



**SILVER OAK  
UNIVERSITY**  
EDUCATION TO INNOVATION

(Established under Gujarat Private Universities Act, 2009)

**SEMESTER – I  
(Group A)**

Physics-I  
Chemistry-I  
Mathematics-I  
English



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<b>Subject: - Physics-I</b>								
<b>Program: B.Sc.</b>				<b>Subject Code:</b>			<b>Semester: I</b>	
<b>Teaching Scheme</b>				<b>Examination Evaluation Scheme</b>				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)-Theory	Continuous Internal Evaluation (CIE)-Practical	Total
03	-	01	04	24/60	20/50	16/40	-	150

## THEORY

### UNIT 1 – Vector Analysis

Introduction, Applications of Vector Multiplication, Triple Scalar Product, Triple Vector Product, Differentiation of Vectors, Fields, Directional Derivative, Gradient, Some other expressions involving  $\nabla$ , Green's Theorem in the plane, The Divergence and the Divergence theorem. Gauss's law, The curl and Stoke's theorem.

### UNIT 2 – Nuclear Physics

Radioactivity : The law of radioactive decay (review), Radioactive growth and decay, ideal equilibrium, Transient equilibrium and secular equilibrium, Radio active series, Radioactive isotopes of lighter elements, Artificial radioactivity, Age of earth, Carbon dating (Archaeological time scale) The Q Equation : Types of Nuclear Reactions, The balance of mass and Energy in Nuclear reactions, The Q Equation, Solution of the Q Equation. Constituents of the nucleus properties: Measurement of Nuclear radius, Constituents of the nucleus and their properties.

### UNIT 3 – Plasma Physics

Introduction, Composition & characteristics of a plasma, Collisions, Surface phenomena, Transport (or transfer) phenomena, Diffusion & Mobility : Ambipolar Diffusion, Viscosity : Conductivity, Recombination, Ohm's law, Gas Discharge, Comparison of various natural & man-made plasma, Plasma diagnostics, plasma waves & Instabilities confinement of plasma, space plasma.

### UNIT 4 – LASER

Introduction, Attenuation of light in an optical medium, Thermal equilibrium, Interaction of light with matter, Einstein coefficients and their relations, Light amplification, Meeting the three requirements, Components of Laser, Lasing action, Principal pumping schemes, Type of lasers (excluding Carbon Dioxide Laser), Semiconductor laser, Laser beam characteristics, Applications



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## PRACTICALS

1. Newton's Ring
2. To find the wave length of light of given monochromatic source
3. Determination of dispersive power of material of a prism.
4. To determine the wavelength and speed of ultrasonic wave by method of Acoustic grating.
5. Logic Gates (AND, OR, NOT) (Using discrete components)
6. Verification of truth tables and giving understanding of voltage level for '0' and '1' level.
7. Half-Wave Rectifier
8. I-V Diode characteristics of a PN-junction diode

### References:

- a. Mathematical Methods in Physical Sciences by M. L. Boas (John Wiley & Sons) Chapter 6
- b. A text book of Optics by N. Subrahmanyam, Brijlal and M. N. Avadhanulu, S. Chand Publication: Chapter 22 (including all sub articles) Fiber Optics and optoelectronics by R. P. Khare, Oxford University Press.
- c. An introduction to LASERS- Theory and Applications by M. N. Avadhanulu, S. Chand & Comp. Ltd.,
- d. Nuclear Physics – An introduction, S. B. Patel, New Age International Limited. Article : 2.3, 2.6 to 2.13, 3.2 to 3.5, 4.1.3, 4.1.4.
- e. Element of Plasma physics by S. N. Goswami, New Central Book Agency (P) Ltd. Calcutta.



Subject: General Chemistry 1								
Program: B.Sc.				Subject Code:			Semester: I	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)-Theory	Continuous Internal Evaluation (CIE)-Practical	Total
03	-	-	3	24/60	-	16/40	-	100

## THEORY

### UNIT-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 accompanied 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.

### Unit – II

#### PERIODIC PROPERTIES

**Periodic Table:** Brief introduction and types of elements, shielding effect and effective nuclear charge, Factor affecting the magnitude of  $\sigma$  and  $Z_{\text{eff}}$  and their variation in the periodic table, Slater's rule for calculation  $\sigma$  and  $Z_{\text{eff}}$ .



**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, EA<sub>2</sub> 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.

**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.

### UNIT-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.

### UNIT-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), Numerical based on above topics.



### Reference

- Vogel, A.I., *Textbook Quantitative Chemical Analysis*, Prentice-Hall, 5th edition.
- Day, R. A. and Underwood A. L., *Quantitative Analysis* 6<sup>th</sup> Edition)
- Mahan, B.H. *University Chemistry*, 3rd Ed. Narosa.
  
- Morrison, R. T. & Boyd, R. N., *Organic chemistry* (6<sup>th</sup> edition).
- Cotton, F.A. & Wilkinson, G. *Basic Inorganic Chemistry*, Wiley.
- Lee J. D., *Concise Inorganic Chemistry* (4th Edition).
- Clayden, J., Greeves, N., Warren, S., *Organic Chemistry* 2nd Edition, Oxford University Press.



<b>Subject: - Calculus and Matrix Algebra</b>								
<b>Program: B.Sc.</b>				<b>Subject Code:</b>			<b>Semester: I</b>	
<b>Teaching Scheme</b>				<b>Examination Evaluation Scheme</b>				
<b>Lecture</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Credits</b>	<b>University Theory Examination</b>	<b>University Practical Examination</b>	<b>Continuous Internal Evaluation (CIE)-Theory</b>	<b>Continuous Internal Evaluation (CIE)-Practical</b>	<b>Total</b>
04	4	-	6	24/60	20/50	16/40	-	150

## THEORY

### Unit 1

Successive differentiation, nth order differentiation, Leibnitz theorem, limit of sequence, bounded sequence, convergence and divergence of sequence and infinite series, absolute and conditional convergence, limit comparison test, ratio test, root test, integral test, Raabe's test, Power series and radius of convergence.

