## **CHEMISTRY**

#### **BLUE PRINT**

S.NO	LESSONS	1 marks	3 marks	5 marks	10 marks	TOTAL
1	Atomic Structure	2	1	1	-	10
2	Periodic classification	1	1	-	1	09
3	P – Block Elements	1	2	-	1	12
4	d – Block Elements	2	2	1	1	18
5	f - Block Elements	2	-	1	-	07
6	Coordination Components	1	-	1	1	11
7	Nuclear Chemistry	1	1	-	1	09
8	Solid State	1	1	-	1	09
9	Thermodynamics	2	1	1	-	10
10	Chemical equilibrium	2	1	1	-	10
11	Chemical Kinetics	1	2	1	-	12
12	Surface Chemistry	3	1	-	1	11
13	Electro Chemistry I	1	1	-	1(1)	14
14	Electro Chemistry II	-	-	1	1	10
15	Isomerism in Organic Chemistry	-	1	-	1	08
16	Hydroxy Derivatives	1	2	-	1	12
17	Ethers	2	-	1	-	07
18	Carbonyl Compounds	1	1	1	1	14
19	Carboxylic Acids	1	1	1	1	14
20	Organic Nitrogen Compounds	3	1	-	1	11
21	Bio molecules	2	-	-	1	07
22	Chemistry in Action	-	1	1	-	08
	Total	30	21	12	14	233

We classify the learning capacity of categories. In the first category, this package is used for scoring pass mark. In the second stage, it is used for scoring 80 marks, the third stage is used for scoring 120 marks and the fourth stage ,they can able to get 150/150.

Stage - I

Lesson 10 Mark Lesson 1 mark 3 Mark 5 Mark Total No 5 F – block Elements 2 07 1 --7 Nuclear Chemistry 09 1 1 -1 Solid State 8 1 1 1 09 -9 Thermodynamics 2 1 10 1 -Chemical Equilibrium 10 2 1 1 10 -22 Chemistry in Action -1 1 -80 53 Total

TABLE – 1

In the first table, this package is used maximum scoring 53 marks.

#### Stage - II

TABLE – 2

Lesson No	Lesson	1 mark	3 Mark	5 Mark	10 Mark	Total
2	Periodic Classification	1	1	-	1	09
12	Surface Chemistry	3	1	-	1	11
17	Ethers	2	-	1	-	07
	Total					27

In the stage I & II it is used for scoring 80 marks.

Stage III

TABLE – 3

Lesson No	Lesson	1 mark	3 Mark	5 Mark	10 Mark	Total
1	Atomic Structure	2	1	1	-	10
4	d – Block Elements	2	2	1	1	18
6	Coordination Components	1	-	1	1	11
14	Electro Chemistry	-	-	1	1	10
	Total				49	

The stage I, II & III is used for scoring 129 marks.

#### Stage - IV

TABLE – 4

Lesson	Lesson	1 mark	3 Mark	5 Mark	10 Mark	Total
No						
3	P – Block Elements	1	2	-	1	12
16	Hydroxy Derivatives	1	2	-	1	12
			24			

## <u>NOTE</u>

To score 150/150

- Practice the units mentioned in the four tables .
- Practice Book back one mark questions (self evaluation) for 19 units.
- Practice the questions that where asked in the PTA guide as well as previous year public question papers.
- Practice for the chapters Hydroxy derivatives and d-block elements problems.
- Practice for the chapters Electro chemistry Chemical kinetics and Isomerism in organic chemistry

1.Based on the blue print Without	14,15,22
one mark lessons	
2. Based on the blue print Without	5,6,14,17,21
three mark lessons	

## Lesson 5 – f Block Elements

## 5 marks questions (Public Q.No: 54)

## 1. What is Lanthanide contraction and causes?

(i) Lanthanide contraction :

The size of the  $M^{_{3^+}}$  ions decreases from La to Lu is called Lanthanide contraction.

## (ii) Causes :

- a) Imperfect shielding of 4f electrons
- b) increase in nuclear attraction

## 2. Discuss the consequences of Lanthanide contraction.

Consequences :

1) According to Fajan's rule, in Ln(OH)<sub>3</sub> the covalent character increases

between  $Ln^{3+}$  and OH- ions The order of size of  $Ln^{3+}$  ions are

 $La^{3+} > Ce^{3+} \dots > Lu^{3+}$ 

- 2) There is regular decrease in their ionic radii.
- 3) Regular decrease in their tendency to act as reducing agent
- 4) Second and third rows of d block elements are quite close in their properties.
- 5) These elements occur together in natural minerals and are difficult to separate.

## 3. Write the uses of lanthanides and actinides.

## Uses of lanthanides

- 1. pyrophoric alloy : (Ce, La, Nd, Fe, Al, C, Sc) used in cigarette lighters, flame throwing tanks and tracer bullets.
- 2. Ceria and Thoria are used as gas lamp materials.
- 3. Cerium salts are used in dyeing cotton and as catalyst in lead storage batteries.
- 4. Lanthanido thermic process. It is used to extract pure Nd, Zn, Fe, Co etc
- Mish metal : Ce : 45 50% ; La : 25% ; Nd : 5% and other Lanthanide metals, Fe, Ca mixture Used for the production of brands of steel like high resistant stainless steels.30% mish metal and 1% Zn mixture is used in making parts of get engines.

Uses of actinides :

- (i) U-235 is used as fuel in nuclear power plant and as a component in nuclear weapons.
- (ii) Pu-235 used as a power source in long mission space probes

## 4. Write various oxidation states of Lanthanides and Actinides

	Common oxidation state	Other oxidation state
Lanthanides	+3	+2,+4
Actinides	+4	+2,+3,+5,+6

## 5. What is the difference between Lanthanides and Actinides.

Lanthanides	Actinides
1. Binding energies of 4f electrons	Binding energies of 5f electrons are
higher.	lower.
2. 4f electrons have greater shielding	5f electrons have poor shielding
effect.	effect.
3. Most of the ions are colourless.	Most of the ions are coloured.
	E.g. U <sup>3</sup> +(Red)
4. Their compounds are less basic.	Their compounds are more basic.
5. Except promethium, they are non	All of them are radioactive.
Radioactive .	
6. They do not form oxocation .	They form oxocations.
7.They do not form complexes easily.	They have much greater tendency
	to form complexes.



#### Lesson – 7 - NUCLEAR CHEMISTRY

#### <u>3 Marks guestion and answers: (Public Q.no : 37 )</u>

#### 1. What is half life period?

The time required to disintegrate the half of any radioactive substance is called half life period.

t 1/2 = 0.693/λ

#### 2. What is 'Q' value of a nuclear reaction?

The amount of energy absorbed or released during the nuclear reaction is called

'Q' value of nuclear reaction

Q value =  $(m_{P}-m_{r})$  931 Mev

m<sub>p</sub>= sum of masses of products

mr = sum of masses of reactants

When Q= (+) energy absorbed i.e m<sub>p</sub>>m<sub>r</sub>

Q= (-) energy released i.e m<sub>r</sub>>m<sub>p</sub>

#### 3. Explain the Spallation reactions with example.

Spallation reaction: The reaction in which high speed projectiles may chip heavy nucleus into several fragments

 $_{29}$ Cu<sup>63</sup>+<sub>2</sub>He<sup>4</sup>+400MeV  $\rightarrow _{17}$ Cl<sup>37</sup>+14<sub>1</sub>H<sup>1</sup>+16<sub>0</sub>n<sup>1</sup>

#### 4. What is Binding energy of nucleus?

1. Whenever a nucleus is formed, certain mass is converted into energy.

2. The atomic mass is lower than the sum of masses of protons, neutrons and electrons present. This difference in mass is termed as mass defect.

3. Binding Energy  $\Delta E = \Delta mc^2$ 

#### 5. Write the two uses of radio carbon dating.

i. It is a great tool for correlating facts of historical importance.

 It is very useful in understanding the evolution of life and rise and fall of civilizations.

Note: Public question paper problem and example problem also practice.

#### **<u>5 Marks - ( Public Q.No : 65 (b) )</u>**

#### 1. Explain about the nuclear reaction taking place in sun.

It has been estimated that the sun is giving out energy equally in all possible directions at the rate of  $3.7 \times 10^{33}$  ergs/sec. The energy of the sun is supposed to arise from the fusion of hydrogen nuclei into helium nuclei which in going on inside it all the time.

The various fusion reactions taking place in the sun are as follows:

a) Proton - proton chain reaction:  $_{1}H^{1} + _{1}H^{1} \xrightarrow{fusion} _{1}H^{2} + _{+1}e^{0} + energy$ positron  $_{1}H^{2} + _{1}H^{1} \xrightarrow{fusion} _{2}He^{3} + energy$   $_{2}He^{3} + _{1}H^{1} \xrightarrow{fusion} _{2}He^{4} + _{+1}e^{0} + energy$ The overall reaction, therefore, may be written as:  $4 _{1}H^{1} \xrightarrow{fusion} _{2}He^{4} + 2 _{+1}e^{0} + energy$ 

#### 2. Differentiate between chemical reaction and Nuclear reaction.

Chemical reactions			Nuclear reactions
1.	These reaction involve some loss, gain or overlap of outer orbital electrons of the reactant atoms.	1.	Nuclear reactions involve emission of alpha, beta and gamma particles from the nucleus.
2.	A chemical reaction is balanced in terms of mass only	2.	Nuclear reaction is balanced in terms of both mass and energy.
3.	The energy changes in any chemical reaction is very much less when compared with nuclear reaction.	3.	The energy changes are far exceed than the energy changes in chemical reactions.
4.	In chemical reactions, the energy is expressed in terms of kilojoules per mole.	4.	In nuclear reactions, the energy involved is expressed in MeV (Million electron volts) per individual nucleus.
5.	No new element is produced since nucleus is unaffected.	5.	New element / isotope may be produced during the nuclear reaction.

### 3. Explain Radio Carbon dating.

By knowing the amount of C<sub>14</sub> present in plant or animal fossil the age of wood or fossil can be determined is called radio carbon dating. C<sub>14</sub> radio isotope of carbon is formed in the upper atmosphere by reaction with neutrons. (cosmic rays)

$$_7N^{14} +_0n^1 \rightarrow _6C^{14} + _1H^1$$

The  $C_{14}$  atoms produced are oxidised to  ${}^{14}CO_2$ . It is incorporated in plants as a result of photo synthesis .

