SYLLABUS

1.1 ENGLISH LANGUAGE

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DETAILED CONTENTS

1. Basics of Communication   **(06 Hrs)**

1.1. Definition and process of communication
1.2. Types of communication – Verbal (Listening, Speaking, Reading and Writing) and Non-verbal communication

2. Functional Grammar   **(22 Hrs)**

2.1. Noun and Pronoun
2.2. Punctuation
2.3. Preposition
2.4. Conjunction
2.5. Verb –Main verb and Auxiliary verb)
2.6. Tenses

3. Reading Skills   **(12 Hrs)**

3.1. Unseen passage for comprehension (Based upon the passage, following aspects may be covered
   - Questions from the passage
   - One-word substitution
   - Prefixes and Suffixes
   - Antonyms and Synonyms etc.

4. Writing Skills   **(30 Hrs)**

4.1. Correspondence – Business and Official
4.2. Notice, including Press Releases
4.3. Memos
4.4. Circular

4.5.   Basics of Report Writing
4.6.   Resume Writing
4.7.   Writing E-mail
4.8.   Paragraph Writing
4.9.   Picture Composition

List of Practicals

1.   Listening Exercises

2.   Self and Peer Introduction

3.   Debate

4.   Situational Conversations: Offering - Responding to offers; Requesting – Responding to requests; Congratulating; Expressing sympathy and condolence; Apologizing and Forgiving; Complaining; Warning; Asking and giving information; Getting and giving permission; Asking for and giving opinions; Talking about likes and dislikes

5.   Just a Minute Sessions – Extempore

6.   Group Discussion

7.   Newspaper Reading

8.   Mock Interviews: Telephonic and Personal

DISTRIBUTION OF SYLLABUS FOR ASSESSMENTS AND DISTRIBUTION OF MARKS

Section	Assessment	Units to be covered		Distribution of Marks
A	1st Internal (20 marks)	Unit 1.1	Definition and process of communication	5
		Unit 2.1	Noun and Pronoun	5
		Unit 4.1	Correspondence – Business and Official	10
B	2nd Internal (20 marks)	Unit 2.2	Punctuation	5
		Unit 4.2	Notice, including Press Releases	5
		Unit 4.3	Memos	10
C	Final (60 marks)	Unit 1.2	Types of communication – Verbal (Listening, Speaking, Reading and Writing) and Non-verbal communication	5
		Unit 2.3	Preposition	5
		Unit 2.4	Conjunction	5
		Unit 2.5	Tenses (Verb –Main verb and Auxiliary verb)	5
		Unit 3	Unseen passage for comprehension (Based upon the passage, following aspects may be covered • Questions from the passage • One-word substitution • Prefixes and Suffixes • Antonyms and Synonyms etc.	10
		Unit 4.4	Circular	5
		Unit 4.5	Basics of Report Writing	5
		Unit 4.6	Resume Writing	5
		Unit 4.7	Writing E-mail	5
		Unit 4.8	Paragraph Writing	5
		Unit 4.9	Picture Composition	5

SYLLABUS

1.4 APPLIED CHEMISTRY

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RATIONALE

The use of various chemical and chemical products in diverse technical and engineering field have repeatedly proved the importance of applied chemistry, which enhances its role to a new peak. On the other hand, ever increasing use of such materials will compel engineers, technocrats to acquire essential applied chemistry knowledge in order to select engineering material, which not only suit them but also provide more environmental compatibility. This situation demands principles of applied chemistry in diploma-engineering courses. Principles of Applied Chemistry will enable budding engineers and technocrats to develop scientific temper and appreciate physical, chemical and engineering properties of materials. Hence the subject of applied chemistry.

LEARNING OUTCOMES

After undergoing this subject, the students will able to:

- Classify matter based on state of aggregation.
- Calculate percentage composition of chemical compounds.
- Substantiate the laws and principles on which structure of atom is established.
- Prepared solution of required concentration.
- Understand pH and Prepare buffer solution and understand their significance in industrial processes such as electrolysis, electrochemical machining of materials etc.
- Explain various characteristics of water.
- Explain cause and facture factors which adversely affecting natural water quality and remedial measure available for water purification to achieve water quality standards required for domestic, agriculture and industrial applications .
- Explain chemistry and technology of industrial metal extraction processes.
- Explain chemistry of fuel and relative advantages.
- Select most efficient fuel for engine and engineering applications.
- Explain mechanism of lubrication and their advantages.
- Explain the chemistry of various polymers and plastics.
- Verify suitability and select polymer/ plastic material for engineering applications.

