CVM UNIVERSITY

FACULTY OF SCIENCE, SYLLABUS & COURSE STRUCTURE(B.Sc GENERAL & HONS)

B.Sc. SEMESTER – 1, SUBJECT : PHYSICS

Course Title – Basic Concepts of Physics

Course Code – UG01CPHY01

No. of Credits – 4, Contact hours per week – 4

Examination Duration – 3 hours

Marks distribution : Total Marks : 100(40 Internal + 60 External)

Unit – 1 : Sound Waves

Introduction to sound waves, Velocity of longitudinal waves in gaseous and solid medium(formula only), Calculation of velocity of sound in air: Newton's formula and Laplace's formula, Factors affecting velocity of sound in air, Effect of pressure, temperature, humidity and wind on velocity of sound in air, Kundt's tube, Applications of Kundt's tube. Ultrasonic Waves : Production of ultrasonic waves : Magnetostriction method and Piezo-electric method, Detection of ultrasonic waves, Properties of ultrasonic waves, Applications of ultrasonic waves.

Books :

1. "Engineering Physics" by R. K. Gaur and S. L. Gupta, Dhanpat Rai Publications, New Delhi
2. "Engineering Physics" by K. Rajagopal, PHI Learning pvt. Ltd., New Delhi

Unit – 2 : Elasticity

Introduction, Three types of elasticity, Work done per unit volume in elongation strain, Deformation of a cube-Bulk modulus, Modulus of rigidity, Young modulus, Relation connecting the elastic constants, Poisson's ratio, Limiting values of σ, Determination of Poisson's ratio for rubber, Factors affecting elasticity, Twisting couple on a cylinder (or wire) ,Torsional pendulum, Determination of η – Statical method (Horizontal twisting apparatus for a rod), Maxwell's vibrating needle method, Bending of beam, Bending moment, Cantilever, Numericals.

Books:

1. "Elements of Properties of matter" by D. S. Mathur S Chand publication
2. "Mechanics" by D. S. Mathur S Chand publication

Unit – 3 : Optics

Interferometry : Introduction to interference, Jamin's interferometer, Michelson's Interferometer; Types of fringes, white light fringes, Uses of Michelson's interferometer: measurement of wavelength of light of a monochromatic source, measurement of refractive index of a thin plate, Interference in thin film; introduction, interference due to reflected light, conditions for maxima and minima, **Resolving power of optical instruments** Resolving power, Rayleigh's criterion; limit of resolution, Resolving Power of Telescope, Resolving Power of Microscope (light microscope), Resolving Power of diffraction Grating, Resolving Power of prism spectroscope

Books:

1. "A textbook of OPTICS" by Dr. N. Subrahmanyam, Brij Lal (25th revised edition) S. Chand.
2. "A textbook of light" by D. N. Vasudeva, (10th Edition), Atma Ram & Sons, New Delhi

Unit – 4 : Network analysis, network theorems and bridges

Network analysis: Introduction, direct method, network reduction method, Kirchhoff's laws (KCL, KVL), network terminology, network analysis by mesh current method (two mesh network and three mesh network), network analysis by node-pair voltage (one node pair network and two node pair network)

Network theorems: Voltage divider theorem, superposition theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem, numericals

Miscellaneous: RFID, Bar code reader, Telemetry, Data logger, (H. S. Kalsi, Electronic Instrumentation)

Book:

1. "Network Analysis" by M. E. Van Valkenburg, Third edition, PHI
2. "Electronic Instrumentation" by H. S. Kalsi

CVM UNIVERSITY

FACULTY OF SCIENCE, SYLLABUS & COURSE STRUCTURE(B.Sc GENERAL & HONS)

B.Sc. SEMESTER – 1, SUBJECT : PHYSICS

Course Title – Physics Practicals

Course Code – UG01CPHY02

No. of Credits – 2, Contact hours per week – 3, Examination Duration – 3 hours

Marks distribution : Total Marks : 100(40 Internal + 60 External)

Mechanics

1. Determination of Modulus of Rigidity of a steel rod using Statical method
2. Couple per unit twist of a wire using Torsional pendulum
3. Melds experiment
4. Young Modulus of a cantilever
5. Poisson's ratio for rubber
6. Determination of Modulus of Rigidity of a steel wire using Dynamical method

Electronics

1. Determination of frequency of ac current using Sonometer
2. Characteristics of PN junction diode(Forward & Reversed bias characteristics)
3. Evaluation of A.C. components for a Half wave rectifier
4. Evaluation of A.C. components for a Full wave rectifier
5. Conversion of galvanometer in to voltmeter
6. Conversion of galvanometer in to ammeter
7. Zener Diode characteristics