Animals too consume C<sub>14</sub> by eating plants, on death, organisms cease to take in fresh carbonations.

$${}_{6}C^{14} \rightarrow 7N^{14} + {}_{-1}e^{0}$$

Carbon - 14 begins to decay.

Half life period of  $C_{14}$  = 5700 years. Therefore by knowing either the amount of  $C_{14}$  or the number of  $\beta$ - particles emitted per minute per gram of carbon at the initial and final stages, the age of carbon material can be determined by

t = 
$$\frac{2.303 \times t^{1/2}}{0.693}$$
 log  $\frac{\text{Amount of C}^{14} \text{ in fresh wood}}{\text{Amount of C}^{14} \text{ in dead wood}}$ 

### Uses :

1. It is a great tool for correlating facts of historical importance

2. It is very useful in understanding the evolution of life and rise and fall of civilizations

#### S.No Names Uses Tritium 1H<sub>3</sub> 1 Measure water content of the body 2 Carbon - 11 6C<sup>11</sup> Brain scan 3 Carbon - 14 6C14 Radio immunology 4 lodine -131 531131 diagnosis of damaged heart muscles and hyper thyroidism Mercury - 197 90Hg<sup>197</sup> 5 Kidney scan Phosphorous -32 15P<sup>32</sup> 6 Detection of eye tumours Iron - 59 26Fe<sup>59</sup> 7 Diagnosis of anemia 8 Cobalt - 60 27CO60 Treatment of cancer Sodium -24 11Na<sup>24</sup> 9 Location of blood clots, and circulatory disorders. 10 Gold - 198 79Au<sup>198</sup> Curing of cancers

#### 4. Write the medicinal uses of radioactive isotopes.(March -06)

#### 5. Explain the principle behind the hydrogen bomb.

The hydrogen bomb is bases on fusion reaction of hydrogen to form helium producing large amount of energy.

Fusion takes place at the centre. Hydrogen bomb consists of an arrangement for nuclear fission in the centre surrounded by a mixture of  $_1H_2$  and  $_3Li_6$  isotope which provides the high temperature necessary to start the fusion.

Fission  $\rightarrow$  heat+ neutrons  $_{3}\text{Li}^{6}+_{0}n^{1} \rightarrow _{1}\text{H}^{3}+_{2}\text{He}^{4}+4.78\text{MeV}$  $_{1}\text{H}^{2}+_{1}\text{H}^{3} \rightarrow _{2}\text{He}^{4}+_{0}n^{1}+17.6\text{MeV}$ 

nuclear fusion	nuclear fission
1. Two or more lighter nuclei combine to	A boow puolous splits in lighter puoloi
form the heavy nucleus	A neavy nucleus spilts in lighter nuclei
2. It requires a high temperature.	It does not require high temperature.
3. It is not a chain reaction.	It is a chain reaction.
4. Hydrogen bomb based on the	Atom bomb is based on the principle of
principle of nuclear fusion.	nuclear fission.
5. Energy is released ≈ 17.6 MeV.	Energy is released $\approx$ 200 MeV.

# 6. What is nuclear fusion reaction? Write the differences between nuclear fission and nuclear fission

#### 7. What is nuclear fusion reaction?

When lighter nuclei moving at a high speed are fused together to form a heavy nucleus, the process is called nuclear fusion.

In fusion reaction, the mass of heavier nucleus formed is less than the total mass of two lighter nuclei. Thus, just like a fission reaction, the source of energy in a fusion reaction is also the disappearance of mass, which gets converted into energy.

Nuclear fusion reaction takes place at very high temperature of about 10<sup>8</sup>K. Therefore, this reaction is called thermonuclear reaction.

 $_{1}^{H^{2}} + _{1}^{H^{3}} \rightarrow _{2}^{He^{4}} + _{0}^{n^{1}} + Energy$ Deuterium Tritium Helium

### 8. What is nuclear fission reaction?

Nuclear fission is the process in which a heavy nucleus breaks up into two lighter nuclei of almost equal size with the release of an enormous amount of Energy.

The process is us usually accompanied by emission of neutrons. Example

 $_{_{92}}U^{_{235}} + _{_{0}}n^{_{1}} \rightarrow _{_{56}}Ba^{_{141}} + _{_{36}}Kr^{_{92}} + 3 _{_{0}}n^{_{1}} + 200 \text{ MeV}$ 

Further, the neutrons released (say three) from the fission of first uranium atoms can hit three other uranium atoms. In this way a chain reaction is set up resulting into the liberation of an enormous amount of energy. In the case of nuclear fission,  ${}_{92}U^{236}$  formed breaks up in several ways.

$${}_{92}U^{235} + {}_{0}n^{1} \longrightarrow {}_{92}U^{236} \longrightarrow {}_{56}B a^{140} + {}_{36}K r^{93} + 3 {}_{0}n^{1}$$

#### 9. Explain the uses of radioactive isotope with example.

#### a) Study of reaction mechanism

#### i) Mechanism of photosynthesis in plants

A small quantity of Radioactive C O  $_2$  containing radioactive oxygen O<sup>18</sup> is mixed with ordinary carbondioxide and the process is carried out. It has been found that oxygen gas evolved along with sugar formation is non-radioactive. Therefore O<sub>2</sub> produced comes from water and not from carbondioxide. So the correct mechanism is as follows.

$$6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$$

#### ii) Study of hydrolysis of ester

By labelling oxygen, the mechanism of ester hydrolysis can be studied by using water labelled with O<sup>18</sup>. The hydrolysis of an ester by water enriched with radioactive oxygen is indicated as :

$$R - C + HOH \implies R - C + R - OH$$

Therefore it is the acid and not alcohol produced which is radioactive confirming the above mechanism.

#### Lesson – 8 Solid states

#### 3 Marks (Public Q.no: 38)

#### 1. State Bragg's equation

A relationship between the wave length x-rays ( $\lambda$ ) the inter planar distance in the crystal (d) and the angle of reflection ( $\theta$ ) is Bragg's equation.

 $n\lambda = 2d \sin\theta$ 

where n is the order of reflection

 $\lambda$  is the wavelength of X-rays

- d is the interplanar distance in the crystal
- $\theta$  is the angle of reflection

## 2. What are super conductors? (March, June 2006)

The ability of certain ultra cold substances to conduct electricity without resistance is called resistivity. Substances having this property are called super conductors.

## 3. Write uses of super conductor.

- 1. super conducting generators It consumes low energy and save more energy.
- 2. Super conducting magnets
- Used in High efficiency Ore separating machines.
- 3. Super conducting solenoids
- Nuclear Magnetic Resonance Imaging equipment which is a whole body scan equipment.

## 4. What is vitreous state?

A state lying between the solid and liquid state is known as vitreous state.

## 5. Sketch sc , bcc and fcc Structure.

Simple Cube (sc) Body Centred Cube (bcc)

Free Centred Cube (fcc)



## 6. Define - Unit cell.

Unit cell is the smallest fundamental repeating portion of a crystal lattice from which the crystal is built by repetition in three dimension.

## 7. What are point Defects?

- 1. If the deviation occurs due to missing atoms .
- 2. Displaced atoms (or ) Extra atoms
- 3. Imperfection of atoms

Ex: Schottky Defect and frenkel defect

## 9. Write note about Metal excess defects.

1. A crystal of NaCl is heated in sodium vapour, it acquires a Yellow colour.

2. This yellow colour is due to the formation of non stoichiometric compound of NaCl in which there is a slight excess of sodium.

3. This defect is called metal excess defect.

#### 10. What is metal deficiency defect?

One of the positive ion is missing from its lattice site and the extra negative charge is balanced by some nearby metal ion acquiring additional to charges instead of one. This defect is known as metal deficiency defect.

Ex. FeO , FeS

## 11. Define : Super conducting transition temperature (Tc) (June 2007)

The super conduction Transition temperature (Tc) of a material is defined as a critical – temperature at which the resistivity of a material is suddenly changed to zero.

## 12. What are molecular crystals? Give an example.

- 1. The lattice points in molecular crystals consists of molecules which do not carry any charge.
- 2. The forces binding the molecules together are of two types.
- i) Dipole dipole interaction Eg. Ice
- ii) Vander Waals forces. Eg. All kind of molecular solids

## 13. Structure of CsCI-Explain.

Let us discuss the structure of CsCl for AB type. It is body centered cubic system. The chloride ions are at the corners of a cube where as  $Cs^+$  ion is at the centre of the cube or vice versa. Each  $Cs^+$  ion is connected with eight Cl<sup>-</sup> ion and Cl<sup>-</sup> is connected with eight  $Cs^+$  ions.



Number of chloride ions per unit  $=\frac{N_c}{8}=\frac{8}{8}=1$ 

Number of cesium ion per unit  $=\frac{N_b}{1}=\frac{1}{1}=1$ 

Thus number of CsCl units per unit cell is one.

## 5 Marks question and answer (Public Q.No: 66 a)

## 1. Write the characteristics of lonic Crystals.

- 1. They are hard and brittle.
- 2. They have high melting and boiling points.
- 3. The heat of vapourisation is high.
- 4. They are insulators in the solid state.
- 5. These crystals are soluble in water and insoluble in Non polar solvents.
- 6. Ionic solids are good conductors when dissolved in water.
- 7. Ionic crystals are hard and brittle.

#### 2. Explain schottky and Frenkel defects.

1. Schottky defects. This defect is caused some of the lattice points are unoccupied. The points which are unoccupied are called vacancies.

2. The number of missing positive and negative ions is the same in this case and thus the crystal remains neutral.

3. Schottky defects appears generally in ionic crystals in which positive and negative ions do not differ much in size.



Na<sup>+</sup> Missing

Cl<sup>-</sup> Missing

#### **Frenkel defects**

- 1. This defect arise when an ion occupies an interstitial position between the lattice points.
- 2. This defect occurs generally in ionic crystals in which the size of anion is much larger than the cation.
- 3. Frenkel Defect on a crystal.



4. The crystal remains neutral since the number of positive ions is the same as the number of negative ions. Ex: AgBr.

#### 3. Explain Bragg's spectrometer method.

1. This method is one of the important method for studying crystals using x rays. The apparatus consists of a x-ray tube from which a narrow beam of x-rays allowed to fall on the crystal mounted on a rotating table.