Detail Content

1. Some Basic Concepts in Chemistry   (8 Hrs)
    1.1   General introduction: Importance and scope of chemistry.
    1.2   Classification of matter:
        a) Physical classification: Solid, Liquid and Gases (only definition with examples).
        b) Chemical Classification: elements, compounds and mixture (Definition and examples   Types of mixture excluded).
    1.3   Definition of atom, molecule, symbol and significance of symbol.
    1.4   Molecular Formula, Writing the formula of compounds containing Cl^-, OH^-, HCO_3^-, SO_4^{2-}, CO_3^{2-} and NH_4^+, Na^+, K^+, Ca^{2+}, Mg^{2+}, Fe^{2+}, Zn^{2+}, Fe^{3+}, Al^{3+} ions
    1.5   Calculation of molecular mass (Atomic mass of constituents should be provided), Calculation of mass percentage composition of elements in compound (Atomic masses of elements should be provided)

2. Structure of Atom   (8 Hrs)
    2.1   Fundamental particles of atom: electron, proton and neutron, charge and mass of electron, proton and neutron.
    2.2   Bohr's model of atom (postulates only) i,e concept of orbit or shell.
    2.3   Atomic number (Z), mass number (A), calculation of protons, electrons and neutrons in ^A_ZX.
    2.4   Isotopes, isobars and isotones (definition with examples).
    2.5   Concept of orbital (wave nature of electron), difference between orbit and orbital.
    2.6   Principles of filling electrons in various orbital: a) Aufbau principle b) Hund's Rule of maximum multiplicity c) Pauli's exclusion principle.
    2.7   Electronic configuration of atoms (upto Z=30)

3. Chemical Bonding   (5 Hrs)
    3.1   Valence electrons, Lewis symbol.
    3.2   Octet rule (Limitation excluded).
    3.3   Chemical bond (definition) and its type.
    3.4   Electrovalent or Ionic Bond with example of NaCl,
    3.5   Covalent Bonding in H_2, O_2

4. Solution   (8 Hrs)
    4.1 Definition of solution, Binary solution, aqueous solution.
    4.2 Definition of solute, solvent.
    4.3 Definition of acid and base and salt.
    4.4 Definition of acidity and basicity.

4.5 Concentration of solution

4.6 Modes of expressing concentration of solution

        a) Strength

        b) Molarity (M)

        c) Normality (N)   and   d) simple numerical problems based on (a) and (b)

4.7 Definition of pH and industrial application of pH. (Numericals excluded)

5. Electrochemistry.   (8 Hrs)

  5.1   Electronic concept of oxidation, reduction

  5.1 Definition of terms electrolyte, non electrolyte with example

  5.2 Types of electrolytes: strong and weak with examples

  5.3 Definition of electrolysis.

  5.4 Faradays laws of electrolysis

  5.5 Industrial applications of electrolysis: Electroplating, electrolytic refining, electrometallurgy.

6   General Principles of extraction of metals   (8 Hrs)

  6.1 Metals and Non-metals (definition)

  6.1 Definition of Mineral, Chief ores of iron, aluminum and copper.

  6.2 Definition of metallurgy, types of metallurgy

  6.4 General Steps of metallurgy

        a) Crushing

        b) Pulverization of ore

        c) Concentration or purification of ore:

            i) Gravity separation method ii) froth flotation method.

        d) Oxidation of ore:

            i) Roasting   ii) Calcination

        e) Reduction:

            i) Smelting (Pyrometallurgy)   and ii) Electrolytic reduction

        f) Refining of Metal:

            i) Electrolytic refining

  6.3 Definition of alloy, types of alloys and purpose of alloying.

7   Fuel   (8Hrs)

  7.1 Definition of fuel, classification of fuel a) on the basis of physical state b) on the basis of   source.

  7.1   Definition of calorific value

  7.2   Characteristics of good fuel, advantages of gaseous fuel over solid fuels.

  7.3   Coal- Proximate analysis of coal and its importance.

7.4 Fuel quality rating- octane number and cetane number (definition only)

7.5 Gaseous fuel: Composition, calorific value and application of CNG, LPG and biogas.

8 Water   (8 Hrs)

8.1 Type of water: Soft and hard water.

8.2 Types of hardness of water

8.3 Units of hardness of water: ppm, mg/L (with simple numericals).

8.4 Disadvantages of using hard water in boiler. a) Scale and sludge formation b) Boiler Corrosion c) Caustic embrittlement

8.5 Qualities of drinking (potable) water

9 Lubricants   (5Hrs)

9.1 lubricant and lubrication.