Optics and Numerical Analysis

1. Resolving power of a prism
2. Least square fitting for given linear data

CVM UNIVERSITY
B.Sc. (General & Honors)
SEMESTER -I
Core Course – Chemistry (theory)
GENERAL CHEMISTRY- I
UG01CCHE01

4 Credits, 4 periods per week
Total Learning Hours - 60

Unit-I ORGANIC CHEMISTRY

Alkane, Alkene, Alkyne, Cycloalkane & Spiro compounds:

IUPAC nomenclature of alkanes, cycloalkane, spiro alkane, alkenes and alkynes. Bayer strain theory, Preparation of alkane, Mechanism of halogenations of alkane, 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, Analysis of alkynes.

UNIT-II INORGANIC CHEMISTRY

Periodic Table And Periodic Properties: Brief introduction and types of elements, Shielding effect and effective nuclear charge, Factor affecting the magnitude of σ and Zeff and their variation in the periodic table, Slater's rule for calculation σ and Zeff.

Ionization Energy: Successive ionization energy, Factor affecting magnitude of Ionization Energy, Find out the order of second IE values of the element of second period, Variation of IE values in different element groups, 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.

Electronegativity: Different methods used for calculating electronegativity (like Pauling, Mulliken, Allred-Rachow), Factor affecting the magnitude of electronegativity, Role of electronegativity in chemical behavior, Application of electronegativity. Numericals based on above topics.

UNIT- III PHYSICAL CHEMISTRY

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

Titrimetric Methods in Analysis: Introduction, types of titrations, Definitions: Standard solutions, Equivalence Point, Indicators, End point, Titration General Aspects of: Primary standards, secondary standards, Desirable properties of standard solution. Volumetric calculations: Molarity, Normality, percentage concentration, parts per million, % V/V, % W/V solution.

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 IUPAC. Compendium of Chemical Terminology, 2nd ed. (the "Gold Book"). Compiled by A. D. McNaught and A. Wilkinson. Blackwell Scientific Publications, Oxford (1997). Online version (2019-) created by S. J. Chalk. ISBN 0-9678550-9-8.

CVM UNIVERSITY
B.Sc. (General & Honors)
SEMESTER -I
Core Course – Chemistry (practical)
GENERAL CHEMISTRY- I
UG01CCHE02

2 Credits, 4 periods per week
Total Learning Hours - 60

[A]Volumetric analysis of :
(1) Preparation and standardization of NaOH and HCl
(2) Succinic acid with NaOH
(3) Oxalic acid with NaOH
(4) Na_2CO_3 with HCl

[B] Organic Qualitative Analysis of single component:
Identification of Organic substance, detection of elements, Type of compound like aliphatic/aromatic, Nature (acidic/phenolic/basic/neutral), Functional group(s) analysis, and melting point, boiling point determination of the following compounds.

Benzoic acid, Salicylic acid, Cinnamic acid, α-naphthol, β-Naphthol, resorcinol, p-nitroaniline , m-nitroaniline, Acetanilide, Benzamide, Urea, Naphthalene, p-dichlorobenzene, m-dinitrobenzene, Acetone, Benzaldehyde, Methanol, Methyl acetate, Aniline, toluene, chloroform.

Reference Books:.
(1)‘Vogel’s Textbook of Quantitative Chemical analysis’ Revised by G. H. Jeffery, J. Bassett, J. Mendham & R. C. Denney, 5/E , ELBS (English Language Book Society) Longman
(2) ‘Analytical Chemistry’ by Dhruba Charan Dash, PHI Learning Private Ltd, New Delhi, 2011.
(3)Comprehensive Practical Organic Chemistry – Qualitative Analysis’ by V. K. Ahluwalia, Sunita Dhingra University Press (India) Private Limited, Hyderabad, First Indian Reprint 2010.
(4)‘Elementary Practical Organic Chemistry Part-2, Qualitative Organic Analysis’ by Arthur I. Vogel,-CBS Publishers & Distributers, New Delhi.(Second edition, reprint 2004)

CVM University

Syllabus for B.Sc Sem-1 (General and Honours)

Sub: Mathematics

Course code: UG01CMTH01

Course Title: Calculus

Credit – 4 (Max Marks 100: 60 Ext.+40 Int.)