2. The rotating table is provided with scale and vernier, from which the angle of incidence  $\theta$  can be measured.

3. An arm which is rotating about the same axis as the crystal table, carries an ionisation chamber.

4. The rays reflected from the crystal enter into the ionisation chamber and ionise the gas present inside.

5. Due to ionisation current is produced which is measured by electrometer. The current of ionisation is a direct measure of intensity of reflected beam from the crystal.

6. For different angles of incidence, the corresponding ionisation current is measured from the electrometer. These values are plotted in the form of graph.

θ $5.9^{\circ}$  $11.85^{\circ}$  $18.15^{\circ}$ .Sin0.1030.2050.312Ratio123

For sodium chloride, the maximum reflection or peaks for 100 plane occurred.



#### 4. Significance of Bragg's equation

1. If we use x-rays of known wavelength  $(\lambda)$  then the inter atomic distance (d) is an unknown crystal can be calculated. On the other hand, if we use a crystal whose inter atomic distance 'd' is known then the wavelength of x-rays can be calculated.

2. The Bragg's equation gives the essential condition for diffraction to occur.

3. When the experiment is done there will be a maximum reflection at a particular angle  $\theta$ . That angle is noted. It corresponds to first order reflection (n=2). Similarly, Third, fourth and higher order of reflection occur at certain specific angles. The values of angles obtained are in accordance with the Bragg's equation. Hence Bragg's equation is experimentally verified.

#### 5. Explain the various types of crystals based on lattice points.

#### Four types :

1. Molecular Crystals 2. Covalent Crystals

3. Metallic Crystals 4. Ionic crystals

#### **Molecular Crystals**

- 1. The lattice points in molecular crystals consists of molecules which do not carry any charge.
- 2. The forces binding the molecules together are of two types.

i) Dipole - dipole interaction Eg. Ice

ii) Vander Waals forces. Eg. All kind of molecular solids

#### **Covalent Crystals**

The lattice in covalent crystals consists of atoms linked together by a continuous system of covalent bonds. Eg. diamond.

#### Metallic crystal

Metallic crystal consists of an assemblage of positive ions immersed in a sea of mobile electrons.

Thus each electron belongs to a number of positive ions and each positive ion belong to a number of electrons. The force that binds a metal ion to a number of electrons within its sphere of influence is known as metallic bond.

The Vanderwaals forces are more general and occur in all kinds of molecular solids.

#### Ionic crystal

In ionic crystals the units occupying lattice points are positive and negative ions. Each of a given sign is held by columbic forces of attraction to all ions of opposite sign. The forces are very strong.

6. How are glasses formed? Explain the nature of glass.

When certain liquids are cooled rapidly there is no formation of crystals at a definite temperature, such as occurring on slow cooling. The viscosity of the liquid increases steadily and finally a glassy substance is formed.

#### **Characteristics of glass :**

i) The chief characteristics of glass are hardness, rigidity and ability to withstand shearing stresses which are all properties of the solid state.

ii) Glasses are optically isotropic and on heating without any sharp transition passes into a mobile liquid.

iii) At a high temperature glasses undergo phase transition when crystals separate first as they do form super cooled liquid. Therefore glasses are regarded as amorphous solids or super cooled liquids as well.

iv) Glassy or vitreous state is a condition in which certain substance can exit, lying between the solid and liquid states.

#### Lesson – 9

#### THERMODYNAMICS

#### 3 Mark Question and Answer (Public Q.No: 39)

#### 1. What is entropy? Give its unit.

Entropy is the ratio of the heat evolved (q) to the temperature (T) of the process. S = q/T. Unit of entropy is cal / degree / mole or eu/mole

#### 2. What is Gibbs free energy (G)

G is defined as (H-TS) when H and S are the enthalpy and entropy of the system respectively T- temperature in Kelvin. Since H and S are state functions. G is a state function

## 3. Give Kelvin Planck statement second law of thermodynamics. (March 2007)

"It is impossible to construct an engine which operated in a complete cycle will absorb heat from a single body and convert it completely to work without leaving some change in the working system"

### 4. State Troutons rule.

The heat of vaporisation ( $\Delta H_{vap}$ ) is calories per mole divided by the boiling point of the liquid in Kelvin is a constant equal to 21 cal.deg.1 mol-

 $\Delta Svap = \Delta Hvap / T_b = 21 \text{ cal deg}^{-1} \text{ mol}^{-1}$ 

### 5. What kind of substances deviate from Trouton's rule?

i) Low boiling liquids such as hydrogen and Helium which boil only a little above OK

ii) Polar substances like water, alcohol which from hydrogen bonded liquids and exhibit very high boiling points as well as high  $\Delta H_{vap}$ .

iii) Liquids such as acetic acid whose molecules are partially associated in the vapour phase and possess very low entropy vaporisation which is much less than 21 cals /mol/deg.

## 6. When does entropy increase in a process?

- a) In a chemical reaction, when number of molecules of products are more than the number of molecules of reactant entropy increases
- b) In physical process when a solid changes to liquid, when a liquid changes to vapour and when a solid changes to vapour, entropy increases.

#### 7. What are spontaneous reaction?

1. Spontaneous process is the process that is natural and does not need to be induced. It takes place on its own accord.

2. In order to find out whether a process is spontaneous or not, the entropy changes of the system and the surroundings for the stipulated process is considered.

 $\Delta S=$  (+) ve, the entropy of the universe increases.

## 8. Mention the essential conditions for spontaneity in a chemical reaction.

For a spontaneous chemical process,

 $\Delta$ G<0,  $\Delta$ H<0 and  $\Delta$ S>0

Ie,  $\Delta H$  = negative,  $\Delta G$ = negative  $\Delta S$  = positive

## 5 Marks Question and answer (Public Q.No: 56)

#### 1. State the various statement of Second Law Of Thermodynamics.

i) "It is impossible to construct an engine which operated in a complete cycle will absorb heat from a single body and convert it completely to work without leaving some changes in the working system". This is called as the Kelvin – Planck statement

ii) "It is impossible to transfer heat from a cold body to a hot body by a machine without doing some work". This is called as the clausius statement of II law of thermodynamics.

iii) 'A process accompanied by increase in entropy tends to be spontaneous".

iv). Entropy is a measure of randomness or disorder of the molecules of a system.

v) "Efficiency of a machine can never be cent percent".

vi) The heat Efficiency of any machine is given by the value of ratio of output to input energies. Output can be in the form of any measurable energy or temperature change while input can be in the form of heat energy or fuel amount which can be converted to heat energy. % efficiency = input/output x 100

## 2. Write Characteristics of Entropy 'S'.

1. Entropy 'S' is a thermodynamic state function.

2. The entropy depends on the quality of the substance.

3. Entropy change  $\Delta S$  is defined as at constant temperature of the ratio of the heat changes of a process to the temperature of the system.

The process should be reversible  $\Delta S_{rev} = \Delta q_{rev} / T_{(k)}$ 

4. Entropy is a measure of randomness of the molecule of a system. Entropy increases in all spontaneous process.

5. The total entropy changes of the universe ( $\Delta S_{rev}$ ) is equal to the entropy of the system and in its surroundings.

 $\Delta S_{uni} = \Delta S_{sys} + \Delta S_{surr}$ 

6. For an isothermal process(T= constant), the entropy change of the universe during a reversible process is zero.

7. There are three cases of  $\Delta S$  predicting the nature of process.

Process	Spontaneous	Equilibrium	Non-Spontaneous
ΔS	(+)ve	0	(-)ve

8. The energy of the universe remains constant although the entropy of the universe tends to a maximum.

9. Units of entropy: Unit of entropy is cal / degree / mole or eu/mole

10.  $\Delta S$  is related to  $\Delta H$ , for a reversible and isothermal process  $\Delta S_{rev=}\Delta q_{rev}/T$ . Since  $\Delta H$  is the heat absorbed or evolved in the process at constant temperature and pressure.  $\Delta S$  is also calculated from  $\Delta H$  as  $\Delta S=\Delta H/T$ 

#### 3. Write characteristics of Free energy 'G'.

1. Free energy is defined as G= H-TS. 'G' is a state function.

2. G is an extensive property. But  $\Delta G$  is the intensive property when mass remains constant between initial and final states.

3. 'G' has a single value for the thermodynamic state of the system.

4. G and  $\Delta G$  values corresponds to the system only.

5. There are three cases of  $\Delta G$  predicting the nature of process

Process	Spontaneous	Equilibrium	Non-Spontaneous
ΔG	(-) ve	0	(+)ve

6.  $\Delta G = \Delta H - T\Delta S$ . But according to I law of thermodynamics,

 $\Delta H = \Delta E + P\Delta V \text{ and}$   $\Delta E = q - w.$   $T\Delta S = q.$   $\Delta G = q - w + P\Delta V - q$  $\Delta G = -w + P\Delta V = \text{Net Work}$ 

#### Lesson 10

#### CHEMICAL EQUILIBRIUM - II

#### 3 Marks Questions and Answers (Public Q.No: 40)

#### 1. What is Equilibrium constant?

The ratio of product of molar concentration of products to the product of molar concentration of reactants at equilibrium.

a A+b B 
$$\leftarrow$$
 c C+d C  
 $\therefore K_c = \frac{[C]^c [D]^d}{[A]^a [B]^b}$ 

#### 2. Why do equilibrium reactions referred to as dynamic equilibrium?

At equilibrium rate of forward reaction is equal to rate of backward reaction. Reactants and products are present in the reaction mixture in definite amounts. Therefore chemical equilibrium is called as dynamic equilibrium.

#### 3. State the Chatlier's principle.

According to Le Chatlier's principle, if a system at equilibrium is subjected to a disturbance or stress, then the equilibrium shifts in the direction that tends to nullify the effect of disturbance of stress.