9.2 Functions of lubricants.

9.3 Classification of lubricants: solid, semisolid and liquid lubricants with examples.

9.4 Type of lubrications – hydrodynamic and boundary lubrication with illustrative diagrams.

9.5 Properties of lubricants

a) Physical properties- viscosity, viscosity index, cloud point, pour point, flash point, fire point, oiliness

b) Chemical properties- TAN or TAV (Total acid number), emulsification, aniline point and iodine value.

10 Polymer and Plastic   (5 Hrs)

10.1 Definition of polymer, Monomer, Degree of Polymerization

10.2 Monomer and uses of PE, PVC, PS, Teflon, Nylon-66, Bakelite

10.3 Brief introduction to addition and condensation polymers with suitable examples (PE, PVC, PS, Teflon, Nylon-66, Bakelite).

10.4 Definition of plastics, thermoplastic and thermosetting polymer with example, difference between thermoplastic and thermosetting polymers.

10.5 Uses of polymer and plastic in daily life and in industries.

LIST OF PRACTICALS:

1. Volumetric analysis and apparatus used their in.
2. To prepare standard solution of oxalic acid (N/20).

3. To determine the strength of given sodium hydroxide solution by titrating against standard oxalic acid (N/10) solution using phenolphthalein as indicator.
4. Gravimetric analysis and apparatus used their in.
5. To determine the percentage of moisture in given sample of coal.
6. To determine the percentage of ash in given sample of coal.
7. To determine the percentage of volatile and non volatile substance in given mixture.
8. To determine the viscosity of lubricant by using Redwood viscometer.
9. To determine total acid number (TAN) or Total acid value of given lubricant (liquid).
10. Detection of iron metal in the given solution of rust.

INSTRUCTIONAL STRATEGY

Teachers may take help of various models and charts while imparting instructions to make the concept clear. Awareness of the contents should be done through examples using you-tubes and subsequent discussions. More emphasis should be laid on discussing and explaining practical applications of various chemical process and reactions. In addition, students should be encouraged or motivated to study those processes in more details, which may find practical application in their future professional career.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests, model/prototype making
- Actual laboratory and practical work, exercises and viva-voce

RECOMMENDED BOOKS

1. Chemistry in Engineering by J.C. Kuricose& J. Rajaram, Tata McGraw Hill, Publishing Company Limited, New Delhi.
2. Engineering Chemistry by P.C. Jain & Monika Jain, DhanapatRai Publishing Company, New Delhi.
3. Eagle's Applied Chemistry - I by S. C. Ahuja & G. H. Hugar, Eagle Prakashan, Jalandhar.
4. Engineering Chemistry – A Text Book by H. K. Chopra & A. Parmar, Narosa Publishing House, New Delhi.
5. Engineering Chemistry by Dr.Himanshu Pandey, Goel Publishing House, Meerut, India.
6. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in

Distribution of Syllabus For Assessments & Distribution Of Marks

Section	Assessment	Units to be covered		Distribution of marks
A	1st Internal	1.	Some basic concepts in chemistry	08
		2.	Structure of atom	12
B	2nd INTERNAL	3.	Chemical bonding	08
		4.	General principals of extraction of metal	12
C	Final	5.	Solution	11
		6.	Electrochemistry	10
		7.	Fuel	10
		8.	Water	12
		9.	Lubricants	10
		10.	Polymers and plastics	07

SYLLABUS

1.3 APPLIEDPHYSICS

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RATIONALE

Applied physics includes the study of a large number of diverse topics all related to things that go on in the world around us. It aims to give an understanding of this world both by observation and by prediction of the way in which objects will behave. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content.

Note:Teachersshouldgive examples of engineering/technology applications of various concepts and principles in each topic so that students are able to appreciate learning of these concepts and principles. In all contents, SI units should be followed. Working in different sets of units can be taught through relevant software.