Effective from June, 2020

Unit: 1

Successive derivative, higher order derivatives, Leibnitz's theorem and its application, Lagrange's and Cauchy's mean value theorems and their geometrical interpretations, Reduction formulas for integration of trigonometric functions.

Unit: 2

Indeterminate forms, L. Hospital's rules (proof for 0/0 case only), Taylor's and Maclaurin's theorems (Lagrange's form of remainder), Taylor's polynomial and approximation, Power series expansion of $\sin x$, $\cos x$, $\exp(x)$

Unit: 3

Limit and Continuity of function of two variables, Partial Derivative, Chain rule, Homogenous function, Euler's theorem, total derivative, Differentiation of composite and implicit functions.

Unit: 4

Application of Partial Derivative: Errors and approximations, Tangent and Normal to a surface, Maxima minima for two variable function, Taylor's formula for two variable

REFERENCE BOOKS:

1. Louis Leithold, The Calculus with Analytic Geometry, Harper-Collins Publishers, 1981.
2. Shanti Narayan, Differential Calculus, S. Chand & Co. Ltd,1996
3. Shanti Narayan, Integral Calculus, S. Chand & Co. Ltd, 1999.
4. V. M. Shah, Introductory Calculus, Acharya Book Depot,1980
5. G. B. Thomas Jr. and R. L. Finney, Calculus and Analytic Geometry, Addison-Wesley Publications, 1999.
6. Tom Apostol, Calculus (Volume II), Wiley Eastern Ltd, 1980.
7.. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley and Sons Inc, 1983.
8.. Louis Leithold, The Calculus with Analytic Geometry, Harper-Collins Publishers, 1981.
9. Shanti Narayan, Differential Calculus, S. Chand & Co. Ltd, 1996.
10. G. B. Thomas Jr. and R. L. Finney, Calculus and Analytic Geometry, Addison-Wesley Publishers, 1999.
11.. David V. Widder, Advanced Calculus, Prentice-Hall of India, 1989.

CVM University

Syllabus for B.Sc Sem-1 (General and Honours)

Sub: Mathematics

Course code: UG01CMTH02

Course Title: PROBLEMS AND EXERCISES IN CALCULUS (Practical)
Credit – 2 (Max Marks 100: 60 Ext.+40 Int.)

Effective from June, 2020

List of Practical:

1. Successive derivative, higher order derivatives, Leibnitz's theorem and its application, Lagrange's and Cauchy's mean value theorems and their geometrical interpretations
2. Reduction formulas for integration of trigonometric functions.
3. Indeterminate forms, L. Hospital's rules (proof for 0/0 case only)
4. Taylor's and Maclaurin's theorems (Lagrange's form of remainder), Taylor's polynomial and approximation
5. Power series expansion of sin x , cos x , exp(x)
6. Limit and Continuity of function of two variables, Partial Derivative,
7. Chain rule, Homogenous function, Euler's theorem
8. Total derivative, Differentiation of composite and implicit functions.
9. Application of Partial Derivative: Errors and approximations, Tangent and Normal to a surface
10. Maxima minima for two variable function, Taylor's formula for two variable

NO TE:

- Problem solving skill in mathematics is an important aspect in the learning and understanding of mathematics.
- There would be a batch of problem solving session will be of four hours per week and they will be conducted in batches of students of size 20 per batch.

- The candidate shall have to produce at the time practical Examination the record of their prescribed Laboratory work, certified by the Head of the Department.

REFERENCE BOOKS:

1. Louis Leithold, The Calculus with Analytic Geometry, Harper-Collins Publishers, 1981.
2. Shanti Narayan, Differential Calculus, S. Chand & Co. Ltd,1996
3. Shanti Narayan, Integral Calculus, S. Chand & Co. Ltd, 1999.
4. V. M. Shah, Introductory Calculus, Acharya Book Depot,1980
5. G. B. Thomas Jr. and R. L. Finney, Calculus and Analytic Geometry, Addison-Wesley Publications, 1999.
6. Tom Apostol, Calculus (Volume II), Wiley Eastern Ltd, 1980.
7. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley and Sons Inc, 1983.
8. Louis Leithold, The Calculus with Analytic Geometry, Harper-Collins Publishers, 1981.
9. Shanti Narayan, Differential Calculus, S. Chand & Co. Ltd, 1996.
10. G. B. Thomas Jr. and R. L. Finney, Calculus and Analytic Geometry, Addison-Wesley Publishers, 1999.
11. David V. Widder, Advanced Calculus, Prentice-Hall of India, 1989.