#### 4. Define Reaction quotient (Q).

Q is defined as the ratio of product of initial concentrations of products to the product of initial concentrations of the reactants under non equilibrium conditions.

$$aA + bB \xrightarrow{k_f} cC + dD$$

#### 5. Dissociation of PCI<sub>5</sub> decreases in presence of CI<sub>2</sub>. Why?

$$K_{c} = \frac{PCl_{5(g)}}{[PCl_{3}] [Cl_{2}]} PCl_{3(g)} + Cl_{2(g)}$$

$$K_{c} = \frac{[PCl_{3}] [Cl_{2}]}{[PCl_{5}]}$$

According to Le Chatlier's principle increase in concentration of Cl<sub>2</sub> favors backward reaction ie dissociation of PCl<sub>5</sub> decreases

6. What happens when  $\Delta n_g = 0 \Delta ng = (-)ve \Delta ng = +(ve)$  in a gaseous reaction Kp = Kc [RT]<sub> $\Delta ng$ </sub>

lf ∆ng = 0	Kp = Kc
∆ng = (-)ve	Kp < Kc
∆ng = (+)ve	Kp > Kc

#### 7. Calculate $\Delta$ ng, for the following reactions.

1. 
$$H_{2 (g)} + I_{2 (g)} \longrightarrow 2HI (g)$$
  
 $\Delta n_g = (n_p - n_r)_g = 2 - 2 = 0$   
2.  $H_{2}O_{(g)} + 2 Cl_{2 (g)} \longrightarrow 4HCl (g) + O_{2 (g)}$   
 $\Delta n_g = (n_p - n_r)_g = 5 - 4 = 1$ 

#### 8. Write the equilibrium constant for the following reactions.

 $\label{eq:constraint} \begin{array}{l} i) \ H_2O_{2(g)} \ H_2O_{(g)} + \frac{1}{2}O_{2(g)} \\ ii) \ CO_{(g)} + \ H_2O_{(g)} \ CO_{2(g)} + \ H_{2(g)} \\ iii) \ N_2O_{4(g)} \ 2 \ NO_{2(g)} \end{array}$ 



#### 5 Marks Question and Answers : (Public Q.No : 57)

1. Describe the synthesis of NH<sub>3</sub> by Haber's process.

$N_{2(g)} + 3H_{2(g)}$	$\geq$ 2NH <sub>3(g)</sub> $\Delta H^0_{f}$	=-22.0 kcal/mole	
H <sub>2</sub> and N <sub>2</sub> Ratio :- 3:	:1		
Pressure	Temperature	Catalyst	% of NH <sub>3 formed</sub>
300-500 atm	500° C – 550° C	Fe	37%

The equilibrium conditions, steam is passed to remove away the ammonia as and when it is formed so that the equilibrium remains shifted towards the product side.

2. Write synthesis of  $SO_3$  by Contact process.

 $2SO_{2(g)} + O_{2(g)} \stackrel{V_2O_5}{\longleftarrow} 2SO_{3(g)} \qquad \Delta H_f^0 = -47 \text{ kcal/mole}$ 

SO<sub>2</sub> and O<sub>2</sub> Ratio :- 2:1

l m n

Pressure	Temperature	Catalyst	% of SO <sub>3 formed</sub>
700-1200 atm	400° C – 450° C	$V_2 O_5$	97%

 $SO_3$  from contact process along with steam is used in oleum and  $H_2SO_4$  manufacturing processes.

#### 3. Derive the relation $K_p = K_c (RT)_{\Delta ng}$ for a general chemical equilibrium reaction.

 $aA + bB + cC + \dots \longrightarrow lL + mM + nN + \dots$ 

$$\begin{split} K_{p} &= \frac{p_{L}p_{M}p_{N}....}{p_{A}^{a}p_{B}^{b}p_{C}^{e}.....} \\ K_{c} &= \frac{[L]^{l}[M]^{M}[N]^{n}...}{[A]^{a}[B]^{b}[C]^{c}.....} \\ C_{i} &= \frac{p_{i}}{RT} \quad \text{since} \ p_{i} = \frac{n_{i}}{V}RT \\ K_{c} &= \frac{(p_{L}/RT)^{l}(p_{M}/RT)^{m}(p_{N}/RT)^{n}...}{(p_{A}/RT)^{a}(p_{B}/RT)^{b}(p_{C}/RT)^{c}...} \\ &= \frac{p_{L}^{l}p_{M}^{m}p_{N}^{n}....}{p_{A}^{a}p_{B}^{b}p_{C}^{e}....} \left(\frac{1}{RT}\right)^{(l+m+n+...)-(a+b+c+...)} \end{split}$$

$$=\frac{K_p}{(RT)^{\Delta ng}}$$
 and  $\therefore K_p = K_c (RT)^{\Delta n_g}$ 

 $H_{2(g)}+I_{2(g)}$ 

 $\Delta n_g$  = ( total number of stoichiometric moles of gaseous products) - ( total number of stoichiometric moles of gaseous reactants ).

## 4. Derive the values of $K_c$ and $K_p$ for the synthesis of HI.

2HI(g)

	H <sub>2</sub>	I <sub>2</sub>	HI
Initial No. of moles	a	b	0
No. of moles	X	Х	-
dissociated			
No. of moles at	(a-x)	(b-x)	2x
equilibrium			
Equilibrium	( <u>a - x)</u>	(b - x)	2x
concentration	v	v	v
	[ HI ] <sup>2</sup>		



## 5. Derive the values of $K_c$ and $K_p$ for the Decomposition of $PCl_5$

	PCl <sub>5</sub>	PCl <sub>3</sub>	Cl <sub>2</sub>
Initial No. of moles	а	0	0
No. of moles	Х	-	-
dissociated			
No. of moles at	(a-x)	Х	Х
equilibrium			
Equilibrium	( <u>a - x)</u>	x	X
concentration	v	v	V

[ PCl 5 ]



#### Lesson 22

#### **CHEMISTRY IN ACTION**

#### 3 Marks Question and Answers (Public Q.No: 51)

#### 1. What are Anaesthetics? Give two examples.

The drugs which produce loss of sensation are called anaesthetics. They are two types.

- (i) **General anaesthetics** are the agent, which bring about loss of all modalities of sensation, particularly pain along with 'reversible' loss of conciousness.
- (ii) **Local anaesthetics** prevent the pain sensation in localised areas without affecting the degree of consciousness

Example : Nitrous Oxide, Diethyl ether, chloroform

#### 2. In what way Antipyretics are important?

1. Antipyretics are the compounds which are used for the purpose of reducing fever

2. lowering the body temperature to the normal

Ex. aspirin, antipyrine, phenacetin, and paracetamol.

#### 3. What are antiseptic?

Antiseptic is a substance that rendors micro organisms innocuous by killing them or preventing their growth.

Ex. Iodoform, 0.2 % solution of phenol.

#### 4. Write a note on Antiprotozoals (or) Antimalarials.

- 1. Antiprotozoals are the chemical compounds used to cure malaria.
- 2. Extracts of certain plants, specially te roots and stems are extensively used as anti malarial.

Ex: Cinchona park which gives rise to quinine acts as anti malarial.

#### 5. What are analgesics? Give examples.

Analgesics are the compounds which relieve all sorts of pains without the loss of consciouness. Eg. Aspirin, Novalgin

#### 6. What are antibiotics? Give example.

Antibotics are the chemicals present in the microorganism which inhabit the growth or metabolism of some other microorganism. (e.g) Penicillins.

#### 7. In what way antacids are important?

1. Antacids are drugs that provide relief from burning sensation caused by eating oily and spicy food.

2. Antacids are the drugs used to rectify the imbalance in the acidity in the stomach.

#### Eg. Magnesium and Aluminium hydroxide

#### 8. Write note on Antipasmodics.

1. Antipasmodics are used to relieve cramps, spasms of the stomach intestines and bladder,

2. Some are used with antacid, in the treatment of peptic ulcer.

3. If prevent Nausea Vomiting and motion sickness.

**Example :** Anisotropine, Atropine

#### 9. Why Iodo form and Phenolic Solutions are called antiseptics?

1. 0.2% solution of phenol and Iodo form are used as antiseptics.

2. Both are used to destroy the micro organism and so they are called antiseptics.

#### 10. What is Food preservative? Give two examples.

A chemical substance which prevents the spoilage of food material by destroying the food spoiling micro organism in it is called a food preservative.

#### e.g Sodium benzoate, Potassium meta bi sulphite

#### 11. Write note on Anti oxidants.

1. The substances that act against oxidants are called antioxidants.

- 2. It protect us against cardio vascular disease, Cancer and cataract.
- 3. It act as radical inhibitors.

#### e.g. Vitamin C, Vitamin E, β- carotene

#### 12. How is Buna-S prepared?

Buna- s is a synthetic rubber obtained by the polymerization of butadiene and styrene in the presence of sodium metal.

 $\begin{array}{ccc} n\mathrm{CH}_2=\mathrm{CH}-\mathrm{CH}=\mathrm{CH}_2+n\mathrm{CH}=\mathrm{CH}_2 & \xrightarrow{\mathrm{Na}} -(-\mathrm{CH}_2-\mathrm{CH}=\mathrm{CH}-\mathrm{CH}_2-\mathrm{CH}-\mathrm{CH}_2-)_{\mathrm{n}}-\\ & & & \\ & & &$ 

#### 13. How is Buna – N prepared?

Buna-N is obtained as a result of copolymerisation of two parts of butadiene with one part of acrylonitrile in the presence of sodium metal.



#### 14. How to prepare terylene or Decron or PET?

Both glycol and dicarboxylic acid being molecules with two functional groups, react forming condensation polymers. Thus with Terphthalic acid, ethylene glycol forms the polymer 'Terylene''.

$$n$$
HO - CH<sub>2</sub> - CH<sub>2</sub> - OH +  $n$  HOOC  $\longrightarrow$  COOH  $\longrightarrow$   
HO-[-CH<sub>2</sub>-CH<sub>2</sub>-O-CO  $\longrightarrow$   $-$ CO-O-] <sub>$n$</sub>  H + (2 $n$  - 1) H<sub>2</sub>O

#### 15. How is Nylon-66 prepared?

Nylon - 66 is obtained by condensing adipic acid with hexa methylene diamine with the elimination of water molecule.



#### 16. Write about Artificial Sweeteners.

Certain organic compounds which have been synthesized in laboratories are known to be many times sweeter than cane sugar. Such compounds are called **artificial sweetening agents** or **artificial sweetners.** 

Eg. (i) Saccharin, (ii) Dulcin,

#### 5 Marks Questions and Answers (Public Q.No: 63)

#### **1.** Explain briefly on colour and structure of dyes.

#### 1. Chromophroes :

An organic compound appears coloured due to the presence of certain *unsaturated groups* (the groups with multiple bonds) in it. Such groups with multiple bonds are called **chromophores.** 



#### 2. Chromogen

The compounds containing the chromophore group is called chromogen. The colour intensity increases with the number of chromophores or the degree of conjugation.