LEARNINGOUTCOMES

Afterundergoingthis subject, thestudents willbe able to:
- Identifyphysicalquantities,parameters and select their units for use in engineering solutions.
- Units anddimensions of different physical quantities.
- Represent physical quantities as scalarand vectors.
- Basic laws of motions,
- Analyseanddesignbankingofroadsandapplyconservationof to explain recoilof gunetc.
- Definework, energyandpower and theirunits.Solve problems about work and power
- Statethe principle of conservation of energy.
- Identifyforms ofenergy,conversion from one form to another.
- Compare and contrast the physical properties associated with linear motion and rotational motion and give examples of conservation of angularmomentum.
- Describe thesurface tensionphenomenonanditsunits,applications, effectsof temperature on surfacetension.
- Describetheviscosityofliquids.
- Definestressand strain, modulus of elasticity.
- StateHooke's law.
- Measuretemperature in various processes on different scales (Celsius,Kelvin, Fahrenheitetc.)
- Distinguish betweenconduction, convection and radiation.
- Useequipmentlike,Vernier calliper, screwgauge, spherometer.

- Differentiate between Transverse and Longitudinal, Periodic and Simple Harmonic Motion.
- Explain the terms: frequency, amplitude, wavelength, wave velocity, frequency and relation

between them.
- Explain various Engineering and Industrial applications of Ultrasonics.
- Applyacoustics principles to various types of buildings toget best sound effect.
- Explain the laws of reflection and refraction oflight.
- Explain total internal reflection as applied to optical fibers.
- Definecapacitanceand its unit and solvesimple problems using$C=Q/V$
- Explain the role of free electrons in insulators, conductors andsemiconductors.
- Application of semiconductors as diode, rectifiers, concept of transistors
- Explain electric current as flow of charge, theconcept of resistance, heating effect of current.
- State and applyOhm's law.
- Calculate the equivalent resistanceof avarietyofresistor combinations.
- Apply the concept of light amplification in designing of various LASER based instruments and optical sources.
- Applythe useof optical fibrein Medical fieldandoptical fibreCommunication.
- Concept of nanomaterials

LIST OFPRACTICALS (To perform minimum fourteen experiments)

1. To find diameter ofsolidcylinder using a Vernier calliper
2. Tofindinternaldiameteranddepthofabeakerusinga Vernier calliperandhencefind its volume.
3. To find the diameter ofwireusingscrewgauge.
4. To find thickness of paper usingscrewgauge.
5. To determinethe thickness of glass strip usingaspherometer
6. To determine radius of curvature of a given spherical surface by a spherometer.
7. To verifyparallelogram law of forces
8. To determinetheatmosphericpressure ataplaceusingFortin's Barometer
9. To determine forceconstant of springusingHooke's law
10. Measuring room temperature with the help of thermometer and its conversion in different scale.
11. To find thetime period of asimple pendulum
12. To determine and verifythetime period ofCantilever
13. To verify Ohm's laws byplottingagraph betweenvoltageand current.
14. To verifylaws of resistances in seriescombination.
15. To verifylaws of resistancein parallel combination.
16. To find resistanceofgalvanometer byhalf deflection method
17. To verifylaws of reflection oflight usingmirror.
18. To verifylaws of refraction using glass slab.
19. To find the focal length of a concave lens, using a convex lens
20. To studycolourcodingscheme ofresistance.

INSTRUCTIONAL STATREGY

Teachermayusevariousteachingaidslikemodels,charts,graphsandexperimentalkitsetc.   for imparting effective instructions in the subject. Students need to be exposed to use of different sets of units and conversion from one unit type to another. Software may be used to solve problems involving conversion of units. The teacher should explain about field applications before teaching the basics of mechanics, work, power and energy, rotational motion, properties of   matter etc. to develop proper understanding of the physical phenomenon. Use of demonstration can make the subject interesting and develop scientific temper in the students.

MEANSOFASSESSMENT

☐ Assignments and quiz/class tests, mid-term and end-term written tests, model/prototype
☐ Actual laboratoryand practical work, exercises and viva-voce

RECOMMENDED BOOKS

1. Text Book ofPhysics forClass XI(Part-I, Part-II); N.C.E.R.T., Delhi
2. AppliedPhysics,Vol.IandVol.IIbyDr.HHLal;TataMcGraw Hill, Delhi
3. Applied Physics - I& II by AS Vasudeva; Modern Publishers, Jalandhar.
4. Applied Physics - I& II by R A Banwait; Eagle Prakashan, Jalandhar.
5. A text book of OPTICS by N Subrahmanyam, Brij Lal and Avadhanulu; S Chand Publishing, New Delhi.
6. Nanotechnology: Importance and Applications by M H Fulekar; IK International Publishing House (P) Ltd., New Delhi.
7. e-books/e-tools/relevant software to be used as recommended by AICTE/ HSBTE/ NITTTR.
8. Practical Physics, byC.L. Arora, SChandPublication

