Chemistry class (XI-XII)

Objectives

1. To promote understanding of basic principles of Chemistry.
2. To apply the concepts of Chemistry useful in real life situation for making learning of Chemistry more relevant, meaningful and interesting.
3. To develop positive scientific attitude and appreciate contribution of Chemistry towards the improvement of quality of human life.
4. To develop problem solving skills and nurture curiosity, aesthetic sense and creativity.
5. To inculcate values of honesty, integrity, co-operation, concern for life and preservation of the environment.
6. To make the learner realize the interface of Chemistry with other disciplines of Science such as Physics, Biology, Geology etc.
7. To equip students to face challenges related to health, nutrition, environment, population whether industries & agriculture.

Evaluation

XI and XII papers should have maximum 30 questions.

Question No. 1 – 9 of 1 mark each	=	9 Marks
Question No. 10 – 19 of 2 mark each	=	20 Marks
Question No. 20 – 26 of 3 mark each	=	21 Marks
Question No. 27 – 30 of 5 mark each	=	20 Marks

Total Question = 30 Marks = 70

NOTE :- Numericals should not be more than 25% of 70 Marks

Evaluation (Distribution of Marks)

Class - XI Chemistry
(Theory)

Unit	Topic	Marks
I	Some Basic Concepts of Chemistry	3
II	Atomic Structure	6
III	Classification of Elements and Periodicity in Properties	4
IV	Chemical Bonding and Molecular Structure	6
V	States of Matter : Gases and Liquids	5
VI	Thermodynamics	5
VII	Equilibrium	7
VIII	Redox Reactions	3
IX	Principles and Process of Extraction of Elements	2
X	Hydrogen	2
XI	s-Block Elements	5
XII	Some p-block Elements	6
XIII	Organic Chemistry –Some Basic Principles and Techniques	6
XIV	Hydrocarbons	7
XV	Environmental Chemistry	3
	TOTAL	**70**

Class - XI Chemistry (Practical)

Volumetric Analysis	=	12 Marks
Salt Analysis	=	8 Marks
Content Based Experiments	=	5 Marks
Class Record and Viva	=	5 Marks

Total = 30 Marks

Class - XII Chemistry
(Theory)

Unit	Topic	Marks
I	The Solid State	5
II	Solutions	5
III	Electro chemistry	6
IV	Chemical Kinetics	5
V	Surface chemistry	4
VI	p-Block Elements	8
VII	d & f -Block Elements	5
VIII	Co-ordination Compounds	3
IX	Haloalkanes and Haloarenes	3
X	Alcohols, Phenols and Ethers	3
XI	Aldehydes, Ketones and Carboxylic Acids	5
XII	Organic Compounds containing Nitrogen	5
XIII	Bio-molecules	6
XIV	Polymers	3
XV	Chemistry in Everyday Life	4
	TOTAL	**70**

Class - XII Chemistry (Practicals)

Volumetric Analysis	=	10 Marks
Salt Analysis	=	8 Marks
Content Based Experiments	=	4 Marks
Project	=	4 Marks
Class Record and Viva	=	4 Marks

Total = 30 Marks

Class - XI

Chemistry Practical

A.. **Basic Laboratory Techniques :** (2 Periods)

1. Cutting glass tube and glass rod.
2. Bending a glass tube.
3. Drawing out a glass jet.
4. Boring a cork.

B. **Characterisation and Purification of Chemical Substance :** (6 Periods)

1. Determination of melting point of organic compounds.
2. Determination of boiling point of organic compounds.
3. Crystallization involving impure sample of any one of the following - Alum, Copper Sulphate, Ferrous Sulphate.

C. **Thermochemistry :** (4 Periods)

1. Enthalpy of dissolution of copper sulphate or potassium nitrate.
2. Enthalpy of neutralization of strong acid (HCl) and strong base (NaOH).

D. **Experiments Related to pH Change :** (6 Periods)

1. Determination of pH of some solutions obtained from fruit juices, solutions of known and varied concentrations of acids, bases and salts using pH paper or universal indicator.

2. Comparing the pH of solutions of strong and weak acid of same concentration.
3. Study of pH change by common-ion in case of weak acids and weak bases.

E. **Chemical Equilibrium :** (4 Periods)

1. Study the shift in equilibrium between ferric ions and thiocynate ions by increasing/decreasing the concentration of either ions.
2. Study the shift in equilibrium between $[Co(H_2O)_6]^{2+}$ and chloride ions by changing the concentration of either of the ions.

F. **Quantitative Estimation :** (16 Periods)

1. Using a chemical balance.
2. Preparation of standard solution of oxalic acid.
3. Determination of strength of a given solution of sodium hydroxide by titrating it against standard solution of oxalic acid.
4. Preparation of standard solution of sodium carbonate.
5. Determination of strength of a given solution of hydrochloric acid by titrating it against standard sodium carbonate solution.

G. **Qualitative Analysis :** (16 Periods)

Determination of one anion and one cation in a given salt :-

Cations :- Pb^{+2}, Cu^{+2}, Al^{+3}, Fe^{+3}, Ni^{+2}, Zn^{+2}, Co^{+2}, Ca^{+2}, Sr^{+2}, Ba^{+2}, Mg^{+2}, NH_4^+.,Na^+,K^+ .