For example, ethene (CH<sub>2</sub> = CH<sub>2</sub>) is colourless, but the compound  $CH_3 - (CH = CH)_6 - CH_3$  is yellow in colour.

#### 3. Auxochromes:

The presence of certain groups which are not chromophores themselves, but deepen the colour of the chromogen. Such supporting groups are called **auxochromes**.

E.g –OH, –NH2, –NHR, NR2.

4. The presence of an auxochrome in the chromogen molecule is essential to make it a dye. However, if an *auxochrome* is present in the meta position to the chromophore, it does not affect the colour.



#### 2. Explain briefly on characteristics of rocket propellants.

1. The *propulsion system* in most space vehicles consists of rocket engines **powered by chemical propellants.** These also called *rocket propellants*.

2. Propellants are combustible compounds which on ignition undergo rapid combustion to release large quantities of hot gases.

3. A propellant is a combination of an *oxidiser* and a *fuel*.

4. Working of a propellant. When a propellant is ignited, it burns to produce a large quantity of hot gases. These gases then come out through the nozzle of the rocket motor. The passage of gases through the nozzle of the rocket motor, provides the necessary thrust for the rocket to move forward according to the Newton's Third law of Motion

5. E.g. Hydrazine, Liquid hydrogen, Polyurethane, etc.

## 3.What are the characteristics of dyes.

- It should have a suitable colour
- It should be able to fix itself or be capable of being fixed to the fabric.
- It should be fast to light
- It should be resistant to the action of water, dilute acids and alkalies.

## Lesson wise one words questions <u>1.Atomic structure - II ( 2 x 1 = 2 )</u>

- If the value of E<sub>1</sub> = -34.84 to which value 'n' corresponds Ans:-3
- 2. Dual character of an electron was explained by Ans:-de-Broglie
- De- Broglie equation is Ans:- λ=h/mv
- 4. The value of Bohr radius for hydrogen atom is

## Ans:- 0.529 x 10<sup>-8</sup> cm

5. Which of the following particle having same kinetic energy would have maximum de –braglie wave length

## Ans:- β particle

6. If the energy electron in the second Bohr orbit of H - atom is -E. What is the energy of the electron in the Bohr's first orbit?

## Ans:- -4E

7. The energy of electron in an atom if given  $/E_n$ 

Ans:- $E_n$ =-2 $\pi^2$ me<sup>4</sup>/n<sup>2</sup>h<sup>2</sup>

8. The bond order of oxygen molecule is Ans:-2

## 9. The hybridisation in SF6 molecule is

## Ans: sp<sup>3</sup>d<sup>2</sup>

10. The intramolecular hydrogen bonding is present in

## Ans:- o- nitro phenol

## 2. Periodic classification -II (1 x 1 = 1)

- 1) The value of C-C distance found experimentally in a saturated hydrocarbon is **Ans:-1.54**Å
- 2) on moving down the group the radius of an ion

## Ans:- increases

- 3) Effective nuclear charge (z\*)can be calculated by using the formula Ans:- z\*=z-s
- 4) Pick the correct statement

## Ans:- carbon having more nuclear charge than boron

- 5. Comparing the ionisation energy of fluorine with carbon, fluorine has **Ans:- higher ionisation energy**
- 6. Among the following which has the maximum ionisation energy

### Ans:- Nobel gases

7. The electron affinity of an atom

## Ans:- inversely proportional to its size

8. Among the following which has higher electron affinity value

### Ans:- fluorine

9. The scale which is based on an empirical relation between the energy of a bond and the electro negativities of bonded atoms is

### Ans:- Pauling scale

10. Electron affinity is expressed in

### Ans:- KJmol-1

11. The bond length of Cl<sub>2</sub> molecule is

## Ans:- 1.98A<sup>0</sup>

12. The order of ionisation energy

## Ans:- s>p>d>f

- 13. Across the period electron affinity Ans:-increases
- 14. Noble gases, have \_\_\_\_\_ electron affinity. Ans:- zero
- 15. When X<sub>A</sub>>> X<sub>B</sub>, A B bond is Ans:-Ionic

## <u>3 P-Block elements (1 x 1 = 1)</u>

1. Which of the following does not belong to group -13

## Ans:-Ge

2. Which of the following is most abundant in earth's crust?

## Ans:-Si

3. An element which was burnt in limited supply of air to give oxide A which treatment with water gives an acid B acid B on heating gives acid a which gives yellow precipitate with AgNo<sub>3</sub> solution A is

## Ans:-P<sub>2</sub>O<sub>3</sub>

4. The compound with garlic odur is

## Ans:- P<sub>2</sub>O<sub>3</sub>

5. The shape of PCl₅ is

## Ans:-trigonal bipyramidal

6. The compound used as smoke screen

## Ans:-PH₃

7. Which shows only - 1 oxidation state?

## Ans:- Fluorine

- 8. One can draw the map of building on a glass plate by Ans:- HF
- 9. Among the halogen acid, the weakest acid is

## Ans:-HF

10. Halogens belongs to the group number

## Åns:- 17

11. The noble gas are un reactive because they

## Ans:- have stable electronic configuration

12. The shape of XeF4 is Ans:-square planner

13. Which is not known? Ans:- ArF6 14. The lightest gas which is non - inflammable is Ans:-He 1 5. Which of the following has first ionisation energy? Ans:- He 4. d. Block elements  $(2 \times 1 = 2)$ 1. The general electronic configuration of d- black elements is Ans:- (n-1) d <sup>1-10</sup> ns<sup>1-2</sup> 2. Formation of coloured ions is possible when compounds contain Ans:-lone pairs of electrons 3. Paramagnetism is common in Ans:-d-block elements 4. The colour of [Ti(H<sub>2</sub>O)6]3+ion to Ans:- d-d transition 5. The electronic configuration of chromium is Ans:- 3d₅4s1 6. Paramagnetism is a property of Ans: unpaired electrons 7. d - block elements formed coloured ions because Ans:- They absorb some energy for d-d transition 8. The correct electronic configuration of copper atom is Ans:- 3d10 3s1 9. Copper is extracted from Ans:- copper pyrites 10. Silver salt used in photography is Ans:-AgBr 11. Sodium thiosulphate is used in photography because of its Ans:- complexing behaviour 12. Excess of sodium hydroxide reacts with zinc to form Ans:-Na<sub>2</sub>ZnO<sub>2</sub> 13. Which of the following compounds will not give positive chromyl chloride test? Ans:-C<sub>6</sub>H₅Cl 14. Which of the ions will give colourless aqueous solution? Ans:-Cu+ 15. Which of the following compounds is not coloured? Ans:-NaCd Cl4 16. In the extraction of cu, the reaction which does not takes place in the Bessemer converter is Ans: -  $2CuFes_2O_2 \rightarrow Cu_2s + 2Fes + SO_2$ 17. Select the correct statement Ans:-mercury is a liquid metal

18. Choose the wrong statement regarding K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>

Ans:-It reduces ferric sulphate to ferrous sulphate

19. For a transition metal ion the effective magnetic moment in BM is given by the formula **Ans:**  $\sqrt{n(n + 2)}$ 

20. Which compound is formed when excess of KCN is added to an aqueous solution of copper sulphate

### Ans:- $Cu_2(CN)_2$ +(CN)<sub>2</sub>

- 21. Which of the following has maximum no of unpaired electrons? **Ans:- Mn**<sub>2+</sub>
- 22. Among the following statement , the incorrect one is
  - Ans : Argentite and cuprite are oxides.
- 23. The chemical composition of slag formed during the smelting process in the extraction of copper

## Ans:-FeSiO₃

24. The transition element with the lowest atomic number is

## Ans:- Scandium

- 25. Which transition element shows highest oxidation state **Ans:-Os**
- 26. The Correct statement in respect of d- block element is
  - a) They are all metals.
  - b) They show variable valency
  - c) They form coloured icons and complex salts

## d) All the above statement are correct

## 4. <u>F-Block elements (2 x 1 = 2)</u>

- 1. The electronic configuration of Lanthanides is Ans:-[Xe] 4f1-14 5d16S2
- 2. The electronic configuration of actinides is Ans:-[Rn]5f 0-14 6d 7S2
- 3. The lanthanide is responsible for the fact that
- Ans:- Zr and Hf have about the same radius
- 4. The most common oxidation state of lanthanides Ans:-+3
- 5. Lanthanides are extracted from Ans:-monozite
- 6. The elements in which the extra electron enters (n-2)f orbital's are called **Ans:-f- block elements**
- 7. The Lanthanides contraction is due to

## Ans:-imperfect shielding of 4f electron

8. Ceria used in

## Ans:-gas lamp materials

- 9. ------ is used in gas lamp material. Ans:- CeO<sub>2</sub>
- 10. Alloys of Lanthanides are called as Ans:- mish - metals
- 11. Metallo thermic process involving lanthanides are called as Ans:-Lanthanido thermic process
- 12. ----- form oxocations.

