Amyl butyrate	Apricot

104. Arrange the following.

a) decreasing order of pKb value $C_2H_5NH_2,\ C_6H_5N(CH_3)_2,\ (C_2H_5)_2NH,\ CH_3NH_2$

b) increasing order of basic strength $C_6H_5NH_2,\ C_6H_5N(CH_3)_2,\ (C_2H_5)_2NH,\ CH_3NH_2$

a) $C_6H_5N(CH_3)_2 > CH_3NH_2 > C_2H_5NH_2 > (C_2H_5)_2NH$

b) $C_6H_5NH_2 < C_6H_5N(CH_3)_2 < CH_3NH_2 < (C_2H_5)_2NH$

105. Indicate the vitamin causes the deficiency diseases of the following.

1. Pellagra 2. Beri-Beri 3. Night blindedness

1. Vitamin B3 (Niacin) 2. Vitamin B1 (Thiamine) 3. Vitamin A (Retinol)

106. What are biodegradable polymer? Give example.

The polymer that are readily decomposed by micro organism in the environment are called biodegradable polymer. Eg. PHB, PHBV, PGA, PLA, PCL, etc.

107. What is therapeutic index? How it is related to the safety of drug?

The ratio between the maximum tolerated dose of a drug and the minimum curative dose is known as therapeutic index. Higher the value safer is the drug.

APPLICATION / USES / IMPORTANCE

1. Give the uses of zinc.

1. used in galvanizing metals to protect them from rusting and corrosion
2. zinc oxide used in the manufacture of paint, rubber, cosmetics, plastics, pharmaceutical etc.,
3. zinc sulphide is used in the manufacture of luminous paints, x-ray screet, fluorescent lights
4. Brass an alloy of Zinc is used in water valves and communication equipment since it less corrosive

2. Give the uses of copper.

1. first metal used by human
2. used in making coins with gold and other metals
3. its alloys used in making wires, water pipes and electrical equipment

3. Give the uses of Aluminium

1. in the manufacture of cooking vessel, heat exchangers
2. used in packing material (Aluminium foil)
3. Duralumin alloy is used in the construction of aeroplanes, and other formats of transport
4. used in design of chemical reactors, medical equipment
5. its alloy with iron is used in high voltage cables.

4. Give the uses of Iron.

1. Magnets can be made from iron and its alloys and compounds
2. Stainless steel used in architecture, bearings, cutlery, surgical instruments and jewellery
3. cast iron is used to make pipes, valves and pump stoves, etc
4. Nickel steel is used for making cables, automobiles and aeroplane parts.
5. Chrome steels are used for manufacturing cutting tools and crushing machines.

5. List out the applications of gold.

1. Its copper alloy is used extensively in jewellery.
2. It is used in electroplating to cover other metal with thin layer of gold
3. nano particles of gold used to increase efficiency of solar cells
4. It is used as an catalyst.

6. List the uses of Borax.

1. used to identify coloured metal ions
2. In the manufacture of optical and borosilicate glass, enamels and glazes for pottery
3. It is also used as a flux in metallurgy.

7. List out the uses of alum.

1. It is used for purification of water
2. It is used for water proofing and textiles
3. It is used in dyeing, paper leather tanning industry
4. It is used as septic agent to arrest bleeding

8. Give the uses of Helium

1. He-O2 mixture is used instead of N2-O2 mixture for divers to prevent painful condition Bends.
2. used to provide inert atmosphere in electric arc welding of metals
3. used in cryogenic technology
4. It is used to filling air balloons.

9. Give the uses of Neon

1. used in advertisement board
2. used as alert lamp
3. In garden lamp to improve the production of chlorophyll in plants.

10. Give the uses of Argon

1. Argon prevents the oxidation of a hot filament and prolongs the life in filament bulbs.
2. It is also used in radio valves and tubes.

11. List out the uses of Chlorine

1. in the purification of drinking water
2. used as bleaching agent

3. in the separation of gold and platinum
4. used as disinfectant

12. Write the uses of Potassium di chromate

1. as a strong oxidising agent
2. in dyeing and printing
3. leather tanneries for chrome tanning
4. in the quantitative analysis for the estimation of iron compounds and iodides.

13. Write the uses of Potassium permanganate

1. as a strong oxidising agent
2. for the treatment of various skin infections and fungal infections of the foot
3. in water treatment industries to remove iron and hydrogen sulphide from well water
4. as a Bayer's reagent
5. in the quantitative analysis for the estimation of ferrous salts, oxalates, hydrogen peroxide and iodide

14. Write the uses of silicones

1. used as low temperature lubrication and vacuum pumps, high temperature oil baths, etc.
2. in making water proofing clothes
3. insulator in electrical motors and other appliances
4. silicone rubber retains its elasticity even at low temperature
5. mixed with paint and varnishes to make the resistant towards high temperature, sunlight, dampness and chemicals.