Websites forReference:

   http://swayam.gov.in

DISTRIBUTION OF SYLLABUS AND MARKS FOR ASSESSMENTS

Section A (20%)

1.   Units and Dimensions   (10 periods)
1.1   Definition of Physics, Physical quantities (Fundamental and derived),
1.2   Units: fundamental and derived units,
1.3   Systems of units: CGS, FPS, MKS, SI
1.4   Definition of Dimensions;
1.5   Dimensionalformulae and SI unitsof physical quantities (distance, displacement, area, volume, velocity, acceleration, momentum,force, impulse,work,power, energy, pressure, surfacetension, stress, strain)
1.6   Principleof homogeneityof dimensions
1.7   Dimensional equations, Applications of dimensional equations; checking of correctness of equation, Conversion of system of unit (force, work)

2.   Force and Motion   (10 periods)
2.1   Scalar and vector quantities–(Definition and examples),
2.2   AdditionofVectors,Triangle&Parallelogram Law (Statementonly),
2.3   Scalar and Vector Product (statement and formulaonly)
2.4   Definition of Distance, displacement, speed, velocity, acceleration
2.5   Force and its units, concept of Resolution of force
2.6   Newton's Law of motion (Statement and examples),
2.7   Linear Momentum, conservation of momentum (Statement only), Impulse
2.8   **Circularmotion**:definitionofangulardisplacement,angularvelocity,angular acceleration, frequency, timeperiod; Relation between linear and angular velocity.
2.9   Centripetal and centrifugal forces(definition and formulaonly)
2.10   ApplicationofcentripetalforceinBankingofroads (derivationforangle ofbanking)

Section B (20%)

3.   Work, Power andEnergy   (08 periods)
3.1.   Work (Definition, Symbol, Formula and SI units)
3.2.   Energy (Definition and its SI units), Examples of transformation of energy.
3.3.   KineticEnergy (Formula, examplesand itsderivation)
3.4.   PotentialEnergy (Formula, examplesand itsderivation)

3.5. Law of conservation of mechanical energy for freely falling bodies (With Derivation)

3.6. Power (definition, formula and units)

3.7. Simple Numerical problems based on formula of Power

4   Rotational Motion   (04 periods)

4.1   Rotational motion with examples

4.2   Definition of torque and angular momentum and their examples

4.3   Conservation of angular momentum (quantitative) and its examples

4.4   Moment of inertia and its physical significance, radius of gyration (definition, derivation and formula).

5.   Properties of Matter   (8 periods)

5.1   Definition of Elasticity, Deforming force, Restoring force, example of Elastic and plastic body,

5.2   Definition of Stress and strain with their types,

5.3   Hooke's law, Modulus of Elasticity (Young's, Bulk modulus and shear)

5.4   Pressure (definition, formula, unit), Pascals Law

5.5   Surface tension: definition, its units, applications of surface tension, effect of temperature on Surface tension

5.6   Viscosity: definition, units, effect of temperature on viscosity

5.7   Fluid motion, stream line and turbulent flow.

Section C (60%)

6.   Heat and Temperature   (06 periods)

6.1   Definition of heat and temperature (on the basis of kinetic theory),

6.2   Difference between heat and temperature

6.3   Principles of measurement of temperature.

6.4   Modes of transfer of heat (Conduction, convection and radiation with examples).

6.5   Properties of heat radiation

6.6   Different scales of temperature and their relationship

7.   Wave motion and its applications   (10 periods)

7.1   Wave motion, transverse and longitudinal wave motion with examples, Terms used in wave motion like displacement, amplitude, time period, frequency, wavelength, wave velocity; relationship among wave velocity, frequency and wave length .

7.2   Simple Harmonic Motion (SHM): definition, examples

7.3   Cantilever (definition, formula of time period (without derivation).

7.4   Free, forced and resonant vibrations with examples

7.5   Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time.

7.6   Ultrasonics: Introduction and their engineering applications (cold welding, drilling, SONAR)

8.   Optics   **(05 periods)**
8.1. Reflection and refraction with laws, refractive index, lens formula (no derivation), power of lens (related numerical problems).