## Ans:- actinides

- 13. Maximum oxidation state exhibited by lanthanides is Ans:- +4
- 14. Lanthanides are separated by Ans:-fractional crystallisation

## <u>6. Co - ordination compounds ( $1 \times 1 = 1$ )</u>

1. Which is a double salt?
2 An example of a complex compound baying co ordination number 4
Alist $[Cu(NH3)4]Cl^2$
Ano, equare planar
Alis Square planar A An example of a cholating ligand is
Alls ell 5. The geometry of complex ion [Ee(CN)a], is
5. The geometry of complex for [Fe(CN)6]4-15
AllsOctalleural
7 Which is not an anionic complex?
8 The geometry of (Ni (CN)/ $4$ ]2- is
9 An example of ambidentate ligand is
10 [FeF6]4- is paramagnetic because
$\Delta ne_{-} F$ is a weaker ligand
11 In $[Fe_{in}(CN)]_{i}$ the central metal ion is
$\Delta ne^{-} Eo^{2}$
12 The coordination number of Ni(II) in Ni( $(CN_4)_2$ is
$\Delta ns' - \Delta$
13 The name of $[nt]V$ (NH <sub>3</sub> ) <sub>2</sub> Cl <sub>2</sub> ] <sub>2</sub>
Ans:- Diammine dichloroplatinum (IV) ion
14. For a compound $K_{4}[Fe(CN)_{6}] \rightarrow 4K_{4} + [Fe(CN_{6})]_{4}$ the complex ion is
$\Delta ns' - [Fo(CN)_{a}]_{a}$
15. A metal ion form the first transition series forms an octahedral complex with
magnetic moment of 4.9 BM and another octahedral complex which is diamagnetic
The metal ion is
Ans:- $Fe^{2}$
16 Paramagnetic moment is expressed in
Ans:- BM

17. The type of isomerism found in the complexes  $[Co(NO_2)(NH_3)_5]$  SO4 and  $[Co(SO4)(NH_3)_5]$  NO2

#### Ans:- ionisation isomerism

18. Valence bond theory doesn't explain the property of complex compounds **Ans:- magnetic** 

## <u>7. Nuclear chemistry $(1 \times 1 = 1)$ </u>

1. The phenomenon of radio activity was discovered by

#### Ans:- Henry Becquarrel

2. The most penetrating radiations are

Ans:-γ rays

3. In the nuclear reaction  $_{92}U_{238} \rightarrow_{82}Pb$   $_{206}$  , the no of  $\alpha$  &  $\beta$  particles emitted are Ans:- 8a, 6  $\beta$ 

4. Wheih one of the following particles is used to bombard  $_{13}$  Al  $_{27}$  to give to give  $_{15}$   $P_{30}$  and a neutron

## Ans:- $\alpha$ particle

5. The reaction  ${}_{5}B_{8} \rightarrow {}_{4}Be_{8}$  takes place due to

## Ans:- positron decay

6. Radio activity is due to

## Ans:- un stable nucleus

7. In the following radio active decay  $_{92} X _{232} \rightarrow _{89}y_{220}$  how many  $\alpha$  and  $\beta$  particles are ejected **Ans:-3**  $\alpha$ , **3** $\beta$ 

8.  $_{92}$  U  $_{235}$  nucles absorbs a neutron and disintegrates into  $_{54}$  xe $_{139}$ ,  $_{38}$  sr  $_{94}$  and x. What will be the product?

### Ans:- 3 neutrons

9. Loss of  $\beta$  particle is equivalent to

a) increase of proton only b) decrease of one neutron only <u>c) both a & b</u>
 10. Which of the following is used as neutron absorber in the nuclear reactor?
 Ans:- cadmium.

## 8. Solid State (1 x 1 = 1)

1. The number of chloride ions that surrounds the central Na+ ion in NaCl crystal is

#### Ans:- 6

2. The Bragg's equation is \_\_\_\_\_.

Ans:-  $n\lambda = 2d \sin \theta$ 

3. A regular three dimensional arrangement of identical points in space is called

## Ans:- space lattice

4. The smallest repeating unit in space lattice which when repeated over and again results in the crystal of the given substance is called \_\_\_\_\_\_.

Ans:- unit cell

5. The crystal structure of Cscl is \_\_\_\_\_.

Ans:-Body - centred cubic

6. An example for frenkel defect is \_\_\_\_\_.

#### Ans:- Agcl

7. Semi conductors which exhibit conductivity due to the flow of excess negative electron are called \_\_\_\_\_.

#### Ans:- n-type semi conductors

8. In the Bragg's equation for diffraction of x-ray 'n' represents \_\_\_\_\_\_.

## Ans:-Order of reflection

9. The number of close neighbors in a body centred cubic lattice of identical spheres is \_\_\_\_\_.

## Ans:- 8

10. The crystals which are good conductors of electricity and heat are \_\_\_\_\_. Ans:- Molecular crystals

11. In a simple cubic cell, each point on a corner is shared by \_\_\_\_\_\_.

## Ans:- 8 unit cell

12. The ability of certain ultra cold substances to conduct electricity without resistance is called \_\_\_\_\_.

## Ans:- super conductor

13. The total number of atoms per unit cell is bcc is

Ans:-2

14. Rutile is

#### Ans:- Tio<sub>2</sub>

15. Semi conductors are used as

a) rectifiers b) transistors c) solar cells d)  $\underline{\mbox{all the above}}$ 

16. An example of metal deficiency defect.

Ans:- FeS

## 9. Thermodynamics (2 x 1 = 2)

1. The amount of heat exchanged with the surrounding at constant temperature. **Ans:**  $\Delta$ **H** 

2. All the naturally occurring processes proceed spontaneously in a direction which leads to

## Ans: decrease of free energy.

3. In an adiabatic process which of the following is true?

Ans: q = 0

4. When a liquid boils, there is

## Ans: an increase in entropy

5. If  $\Delta$  G for a reaction is negative, the change is

## Ans: Spontaneous

- 6. Which of the following does not result in an increase in the entropy? Ans: crystallisation of Sucrose from solution
- 7. In which of the following process, the process is always non-feasible? Ans:  $\Delta$ H>O,  $\Delta$ S<O
- 8. Change in Gibb's free energy is given by

## Ans: ∆G=∆H-T∆S

9. For the reaction  $2Cl_{(g)} \rightarrow Cl_{2(g)}$  the Signs of  $\Delta H$  and  $\Delta S$  respectively are \_\_\_\_\_ Ans: \_ - , -

## 10. Chemical equilibrium (2 x 1 = 2)

1. State of chemical equilibrium is:

## Ans: dynamic

2. If the equilibrium constants of the following reactions are 2A B is  $K_1$  and B 2A is  $K_2$ , then

**Ans:**  $K_1 = 1/K_2$ 

3. In the reversible reaction 2HI  $H_2 + I_2$ ,  $K_p$  is

## Ans c) Equal to Kc

4. In the equilibrium  $N_2$  + 3H<sub>2</sub> 2NH<sub>3</sub>, the maximum yield of ammonia will be obtained with the process having

## Ans: high pressure and low temperature

5. For the homogeneous gas reaction at 600 K

 $4NH_{3(g)} + 5O_{2(g)} \longrightarrow 4NO_{(g)} + 6H_2O_{(g)}$  the equilibrium constant K<sub>c</sub> has the unit **Ans:** (mol dm-3)

6. Two moles of ammonia gas are introduced into a previously evacuated 1.0  $dm_3$  vessel in which it partially dissociates at high temperature. At equilibrium 1.0 mole of ammonia remains. The equilibrium constant K<sub>c</sub> for the dissociation is **Ans:** 27/16 (mole dm-3)<sup>2</sup>

7. An equilibrium reaction is endothermic if  $K_1$  and  $K_2$  are the equilibrium constants at  $T_1$  and  $T_2$  temperatures respectively and if  $T_2$  is greater than  $T_1$  then

#### Ans: a) K<sub>1</sub> is less than K<sub>2</sub>

## 11.Chemical kinetics (1 x 1 = 1)

1. Hydrolysis of an ester by dilute HCl is an example for

#### Ans: pseudo first order reaction

2. The unit of zero order rate constant is

#### Ans: (b) mol litre-1 sec-1

3. The excess energy which a molecule must posses to become active is known as

#### **Ans:** activation energy

4. Arrhenius equation is

**Ans:** ) k = Ae - Ea/RT

5. The term A in Arrhenius equation is called as

#### **Ans:** Frequency factor

6. The sum of the powers of the concentration terms that occur in the rate equation is called

#### Ans: order

7. Reactions in which the reacting molecules react in more than one way yielding different set of products are called

#### **Ans:** parallel reactions

8. The half life period of a first order reaction is 10 minutes. Then its rate constant is

#### Ans $6.932 \times 10^{-2} \text{ min}^{-1}$

9. For a reaction : aA bB, the rate of reaction is doubled when the concentration of A is increased by four times. The rate of reaction is equal to

#### Ans: *k* [A]<sup>1</sup>/<sub>2</sub>

10.  $2N_2O_5 4NO_2 + O_2$ ,  $d[N_2O_5] = k_1[N_2O_5]$ ,  $d[NO_2] = k_2[N_2O_5]$  and  $d[O_2] = k_3[N_2O_5]$ , the relation between  $k_1$ ,  $k_2$  and  $k_3$  is

Ans:  $2k_1 = k_2 = 4k_3$ 

11. For a reaction,  $E_a = 0$  and  $k = 4.2 \times 105$  sec-1 at 300K, the value of k at 310K will be

Ans:4.2 × 105 sec-1

## <u>12. Surface Chemistry ( 3 x 1 = 3 )</u>

1. The migration of colloidal particles under the influence of an electric field is known as

#### Ans electrophoresis

2. Which one is the correct factor that explains the increase of rate of reaction by a catalyst

#### Ans: lowering of activation energy

3. Fog is a colloidal solution of

#### Ans: gas in solid

- 4. The phenomenon of Tyndall's effect is not observed in **Ans** true solution
- 5. The Tyndall's effect associated with colloidal particles is due to

## Ans: scattering of light

- 6. In case of physical adsorption, there is desorption when Ans: temperature increases
- 7. Colloidal medicines are more effective because

## Ans: they are easily assimilated and adsorbed

- 8. Oil soluble dye is mixed with emulsion and emulsion remains colourless then, the emulsion is **Ans: O**/**W**
- 9. For selective hydrogenation of alkynes into alkene the catalyst used is

## Ans: Pd, partially inactivated by quinoline

10. For chemisorptions, which is wrong

## Ans: it forms multi molecular layers on adsorbate

11. An emulsion is a colloidal solution of

## Ans: two liquids

12. Colloids are purified by

## Ans: dialysis

## <u>13.Electro chemistry – I ( $1 \times 1 = 1$ )</u>

1. The process in which chemical change occurs on passing electricity is termed as ...... Ans electrolysis

2. The laws of electrolysis were enunciated first by .....

## Ans Faraday

3. When one coulomb of electricity is passed through an electrolytic solution, the mass deposited on the electrode is equal to .....

## Ans electrochemical equivalent

4. Faraday's laws of electrolysis are related to .....

## Ans: equivalent weight of the electrolyte

5. The specific conductance of a 0.01 M solution of KCl is 0.0014 ohm-1 cm-1 at 25<sub>0</sub>C. Its equivalent conductance is .....

## **Ans:** 140 ohm–1 cm2 eq–1

6. The equivalent conductivity of CH<sub>3</sub>COOH at 25<sub>0</sub>C is 80 ohm-1 cm<sub>2</sub> eq-1 and at infinite dilution 400 ohm-1 cm<sub>2</sub> eq-1. The degree of dissociation of CH<sub>3</sub>COOH is .....

## Ans: 0.2

.....