15. Write the uses of glycerol

1. as sweetening agent in confectionary and beverages
2. in the manufacture of cosmetics and transparent soaps
3. in making printing inks and stamp pad ink and lubricant for watches and clock
4. in the manufacture of explosive like dynamite and cordite by mixing it with china clay.

16. Write the uses of ethanol

1. in the preparation of Paints and varnishes
2. in the preparation of organic compounds like ether, chloroform, iodoform, etc.
3. in the preparation of dyes, transparent soaps
4. substituent for petrol under the name power alcohol used as fuel for aeroplane
5. as preservatives for biological specimen

17. List the uses of diethyl ether

1. as a surgical anaesthetic agent in surgery
2. good solvent for organic reactions and extraction
3. as a volatile starting fluid for diesel and gasoline engine
4. as a refrigerant

18. Write the uses of formaldehyde

1. formalin used for preserving biological specimen
2. formalin has hardening effect, hence it is used for tanning
3. formaldehyde – phenol in the production of plastic bakelite.

19. Give the uses of formic acid

1. for the dehydration of hides
2. as coagulating agent for rubber latex
3. in medicine for treatment of gout
4. as an antiseptic in the preservation of fruit juice

20. List the uses of nitroalkane

1. as a fuel for cars
2. chloropicrin is used as an insecticide
3. as fuel additive and precursor to explosive and they are good solvents for polymers, cellulose ester, synthetic rubber and dyes etc.,
4. 4% solution of ethyl nitrite in alcohol is known as sweet spirit of nitre and is used as diuretic

21. List the application of colloids in medicine

1. penicillin and streptomycin are produced in colloidal form for suitable injections.
2. Colloidal gold and colloidal calcium are used as tonics
3. Milk of magnesia is used for stomach troubles
4. silver sol protected by gelatine is used as eye lotion in the name Argyrol

22. Write a note on complexes in biological process.

1. In Red Blood Corpuscle, haem is iron-porphyrin complex carrying oxygen from lungs to tissues and CO_2 from tissues to lungs.
2. Chlorophyll is a Magnesium-modified porphyrin complex plays important role in photosynthesis
3. Vitamin B12 (Cyanocobalamin) contains Cobalt – porphyrin complex.
4. Many enzymes are metal complexes which regulates biological processes

23. Write the complexes used as medicine in treatment for various diseases.

1. Ca-EDTA chelates is used to remove lead and radioactive metal ions from the body.
2. cis- platin is used as an antitumor drug in cancer treatment

24. List some uses of adsorption

1. Activated charcoal used adsorbent in gas masks
2. In the separation of rare gases charcoal used as adsorbent.
3. In the process of softening of hard water
4. Animal charcoal is used to decolourise sugar
5. In the Haber's process reaction occurs on the surface of iron catalyst
6. In the refining of petroleum and vegetable oil Fuller's earth and silica gel used as adsorbent

25. What are the uses of Kohlrausch's law?

1. to calculate molar conductance at infinite dilution of a weak electrolyte
2. to calculate degree of dissociation of weak electrolyte
3. to calculate solubility of sparingly soluble salts

26. List the uses of phenol

1. used in preparation of phenol-formaldehyde resin(bakelite)
2. in preparation of drugs such as phenacetin, salol, aspirin,etc
3. in the preparation of phenolphthalein
4. in the preparation of explosives like picric acid
5. as an antiseptic-carbolic lotion and carbolic soaps

27. What are the importance of carbohydrate

1. widely distributed in plants and animals, act mainly as energy sources and structural polymers
2. stored in the body as glycogen and in plant as starch
3. cellulose is a primary components of plant cell wall, used to make paper, furniture and cloths
4. glucose serves as an instant source of energy
5. ribose sugar is the component of nucleic acids.
6. Hyaluronate act as shock absorber and lubricant

28. What are the importance of proteins

1. All biochemical reactions occur in living systems are catalysed by catalytic proteins called enzymes
2. Keratin, collagen act as structural back bones
3. Haemoglobin as transporting molecules
4. Antibodies help the body to fight various diseases
5. Insulin and glucagon control the glucose level in the blood
6. protein act as receptors
7. to store metals such as iron(Ferritin)

29. What are the biological importance of lipids

1. Lipids are the integral component of cell membrane. They are necessary of structural integrity of cell
2. The main function of triglycerides in animals is an energy reserve
3. act as protective coating in aquatic organisms
4. connective tissue give protection to internal organs
5. help in the absorption and transport of fat soluble vitamins
6. essential for activation of enzymes such as lipases
7. act as emulsifier in fat metabolism

30. What are the importance of Brownian movement?

1. to calculate Avogadro number
2. could be confirmed the increase in movement of particle with increase in temperature (Kinetic theory)
3. it does not allow the particles to be acted on by force of gravity.

