SARDAR PATEL UNIVERSITY
B.Sc. FIRST SEMESTER
Core Course - Chemistry
US01CCHE21 (T) GENERAL CHEMISTRY- I
Effective from June 2018
4 Credits, 4 periods per week
Total Marks 100, Internal -30 Marks, External-70 Marks, exam duration: 3 hours

Unit	Description In Detail	Weightage
I	**ALKANE, ALKENE AND ALKYNE** **Hydrocarbons** : Physical properties of alkanes, alkene and alkynes, Common and IUPAC nomenclature of alkanes, alkenes and alkynes. **Alkanes**: Preparation from alkene by hydrogenation, reduction of alkyl halide, The Grignard reagent, Corey-House reaction, Wurtz reaction. Mechanism of halogenations, Orientation of halogenations: n-butane, isopentane and n-pentane. **Alkenes** : Preparation from dehydrohalogenation of alkyl halide with Mechanism, dehydration of alcohol. The E2 mechanism, Evidence : Absence of hydrogen exchange, The E1 mechanism, Evidence accompanished by rearrangement, Electrophilic addition Mechanism, Electrophilic addition rearrangement, Mechanism of addition of halogen, Halohydrin formation, Free-radical addition, Hydroxylation, Ozonolysis. **Alkynes**: Preparation from dehydrohalogenation of alkyl halide, Reaction of metal acetylide with primary alkyl halides, Hydration of alkynes, Acidity of alkynes, Analysis of alkynes.	**25%**
II	**PERIODIC PROPERTIES** **Periodic Table:** Brief introduction and types of elements, Shielding effect and effective nuclear charge, Factor affecting the magnitude of σ and Z_{eff} and their variation in the periodic table, Slater's rule for calculation σ and Z_{eff}. **Ionization Energy**: Successive ionization energy, Factor affecting magnitude of Ionization Energy, Variation of IE values in main group element, Variation of IE values in different element groups, Ionization energies of isoelectronic species, Find out the order of second IE values of the element of second period, Difference between Ionization potential and Electrode potential of a metal. **Electron Affinity:** Relation between EA of X(g) atom and IE of X-(g) ion, EA2 represents energy required, Factor affecting the magnitude of electron affinity, Variation of electron affinity in main group elements of the periodic table, Variation of electron affinity values of different groups.	**25%**

	Electronegativity : Different methods used for calculating electronegativity (like Pauling, Mulliken, Allred-Rachow),Factor affecting the magnitude of electronegativity, Role of electronegativity in chemical behavior, Variation of electronegativity of the elements of different group, Variation of electronegativity in a period of s and p Block elements, Application of electronegativity. Numericals based on above topics.	
III	**IONIC EQUILIBRIA IN AQUEOUS SOLUTIONS** Acids & Bases, Arrhenius theory of Acids and Bases, The Lowry – Bronsted Concept, Strength of Acids and Bases, The Lewis concept, pH Scale, Self Ionization of water, Hydrolysis, Buffer Solutions, Indicator, Sparingly Soluble Salts, Common ion effect, Selective Precipitation, Numericals based on above topics.	**25%**
IV	**ANALYTICAL CHEMISTRY** Introduction, Qualitative and Quantitative analysis, Instrumental and Chemical Methods of analysis, Applications of Chemical Analytical Chemistry, Sampling of Solid, Liquid and Gas, Stages of Analysis, Interferences, Selection of Methods, limitations of Analytical Methods, Classification of Errors, Accuracy and Precision, Absolute and Relative Error, Minimization of Error, Significant Figure, Rounding off, Mean, Median, Standard Deviation, , Distribution of Random Error, Reliability of Results (Q-test), Comparison of Results: Student's t-test and F-test, confidence limit (interval), Numericals based on above topics.	**25%**

Basic text and Reference Books :

1. Vogel, A.I., *Textbook Quantitative Chemical Analysis,* Prentice-Hall, 5th edition.
2. Day, R. A. and Underwood A. L., *Quantitative Analysis* 6th Edition.

3. Prakash S., Tuli, G. D., Basu, S. K., Madan R. D., *Advance inorganic chemistry* (Vol. - I).

4. Mahan, B.H. *University Chemistry*, 3rd Ed. Narosa.

5. Morrison, R. T. & Boyd, R. N., *Organic chemistry* (6th edition).

6. Cotton, F.A. & Wilkinson, G. *Basic Inorganic Chemistry,* Wiley.

7. Lee J. D., *Concise Inorganic Chemistry* (4th Edition).

8. Clayden, J., Greeves, N., Warren, S., *Organic Chemistry* 2nd Edition, Oxford University Press.