Anions :- CO_3^{-2}, S^{-2}, SO_3^{-2}, SO_4^{-2}, NO_2^-, NO_3^-, Cl^-, Br^-, I^-, PO_4^{-3}, $C_2O_4^{-2}$, CH_3COO^-.

H. **Project :** (10 Periods)

Scientific investigations involving laboratory testing and collecting information from other sources.

Suggested Projects

1. Checking the bacterial contamination in drinking water by testing Sulphide ions.
2. Study the methods of purification of water.
3. Testing the hardness, presence of iron, fluoride, chloride etc. depending upon the regional variation in drinking water and the study of causes of presence of these ions above permissible limits (if any).
4. Investigation of the foaming capacity of different washing soaps and the effect of addition of sodium carbonate on them.
5. Study of the acidity of different samples of the tea leaves.
6. Determination of the rate of evaporation of different liquids.
7. Study of the effect of acids or bases on the tensile strength of fibres.
8. Analysis of fruit & vegetable juices for their acidity.

(Any other investigatory project)

Class - XII

Chemistry Practical

A. **Surface Chemistry :** (6 Periods)

1. Preparation of one lyophillic and one lyophobic sol.
   Lyophillic sol : Starch, egg albumin and gum.

Lyophobic sol : Aluminium hydroxide, ferric hydroxide, arsenious sulphide.

2. Dialysis of sol prepared in (1) above.
3. Study of the role of emulsifying agent in stabilizing the emulsions of different oils.

B **Chemical Kinetics :** (4 Periods)

1. Effect of concentration and temperature on the rate of reaction between Sodium thiosulphate and Hydrochloric acid.
2. Study the reaction rates of any one of the following :-
   (a) Reaction of iodide ion with hydrogen peroxide at room temperature using different concentration of iodide ions.
   (b) Reaction between potassium iodate (KIO_3) and sodium sulphite (Na_2SO_3) using starch solution as indicator (Clock reaction).

C. **Electrochemistry :** (2 Periods)

Variation of cell potential in Zn/Zn^{+2} // Cu^{+2}/Cu with change in concentration of electrolytes ($CuSO_4$ or $ZnSO_4$) at room temperature.

D. **Chromatography :** (4 Periods)

1. Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of R_f values.
2. Separation of constituents present in an inorganic mixture containing two cations only (Constituents having wide difference in R_f values to be provided.

E. **Preparation of Inorganic Compounds :** (4 Periods)

1. Preparation of double salt of Ferrous Ammonium Sulphate or Potash Alum.

2. Preparation of Potassium Ferric Oxalate.

F. **Preparation of Organic Compounds :** (2 Periods)

Preparation of any one of the following Compounds :

(1) Acetanilide

(2) Bi-benzal Acetone

(3) p-Nitroacetanilide

(4) Iodoform.

G. **Test for the Functional Groups Present in Organic Compounds :** (4 Periods)

Unsaturation, alcoholic, phenolic, aldehydic, ketonic, Carboxylic, amino (primary group).

H. **Study of Carbohydrates, Fats and Proteins in Pure Form and Detection of their presence in given Food Stuffs** (4 Periods)

I. **Determination of Concentration/Molarity of $KmnO_4$ Solution By Titrating it against a Standard Solution of :** (8 Periods)

1. Oxalic acid.
2. Ferrous Ammonium Sulphate.

J. **Qualitative Analysis :** (10 Periods)

Determination of one anion and one cation in a given salt :-

Cations :- Pb^{+2}, Cu^{+2}, As^{+3}, Al^{+3}, Fe^{+3}, Mn^{+2}, Ni^{+2}, Zn^{+2}, Co^{+2}, Ca^{+2}, Sr^{+2}, Ba^{+2}, Mg^{+2}, NH_4^+,Na^+,K^+.

Anions :- CO_3^{-2}, S^{-2}, SO_3^{-2}, SO_4^{-2}, NO_2^-, NO_3^-, Cl^-, Br^-, I^-, PO_4^{-3}, $C_2O_4^{-2}$, CH_3COO^-.

K. **Projects :** (8 Periods)

1. Study the presence of Oxalate ions in Guava fruit at different stages of ripening.
2. Study of quantity of casein present in different samples of milk.
3. Preparation of Soyabean milk and its comparison with the natural milk with respect to curd formation, effect of temperature, etc.
4. Study of the effect of potassium bisulphate as food preservative under various conditions (Temperature, Concentration, Tune etc.).
5. Study of digestion of starch by salivary amylase and effect of pH and temperature on it.
6. Comparative study of the rate of fermentation of following material : wheat flour, gram flour, potato juice, carrot juice etc.
7. Extraction of essential oils present in Saunf (Aniseed), Ajwain (Carum), Illaichi (Cardamon).
8. Study of common food adulterants in fat, oil, butter, sugar, turmeric powder, chilli powder and pepper.

(Any other investigatory project)