8.2. Total internal reflection and its applications, Critical angle and conditions for total internal reflection

8.3. Microscope, Telescope (definition)

8.4. Uses of microscope and telescope.

9.   Electrostatics   **(09 Periods)**
9.1. Electric charge, unit of charge, conservation of charge.

9.2. Coulombs law of electrostatics,

9.3. Electric field, Electric lines of force (definition and properties), Electric field intensity due to a point charge.

9.4. Definition of Electric flux, Gauss law (Statement and derivation)

9.5. Capacitor and Capacitance (with formula and units), Series and parallel combination of capacitors (simple numerical problems)

10.   Current Electricity   **(08 Periods)**
10.1   Electric Current and its Unit, Direct and alternating current,

10.2   Resistance, Specific Resistance and Conductance (definition and units)

10.3   Series and Parallel combination of Resistances.

10.4   Ohm's law (statement and formula),

10.5   Heating effect of current, electric power and its units

10.6   Kirchhoff's laws (statement and formula)

11   Electromagnetism   **(04 periods)**
11.1. Introduction to magnetism, Types of magnetic materials. Dia, para and ferromagnetic materials with examples.

11.2. Magnetic field, magnetic intensity, magnetic lines of force, magnetic flux and their units

11.3. Electromagnetic induction (definition)

12.   Semiconductor physics   (09 periods)

    12.1.   Definition of Energy level, Energy bands,

    12.2.   Types of materials (insulator, semiconductor, conductor) with examples,

    12.3.   Intrinsic and extrinsic semiconductors, p-n junction diode and its V-I characteristics

    12.4.   Diode as rectifier – half wave and full wave rectifier (centre tap only)

    12.5.   Semiconductor transistor; pnp and npn (Introduction only), symbol.

13.   Modern Physics   (09 periods)

    13.1.   Lasers: full form, principle, spontaneous emission, stimulated emission, population inversion, engineering and medical applications of lasers.

    13.2.   Fibre optics: Introduction to optical fibers (definition, parts), applications of optical fibers in different fields.

    13.3.   Introduction to nanotechnology (definition of nanomaterials with examples) and its applications.

SYLLABUS

1.2 APPLIED MATHEMATICS

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Section-A **(20%)**

DETAILED CONTENTS

1. **Algebra** **(30 Hrs)**

- Law of Indices, Formula of Factorisation and expansion i.e. $(a+b)^2$, (a^3+b^3) etc.

- Partial fraction:- Definition of Polynomial fraction proper & improper fractions and definition of partial fractions. To resolve proper fraction into partial fraction with denominator containing non-repeated linear factors, only.

- Complex numbers: definition of complex number, real and imaginary parts of a complex number, Polar and Cartesian Form and their inter conversion, Conjugate of a complex number, modulus and amplitude, addition subtraction, multiplication and division of complex number.

- Determinants and Matrices – Evaluation of determinants (up to 3 order) by laplace method. Solution of equations (up to 3 unknowns) by Cramer's Rule. Definition of Matrices and types, addition subtraction and multiplication of Matrices (up to 2 order).

- Permutation, combination formula, Values of ^nP_r and ^nC_r.

- Binomial theorem for positive integral index , General term, simple problems

Section –B **(20%)**

2. **Trigonometry** **(14 Hrs)**

- Concept of angle: measurement of angle in degrees, grades, radians and their conversions.

- T-Ratios of standard angle $(0^0, 30^0, 45^0$ etc) and fundamental Identities, Allied angles (without proof) Sum, Difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa)

- Applications of Trigonometric terms in engineering problems such as to find an angle of elevation, height, distance etc.

3. **Co-ordinate Geometry** **(12 Hrs)**

- Point: Distance Formula, Mid Point Formula, Centroid of triangle and area of triangle.

- Straight line: Slope of a line, equation of straight line in various standards forms (without proof); (slope intercept form, intercept form, one-point form, two-point form, normal form, general form), angle between two straight lines.

- Circle: General equation of a circle and identification of centre and radius of circle. To find the equation of a circle, given:
  - * Centre and radius
  - * Coordinates of end points of a diameter

Section –C (60%)

4. Differential Calculus (40 Hrs)

- Definition of function; Concept of limits (Introduction only) and problems related to four standard limits only.