7. When sodium acetate is added to acetic acid, the degree of ionisation of acetic acid

## Ans: decreases

8. NH4OH is a weak base because .....

## **Ans:** it is only partially ionised

9. Which one of the following formulae represents Ostwald's dilution law for a binary electrolyte whose degree of dissociation is  $\alpha$  and concentration C.

#### Ans: K = $\alpha^2 C$ (1- $\alpha$ )

10. Ostwald's dilution law is applicable in the case of the solution of ...... Ans: CH<sub>3</sub>COOH 11. Which one of the following relationship is correct?

Ans:  $pH = log_{10} 1$ 

#### [H+]

12. When 10–6 mole of a monobasic strong acid is dissolved in one litre of solvent, the pH of the solution is .....

#### Ans: 6

13. When pH of a solution is 2, the hydrogen ion concentration in moles litre-1 is .....

## **Ans:** 1 × 10<sup>-2</sup>

14. The pH of a solution containing 0.1 N NaOH solution is .....

#### Ans: 13

15. A solution which is resistant to changes of pH on addition of small amounts of an acid or a base is known as .....

## Ans: buffer solution

16. The hydrogen ion concentration of a buffer solution consisting of a weak acid and its salt is given by .....

Ans  $[H+] = K_a [Acid]$ [Salt]

17. Indicators used in acid-base titrations are .....

Ans: weak organic acids or weak organic bases

18. For the titration between oxalic acid and sodium hydroxide, the indicator used in .....

## Ans: phenolphthalein

## 16. Hydroxy derivatives $1(1 \times 1 = 1)$

1. Which has the highest boiling point?

#### Ans: C<sub>2</sub>H<sub>5</sub>OH

2. Which is soluble in H<sub>2</sub>O?

#### **Ans:** Alcohols

3. Order of reactivity of alcohol towards sodium metal is

## **Ans** (b) primary > secondary > tertiary

4. The boiling point of ethyl alcohol should be less than that of

## Ans: formic acid

5. Ethyl alcohol cannot be used as a solvent for CH<sub>3</sub>MgI because

## Ans: CH3MgI reacts with alcohol giving methane

6. When alcohols are converted to alkyl chlorides by thionyl chloride in presence of pyridine the intermediate formed is

## **Ans:** alkyl chlorosulphite

7. On oxidation of an alcohol gives an aldehyde having the same number of carbon atoms as that of alcohol. The alcohol is

#### Ans:1º alcohol

8. A compound that gives a positive iodo form test is

## Ans: 2-pentanone

9. The compound that reacts fastest with Lucas reagent is

## Ans 2-methyl propan-2-ol

10. The ionization constant of phenol is higher than that of ethanol because

## **Ans:** phenoxide ion is stabilized through delocalisation

11. Among the following compounds strongest acid is

## Ans: CH<sub>3</sub>OH

12. The most unlikely representation of resonance structures of p-nitrophenoxide ion is **Ans** 



13. p-nitrophenol is having lower pKa value than phenol because

Ans anion of p-nitrophenol is more stabilised by resonance than that of phenol

14. The reaction of Lucas reagent is fast with

#### Ans: (CH3)3COH

15. When phenol is distilled with Zn dust it gives

### Ans: benzene

16. A compound that undergoes bromination easily is

#### Ans phenol

17. Isomerism exhibited by ethylene glycol is

#### **Ans** functional isomerism

18. Ethylene diamine is converted to ethylene glycol using

#### Ans: nitrous acid

- 19. Ethylene glycol forms terylene with Ans terephthalic acid
- 20. 1-propanol and 2-propanol can be best distinguished by

## Ans oxidation by heating with copper followed by reaction with Fehling solution

- 21. Glycerol is used
  - Ans: (a) as a sweetening agent
    - (b) in the manufacture of good quality soap
    - (c) in the manufacture of nitro glycerin

#### (d) in all the above

22. The alcohol obtained by the hydrolysis of oils and fats is

#### Ans: glycerol

- 23. The number of secondary alcoholic group in glycerol is **Ans: 1**
- 24. The active component of dynamite is

## **Ans:** Nitro glycerine

25. The reaction of ethylene glycol with PI3 gives

Ans  $CH_2 = CH_2$ 

## <u>17 Ethers (2 x 1 = 2)</u>

1. The isomerism exhibited by C2H5OC2H5 and CH3 – O – CH – CH3 is

CH3

**Ans:** metamerism

- 2. Which one of the following is simple ether ?
  - **Ans**  $C_2H_5 O C_2H_5$
- 3. Diethyl ether can be decomposed with

## Ans HI

- 4. Oxygen atom of ether is
  - **Ans** Comparatively inert

5. According to Lewis concept of acids and bases, ethers are

## Ans Basic

6. Intermolecular hydrogen bonds are not present in

## Ans C<sub>2</sub>H<sub>5</sub>OC<sub>2</sub>H<sub>5</sub>

7. When ethyl Iodide is treated with dry silver oxide it forms

## Ans diethylether

8. Williamson's synthesis is an example of

## Ans Nucleophilic substitution reaction

9. When ether is exposed to air for sometime an explosive substance produced is

## Ans peroxide

10. Ether is formed when alkyl halide is treated with sodium alkoxide. This method is known as

## Ans Williamson's synthesis

## **<u>18. Carbonyl compounds ( 1 \ge 1 )</u>**

1. The chain isomer of 2-methyl propanal is

## Ans : butanal

2. Schiffs reagent gives pink colour with

## Ans : acetaldehyde

- 3. Isopropyl alcohol vapours with air over silver catalyst at 520 K give **Ans acetone**
- 4. Methyl ketones are usually characterised by

## Ans the iodoform test

5. Which of the following compounds is oxidised to give ethyl methyl ketone ?

## Ans 2-butanol

6. Formaldehyde polymerises to give

## Ans paraformaldehyde

7. Tollen's reagent is

## Ans ammoniacal silver nitrate

- 8. When acetaldehyde is heated with Fehling solution, it gives a precipitate of **Ans Cu2O**
- 9. The compound that does not undergo Cannizzaro reaction is

## Ans acetaldehyde

10. The formation of cyanohydrin from a ketone is an example of

## Ans nucleophilic addition

11. Hydrogenation of benzoyl chloride in the presence of Pd on BaSO4 gives Ans benzaldehyde

12. From which of the following, tertiary butyl alcohol is obtained by the action of methyl magnesium iodide ?

## Ans CH<sub>3</sub>COCH<sub>3</sub>

13. During reduction of aldehydes with hydrazine and C<sub>2</sub>H<sub>5</sub>ONa the product formed is

Ans R-CH3

14. Aldol is

**Ans** 3-hydroxy butanal

15. In the reduction of acetaldehyde using LiAlH4 the hydride ion acts as

Ans nucleophile

16. Which of the following statement is wrong?

## Ans aldehydes and ketones undergo nucleophilic substitution

17. A cyanohydrin of a compound X on hydrolysis gives lactic acid. The X is **Ans CH<sub>3</sub>CHO** 

18. The IUPAC name of CH<sub>3</sub> – C = CH – C – CH<sub>3</sub> is  $\begin{vmatrix} & \parallel \\ & \square \\ & CH_3 & O \end{vmatrix}$ 

## Ans 4-methylpent-3-en-2-one

19. Which of the following does not give iodoform test?

## Ans:benzophenone

20. The compound which does not reduce Fehling solution is

## Ans benzaldehyde

21.CH3COCH3 Conc. H2SO4 The product is

Ans mesitylene

22. Which compound on strong oxidation gives propionic acid ?

## Ans CH<sub>3</sub> CH<sub>2</sub> CH<sub>2</sub> OH

- 23. The compound used in the preparation of the tranquilizer, sulphonal is **Ans acetone**
- 24. Calcium acetate + calcium benzoate gives

## Ans acetophenone

25. Bakelite is a product of reaction between

## Ans phenol and methanal

## <u>19.Carboxlic acids ( 1 x 1 = 1)</u>

1. Which of the following is least acidic

## Ans C<sub>2</sub>H<sub>5</sub>OH

2. Weakest acid among the following is

## Ans Acetylene

3. Ester formation involves the reaction of

## Ans An acylhalide with an alcohol

4. Heating a mixture of sodium acetate and soda lime gives

## Ans methane

5. The acid which reduces Tollen's reagent is **Ans formicacid** 

## CH3

## 6. The IUPAC name of $CH_3 - CH_2 - CH - COOH$ is

- Ans 2-methyl butanoic acid
- 7. The Isomerism exhibited by CH<sub>3</sub>CH<sub>2</sub>COOH and CH<sub>3</sub>COOCH<sub>3</sub> is **Ans functional**
- 8. The acid that cannot be prepared by Grignard reagent **Ans formic acid**

#### 9. Which order of arrangement is correct interms of the strength of the acid Ans CH<sub>3</sub>-CH<sub>2</sub>COOH < CH<sub>3</sub>COOH < HCOOH < ClCH<sub>2</sub>COOH

- 10. The compound which undergoes intra molecular dehydration with P2O5 is Ans formic acid
- 11. HO

Ηĺ

$$C = O - 160^{\circ}c$$
 The product is

Ans  $H_2 + CO_2$ 

12. When chlorine is passed through acetic acid in presence of red P, it forms. **Ans** Trichloro acetic acid

13. Which of the following compounds will react with NaHCO3 solution to give sodium salt and CO<sub>2</sub>?

#### Ans acetic acid

14. When propanoic acid is treated with aqueous sodium - bicarbonatate, CO<sub>2</sub> is liberated. The "C" of CO<sub>2</sub> comes from

**Ans** bicarbonate

15. Carboxylic acids are more acidic than phenol and alcohol because of

**Ans** greater resonance stabilisation of their conjugate base

16. Among the following the strongest acid is

#### Ans Cl<sub>3</sub>CCOOH

17. Which of the following compound is optically active ? Ans (c) CH<sub>3</sub>CH(OH)COOH (d) Cl<sub>2</sub>CHCOOH

18.CH3CH(OH)COOH -

→ ? The product is

#### $H_2O_2/Fe^{2+}$ Ans (a) CH<sub>3</sub>COCOOH

19. The compound found in some stony deposit in kidneys is

#### Ans calcium oxalate

20. Ethylene cyanide on hydrolysis using acid gives

Ans succinic acid

## **20.Organic nitrogen compounds** $(3 \times 1 = 3)$

1. Bromo ethane reacts with silver nitrite to give

## Ans C<sub>2</sub>H<sub>5</sub>NO<sub>2</sub>

2. The isomerism exhibited by and  $CH_3 CH_2 - O - N = O$  is

#### **Ans** functional

3. In nitro alkanes –NO<sub>2</sub> group is converted to –NH<sub>2</sub> group by the reaction with

## Ans Sn/HCl

4. When nitromethane is reduced with Zn dust + NH4Cl in neutral medium, we get

## Ans CH<sub>3</sub>NHOH

5. The compound that is most reactive towards electrophilic nitration is **Ans** Toluene

6. Nitromethane condenses with acetaldehyde to give

## **Ans** 1-nitro-2-propanol

7. Which of the following compounds has the smell of bitter almonds ?

#### Ans nitrobenzene

8. Nitration of nitrobenzene results in

#### **Ans** m-dinitro benzene

- 9. Nitrobenzene on electrolytic reduction in con. sulphuric acid, the intermediate formed is Ans C<sub>6</sub>H<sub>5</sub> – NHOH
- 10. Electrophile used in the nitration of benzene is