Differences / Differentiation

1. Differentiate Mineral and Ore

Sl.No.	Mineral	Ore
1	It is a naturally occurring substance obitained by mining which contains metal in free state or	It is a mineral, if the metal present in it can be easily and commercially separated from it, is

	in the form of a compound like oxide, sulphide, etc	known as ore.
2	All minerals are not ore	All ores are minerals
3	Eg. China clay	Eg. Bauxite

2. Differentiate lanthanoids and actinoids

Sl.No.	Lanthnoid	Actinoid
1	The final electron enters in to the 4f subshell	The final electron enters into the 5f subshell
2	The binding energy of 4f orbital is high	The binding energy of 5f orbital is low
3	They show less tendency to form complex	They show more tendency to form complex
4	Most of Lanthanoids are colourless	Most of the Actinoids are coloured
5	They do not form oxo cations	They are form oxo cations
6	Common oxidation state is +3, highest oxidation state is +4 and lowest oxidation state is +2	Common oxidation state is +4, highest oxidation state is +6 and lowest oxidation state is +2

3. Differentiate double salt and coordination compounds

Sl.no.	Double salt	Coordination compounds
1	It is obtained by evaporation of solutions of 2 or more salts	It obtained by the combination of Lewis acid and Lewis base
2	They lose their identity in solution	They do not loose their identity in solution
3	It dissociates into simple ions in solution	It never dissociates into simple ions
4	Its property aligned with its ionic property	Its property does not aligned with is ionic property
5	Eg. $FeSO_4(NH_4)_2SO_46H_2O$	Eg. $K_4[Fe(CN)_6]$

4. Differentiate crystalline solid and amorphous solid

Sl.No.	Crystalline solid	Amorphous solid
1	Definite shape	Irregular shape
2	Anisotropic in nature	Isotropic like liquids
3	True solids	Pseudo solids or supercooled liquid
4	Sharp melting point	No sharp melting point
5	Long range orderly arrangement of constituents	Short range, random arrangement of constituents
6	Definite Heat of fusion	Heat of fusion is not definite
7	Eg. NaCl crystal	Eg. Rubber, plastic, glass, etc

5. Distinguish tetrahedral and octahedral void

Sl.no.	Tetrahedral void	Octahedral void
1	It is unoccupied empty spaces present in substances having tetrahedral crystal systems	It is unoccupied empty spaces present in substances having octahedral crystal systems
2	It can be found in substances having a tetrahedral arrangement in their crystal system.	It can be found in substances having an octahedral arrangement in their crystal systems
3	It can be observed in edges of the unit cell.	It can be observed in the centre of the unit cell
4	Its coordination number is 4	Its coordination number is 6
5	No. of void formed is equal to 2n	No. of void formed is equal to n

6. Distinguish rate of reaction and rate constant of reaction

Sl.no.	Rate of reaction	Rate constant of reaction
1	Represents the speed of a reaction	It is a proportionality constant
2	It is measured by decrease in concentration of reactant or increase in concentration of product	It is equal to the order of reaction when the concentration of each of the reactant in unity
3	Depends on the initial concentration of reactants.	Does not depend on the initial concentration of reactants.

7. Distinguish order of a reaction and molecularity of a reaction

Sl.no.	Order of a reaction	Molecularity of a reaction
1	It is the sum of the powers of concentration terms involved in the experimentally determined rate law	It is the total number of reactant species that are involved in an elementary step
2	It can be zero or fractional or integer	It is always whole number, cannot be zero or a fractional number

3	Assigned for a over all reaction	Assigned for each elementary step or mechanism

8. Distinguish Lewis acid and Lewis base

Sl.no.	Lewis acid	Lewis base
1	Electron deficient molecule eg.$AlCl_3$	Molecule with one or more lone pair of electrons eg. NH_3, H_2O
2	All metal atom or ions eg. Fe^{2+}, Cr^{3+}	All anions eg. F^-, Cl^-,
3	Molecules that contain a polar double bond eg. SO_2, CO_2	Molecules that contain carbon-carbon multiple bond eg. $CH_2=CH_2$, CHΞCH
4	Due to availability of empty d-orbitals central atom can expand its octet eg. SiF_4, SF_4	All metal oxides eg. CaO, MgO
5	Carbonium ion $(CH_3)_3C^+$	Carbanion CH_3^-