### Unit 2

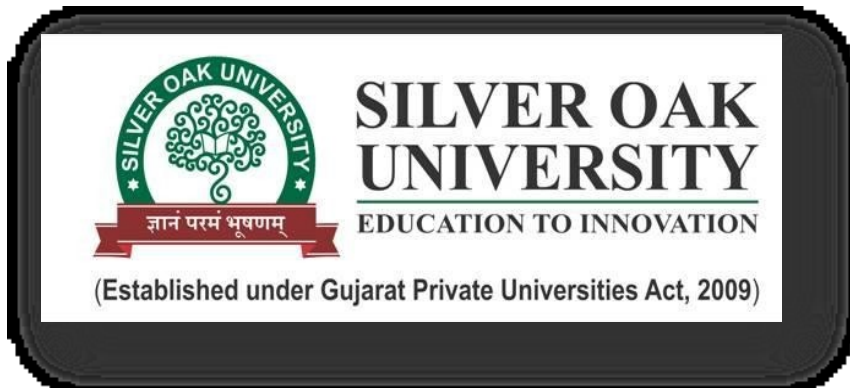
Rolle's theorem (without proof), Lagrange's mean value theorem, Cauchy Mean value theorem, increasing and decreasing functions, Taylor and Maclurin theorems (without proof) for one variable and their application, Indeterminants forms, Improper integral.

### Unit 3

Introduction to Matrices, types of matrices and algebra of matrices, Symmetric, skew-symmetric, Hermitian and skew- Hermitian matrix, orthogonal matrix. Linear dependance and independence of row and column matrix, row and column rank, rank of matrix, Row Echelon form and Row reduced Echelon form, Inverse of matrix by determinant and Gauss Jordan method.

### Unit 4

Application of matrices for solving system of linear equations, homogeneous and non-homogenous system of linear equations, consistency and in consistency of solutions, Cramer's rule, Eigen value and eigen vector, Characteristic equation of matrix, Diagonalization, Caley Hamilton theorem (without proof) and its application to find inverse.



### References:

1. Calculus and Analytic Geometry\_ G.B Thomas and R.L Finney: Pearson Education Indian Reprint.
2. Calculus- James Stewart, Sixth edition, (E-book).
3. Calculus T.M. Apostol Volume 1.
4. Differential Calculus- Shanti Narayan, P.K Mittal, S. Chand.
5. Matrix and Linear Algebra- K.B Dutta, Prentice Hall.
6. Introduction to Linear Algebra-Serge Lang, Springer (India).
7. A text book of Matrices- Shanti Narayan, P.K Mittal, S. Chand Group.

Linear Algebra Theory and Application- Ward Cheney, David Kincaid, Jones and Bartlet, India Pvt., Ltd.





<b>Subject: - English</b>								
<b>Program: B.Sc.</b>				<b>Subject Code:</b>			<b>Semester: I</b>	
<b>Teaching Scheme</b>				<b>Examination Evaluation Scheme</b>				
<b>Lecture</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Credits</b>	<b>University Theory Examination</b>	<b>University Practical Examination</b>	<b>Continuous Internal Evaluation (CIE)-Theory</b>	<b>Continuous Internal Evaluation (CIE)-Practical</b>	<b>Total</b>
2	0	0	2	24/60		16/40	-	100

UNIT -I (Text) Pinnacle (Published by Macmillan) SECTION ONE (Prose: 1 to 3)

Section 2 (Prose 4, 5)

UNIT – II (Text) Pinnacle (Published by Macmillan) SECTION ONE (Poems: 1 to 3)

Section 2 (Prose 4, 5)

UNIT-III (Grammar)

(A) DO, BE and HAVE as Main Verbs

Note: In a way, Do, Be and Have are “special verbs” in English because they are used as Main and Auxiliary verbs. As main verbs, “DO”, “BE” and “HAVE” occur independently in the sentence and express a variety of meanings in formal and informal situations. In this section, PRESENT, PAST and FUTURE forms of these three verbs will be taught and examined only as Main Verbs.

(B) TENSES:

(1) Present Simple Tense (5) Past Simple Tense

(2) Present Continuous Tense  
(6) Past Continuous Tense (3) Present

Perfect Tense (7) Past

Perfect Tense

(4) Present Perfect Continuous Tense (8) Future Simple Tense



(C) VOCABULARY

1. Words often confused
2. Words often misspelt
3. Common errors in English
- 4.

UNIT-IV: Comprehension and Composition) (A) Paragraph Writing:

List of Topics for Paragraph Writing:

- STATE/ NATION/ MEDIA
- ENVIRONMENT/ SOCIAL LIFE
- PERSONAL

(B) Comprehension of an Unseen Passage

Course Outcome:

Text Books:

- Pinnacle (Published by Macmillan)
- David Green: Contemporary English Grammar Structure and Usage, Laxmi Publications Pvt. Ltd.
- Wren and Martin – High School English Grammar and Composition, S. Chand, Latest Print.

Reference Books:

- Raymond Murphy – Intermediate English Grammar, Cambridge Press, Latest Edition
- Martinet and Thomson – A Practical English Grammar, Oxford.
- M L Tickoo and Subramanian: Intermediate Grammar, Usage and Composition, Published by Orient Blackswan.