Ans nitronium ion

- 11. The reduction of  $CH_3 CH_2 C \equiv N$  with sodium and alcohol results in the formation of Ans  $CH_3 - CH_2 - CH_2 - NH_2$
- 12. The basic character of amines is due to the

#### Ans lone pair of electrons on nitrogen atom

13. The organic compound that undergoes carbylamine reaction is

#### Ans C<sub>2</sub>H<sub>5</sub>NH<sub>2</sub>

14. Primary amine acts as

#### Ans Lewis base

15. Oxidation of aniline with acidified potassium dichromate gives

#### Ans p-benzo quinone

16. Which one of the following is a secondary amine ?

## Ans diphenyl amine

## NaNO<sub>2</sub>/HCl

17.C6H5NH2  $\longrightarrow$  X. Identify X.

### Ans:C6H5N2Cl

18. Which of the following will not undergo diazotisation?

### Ans benzyl amine

19. Aniline differs from ethylamine by the reaction with

#### **Ans** nitrous acid

20. When aqueous solution of benzene diazonium chloride is boiled the product formed is **Ans (c) phenol** 

## 21.Bio molecules (2x1=2)

1. Which is a mono saccharide among the following :

#### Ans Glucose

2. Identify the reducing sugar.

#### Ans Glucose

3. Sucrose is not

#### Ans hydrolysed to only glucose

4. Sucrose contains glucose and fructose linked by

#### Ans $C_1 - C_2$

5. Glucose is not oxidised to gluconic acid by

#### Ans Conc. HNO<sub>3</sub>

6. Inversion of sucrose refers to

#### Ans hydrolysis of sucrose to glucose and fructose

7. Glucose forms \_\_\_\_\_\_ with acetic anhydride and sodium acetate.

#### Ans penta acetate

8. The amino acid without chiral carbon is

#### **Ans** Glycine

9. The building block of proteins are

## Ans α-amino acids

10. Which is not true of amino acid?

#### Ans amino acid is insoluble in NaOH solution

#### 11. Two amino acids say A, B- react to give

Ans two dipeptides

12. A di peptide does not have

## Ans two peptide units

13. Proteins are not sensitive to

## Ans water

14. Denaturation does not involve

## Ans breaking up of H- bonding in proteins

15. Specificity of enzyme is due to

Ans (a) the sequence of amino acids

- (b) secondary structure
- (c) tertiary structure

## (d) all of the above

16. Ultimate products of hydrolysis of proteins is

## Ans amino acid

17. Proteins are

## Ans polypeptides

18. Which of the following contains a lipid ?

## Ans edible oil

19. Which among the following contains triglyceride ?

### Ans Cooking oil

20. Which contains a long chain ester ?

### Ans wax

21. An example of a fatty acid obtained from a cooking oil is

### Ans stearic acid

22. Which is not a saturated fatty acid?

## Ans Oleic acid

23. Alkaline hydrolysis of cooking oil gives

## Ans (a) soap (b) glycerol

(c) fatty acid (d) both (a) and (b)

## 24. Hair and nail contains

## Ans keratin

25. Important constituent of cell wall is

## Ans cellulose

### <u>1-Mark</u>

Practice Book back one mark questions (self evaluation) for 19 units.

Practice the questions that where asked in the PTA guide as well as previous year public question papers.

#### <u>3-Mark</u>

#### Important Public exam questions are given below

#### **ATOMIC STRUCTURE-II**

- 1. What do you understand by the dual character of matter?
- 2. State Heisenberg's uncertainty Principle?
- 3. Write the difference between particle and wave?
- 4. What is the significance of negative electronic energy?
- 5. What are molecular orbital?
- 6. Why  $He_2$  is not formed?
- 7. What is bond order?
- 8. Define by hybridization?
- 9. Write the conditions for the effective hydrogen bonding?

#### PERIODIC CLASSIFICATION-II

- 1. Define Ionic radii?
- 2. Compare Ionisation Energy?
  - a.) B & Be
  - b.) N & O
  - c.) Li & Be
  - d.) B & C
  - e.) F & Ne
  - f.) Mg & Al

3. Why Electron affinity of fluorine less than of chlorine?

- 4. State Muliken scale?
- 5. Mention the disadvantage of pauling and muliken scale?
- 6. Define Electron affinity
- 7. Define Ionisation Energy

#### **P-BLOCK ELEMENTS**

- 1. Write inert pair effect
- 2. Write a note on plumbo solvency
- 3.  $H_3PO_3$  is diprotic why?
- 4. Prove that  $p_2o_5$  a powerful dehydrating agent
- 5. H<sub>3</sub>PO<sub>4</sub> triprotic why
- 6. Preparation of potash alum?
- 7. Preparation of phosphorous acid?
- 8. Action of heat on phosphorus acid
- 9. Electronic structure of H<sub>3</sub>PO<sub>3 &</sub> H<sub>3</sub>PO<sub>4</sub>
- 10. Write reducing property of phosphorus acid
- 11. write reducing property of H<sub>3</sub>PO<sub>4</sub>
- 12. Write reducing property of PH<sub>3</sub>
- 13. Discuss the oxidizing Power of Fluorine
- 14. Write note on Holme's Signal
- 15. How do Prepare xenon Fluoride Compounds
- 16. HF cannot be stored in glass or silica bottles Why?
- 17. Write the uses of Neon
- 18. What are the inter halogen Compounds ? How are they formed?
- 19. Write the uses of Helium?
- 20. How can you draw a Picture in glass using HF?

#### SURFACE CHEMISTRY

- 1. What is catalysis?
- 2. What is auto catalyst / give example
- 3. what is Induced catalyst? give example
- 4. what is promoters? give Example?
- 5. what is catalytic poison? Give example
- 6. A colloidal solution of gas in gas is not possible Why?
- 7. What is Peptisation?
- 8. What is Helmholtz double layer?
- 9. What is Tyndall effect?
- 10. What is Brownian Movement?
- 11. Write note on Tanning?
- 12. Write Purification of drinking water by colloids?
- 13. How is Delta formed?
- 14. What are emulsion?
- 15. Write Medical uses of colloids?

### 5Mark

#### ATOMIC STRUCTURE-II

- 1. Discuss the Davis and Germer experiment
- 2. Derive de Broglie's equation what is significance?
- 3. Discuss the shapes of orbitals
- 4. Briefly explain molecular orbital Theory?
- 5. Explain the Formation of  $N_2$  molecule by molecular orbital theory
- 6. Explain the formation of  $O_2$  molecule by molecular orbital theory?
- 7. Explain salient Features regarding Hybridisation?
- 8. Explain Types of Hydrogen bonds.

#### PERIODIC CLASSIFICATION

- 1. Explain the Factors affecting Electron affinity?
- 2. How electron negativity values help to find out the nature of bond?
- 3. Explain pauling method to determination of ionic radii?
- 4. Explain pauling scale electron negativity ?
- 5. Explain the factors affecting ionization energy?

#### **P-block Elements**

- 1. Explain structure of silicones ?
- 2. Explain uses of silicones?
- 3. Write the anomalous nature of fluorine:-
- 4. Give on account of manufacture of lead ?
- 5. How is fluorine isolated from fluorides by?
- 6. Explain the Ramsay Raligh's method ?
- 7. Explain the Dewar's method?

#### **D-block Elements**

- 1. Write note on alumino thermic process:?
- 2. Extraction of copper?
- 3. Extraction of zinc
- 4. Extraction of silver.
- 5. Extraction of gold.
- 6. Write the preparation of K2Cr2O7

#### **Co-Ordination compound**

- 1. Explain co-ordination and Ionisation isomerism with suitable Examples:
- 2. Explain Hydrate linkage and ligand isomerism with suitable Example.
- 3. Explain the postulates of werner's theory.
- 4. Explain the Postulates of valance bond theory.

- 5. for the complex K4 (Fe(CN) 6)
  - a) Name b) Central metal ion c) Ligand d) co-ordination number e) Structure
- 6. For the complex[Cu(NH3)4] SO4 mention.
  - a) Name b) Central metal ion c) Ligand d) co-ordination number e) Structure
- 7. In what why [FeF6] 4- differs from [Fe(CN)6] 4-
- 8. [Ni(CN)4 ] 2- diamagnetic where as [NiCl4] 2+ is paramagnetic explain.
- 9. Mention the function of Haemoglobin .
- 10. How chlorophyll is important in environmental chemistry? Mention its functions.

## Surface chemistry

- 1. Write briefly about the preparation of colloids by dispersion methods:
- 2. Write briefly about the preparation of colloids by condensation method.
- 3. Preparation of colloids by chemical method.
- 4. Write notes on1) Dialysis 2) Electro dialysis
- 5. What is electro osmosis? Explain
- 6. What is Electrophoresis? Explain.
- 7. Explain the intermediate compound formation theory .
- 8. Explain the Adsorption theory.
- 9. Write the characteristics of catalytic reaction.
- 10. Write the difference between the Physical and chemical adsorption?

## **ETHER**

- 1. Write the preparation of diethyl ether.
- 2. Write the difference between diethyl ether and anisole.
- 3. Explain the isomerism of ethers.
- 4. Write the possible isomerism structure and names of C4 H10 O
- 5. Mention the methods of preparation of anisole.
- 6. How does diethyl ether react with the following reagent?1) O2 2) dil. H2SO4 3) Pcl5 4) Con.H2SO4 5) Cl2
- 7. Explain the diethyl ether reacted with HI? mention its use.