9. Distinguish physical adsorption and chemical adsorption

Sl. no.	Chemical adsorption or Chemisorption or Activated adsorption	Physical adsorption or Physisorption or vander waals adsorption
1	It is very slow	It is instantaneous
2	Very specific	Non- specific
3	Adsorption will not increase on increasing pressure	Adsorption increased by increasing pressure
4	On increase of temperature adsorption first increase and then decrease	Adsorption decreases on increase of temperature
5	Electron transfer involved between adsorbent and adsorbate	No transfer of electrons
6	Heat of adsorption is high	Heat of adsorption is low
7	Monolayer of adsorbate is formed	Multilayer of adsorbate is formed
8	Occurs at fixed sites called active centres.	Occurs on all sides
9	Involves the formation of activated complex with appreciable activation energy	Activation energy is insignificant

10. Differentiate homogeneous catalysis and heterogeneous catalysis

Sl.no.	Homogeneous catalysis	Heterogeneous catalysis
1	In a homogeneous catalysed reaction, the reactant, products and catalyst are present in the same phase	In a reaction, the catalyst is present in a different phase i.e. it is not present in the same phase as that of reactants or products
2	$2SO_2+O_2+[NO] \rightarrow 2SO_3+[NO]$ all are in gaseous state	$N_2+3H_2 \xrightarrow{Fe} 2NH_3$ reactant and product are in gaseous state and catalyst in solid state

11. Distinguish DNA and RNA

Sl.no.	DNA	RNA
1	Present in nucleus, mitochondria and chloroplast	Present in cytoplasm, nucleolus and ribosomes
2	Contains Deoxyribose sugars	Contains ribose sugar
3	Base pair A=T, GΞC	Bse pair A=U, CΞG
4	Double stranded molecule	Single stranded molecule
5	Life time is high	Short lived
6	Stable and not hydrolysed easily by alkalis	Unstable and hydrolysed easily by alkalis
7	It can replicate itself	It cannot replicate itself. It is formed from DNA

12. Distinguish vitamin and hormones

Sl.no.	Hormone	Vitamin
1	It is an organic substance that is secreted by one tissue, it limits the blood stream and induces a physiological response in other tissues.	These are small organic compounds that cannot be synthesised by our body but are essential for certain functions
2	Cannot stored in the body. But produced continuously	These are stored in the body and act against the diseases

13. Distinguish antiseptic and disinfectant

Sl.no.	Antiseptic	Disinfectants
1	It stop or slow down the growth of	It stop or slow down the growth of

	microorganism applied to living tissue	microorganism used on inanimate objects
2	Eg. H_2O_2, povidone-iodine	Eg. Chlorine compounds, alcohol,H_2O_2

14. Distinguish thermoplastic and thermosetting plastics

Sl.no.	Thermoplastic	Thermosetting plastic
1	Melting on heating and hardened on cooling	On heating hardened without melting
2	Soft, stronger, unbreakable	Hard, stronger and breakable
3	Eg. Cellulose nitrate, PVC	Eg. Phenol-formaldehyde, urea-formaldehyde

15. Distinguish primary, secondary and tertiary amine

Sl.no.	Primary amine	Secondary amine	Tertiary amine
1	Gives alcohol with nitrous acid	N-nitroso amine obtained	Salt obtained
2	Gives carbylamines with $CHCl_3$/KOH	No reaction	No reaction
3	Gives N- alkyl acetamide with acetyl chloride	Gives N,N- dialkyl acetamide	No reaction
4	Gives alkyl isothio cyanate with CS_2/$HgCl_2$	No reaction	No reaction
5	Gives solid dialkyl oxamide with ethyl oxalate at room temperature	Gives liquid N,N-dialkyl oxamic ester	No reaction
6	Gives quaternary ammonium salt with 3 molecules of RX	Gives quaternary ammonium salt with two molecules of RX	Gives quaternary ammonium salt with 1 molecule of RX

16. The formula CH_3NO_2 has two isomers. How could you differentiate them? (Differentiate Nitro form and Aci- form)

S.No.	Nitro form	Aci – form
1.	Less acidic	More acidic and also called pseudoacids (or) nitronic acids
2.	Dissolves in NaOH slowly	Dissolves in NaOH instantly
3.	Decolourises $FeCl_3$ solution	With $FeCl_3$ gives reddish brown colour
4.	Electrical conductivity is low	Electrical conductivity is high

17. What are the differences between Fibrous proteins and Globular proteins?

Sl.No.	Fibrous Protein	Globular Proteins
1	Linear structure	Spherical shape
2	Insoluble in water	Soluble in water
3	Used as structural protein	Possess many functions including catalysis
4	Eg Keratin, collagen	Eg. Myoglobin, insulin

Reasons/ give reason

1. What are the reason for the anomalous behaviour of first element of each group in p-block elements?

1. Small size of the first member
2. High ionisation enthalpy and high electronegativity
3. Absence of d orbitals in their valence shell