- Differentiation of standard function (Only formulas), Differentiation of Algebraic function, Trigonometric functions, Exponential function, Logarithmic function

- Differentiation of sum, product and quotient of functions.

- Successive differentiation (up to 2nd order)

- Application of differential calculus in:

  - (a) Rate measures
  - (b) Maxima and minima

5. Integral Calculus (28 Hrs)

- Integration as inverse operation of differentiation with simple exs.

- Simple standard integrals, Integrations by parts and related Simple problems

- Evaluation of definite integrals with given limits.

  Evaluation of $\int_0^{\frac{\pi}{2}} sin^n x \, dx$, $\int_0^{\frac{\pi}{2}} cos^n x \, dx$, $\int_0^{\frac{\pi}{2}} sin^m x \, cos^n x \, dx$

  using formulae without proof (m and n being positive integers only) using pre-existing mathematical models.

- Applications of integration: for evaluation of area under a curve and axes (Simple problems where the limits are given).

- Numerical integration by Trapezoidal Rule and Simpson's 1/3rd Rule using pre-existing mathematical models

6. **Differential Equations** **(04 Hrs)**

Definition, order, degree and linearity, of an ordinary differential equation. Solution of I^{st} order and I^{st} degree differential equation by variable separable method (Simple problems)

7. **Statistics** **(12 Hrs)**

- Measures of Central Tendency: Mean, Median, Mode
- Measures of Dispersion: Mean deviation from mean, Standard deviation
- Correlation coefficient and Coefficient of rank correlation (Simple problems)

DISTRIBUTION OF SYLLABUS FOR ASSESSMENTS & DISTRIBUTION OF MARKS

Section	Assessment	Units to be covered		Distribution of Marks
A	1st Internal	Unit 1:	Algebra	20
B	2nd Internal	Unit 2:	Trigonometry	10
		Unit 3:	Coordinate Geometry	10
C	Final	Unit 4	Differential Calculas	20
		Unit 5	Integral Calculas	16
		Unit 6	Differential equations	8
		Unit 7	Statistics	16

SYLLABUS

1.1 ENGLISH LANGUAGE

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2 - 2

DETAILED CONTENTS

1. Basics of Communication (06 Hrs)

1.1. Definition and process of communication
1.2. Types of communication – Verbal (Listening, Speaking, Reading and Writing) and Non-verbal communication

2. Functional Grammar (22 Hrs)

2.1. Noun and Pronoun
2.2. Punctuation
2.3. Preposition
2.4. Conjunction
2.5. Verb –Main verb and Auxiliary verb)
2.6. Tenses

3. Reading Skills (12 Hrs)

3.1. Unseen passage for comprehension (Based upon the passage, following aspects may be covered
   - Questions from the passage
   - One-word substitution
   - Prefixes and Suffixes
   - Antonyms and Synonyms etc.

4. Writing Skills (30 Hrs)

4.1. Correspondence – Business and Official
4.2. Notice, including Press Releases
4.3. Memos
4.4. Circular

4.5.   Basics of Report Writing
4.6.   Resume Writing
4.7.   Writing E-mail
4.8.   Paragraph Writing
4.9.   Picture Composition

List of Practicals

1.   Listening Exercises

2.   Self and Peer Introduction

3.   Debate

4.   Situational Conversations: Offering - Responding to offers; Requesting – Responding to requests; Congratulating; Expressing sympathy and condolence; Apologizing and Forgiving; Complaining; Warning; Asking and giving information; Getting and giving permission; Asking for and giving opinions; Talking about likes and dislikes

5.   Just a Minute Sessions – Extempore

6.   Group Discussion

7.   Newspaper Reading

8.   Mock Interviews: Telephonic and Personal

DISTRIBUTION OF SYLLABUS FOR ASSESSMENTS AND DISTRIBUTION OF MARKS

Section	Assessment	Units to be covered		Distribution of Marks
A	1st Internal (20 marks)	Unit 1.1	Definition and process of communication	5
		Unit 2.1	Noun and Pronoun	5
		Unit 4.1	Correspondence – Business and Official	10
B	2nd Internal (20 marks)	Unit 2.2	Punctuation	5
		Unit 4.2	Notice, including Press Releases	5
		Unit 4.3	Memos	10
C	Final (60 marks)	Unit 1.2	Types of communication – Verbal (Listening, Speaking, Reading and Writing) and Non-verbal communication	5
		Unit 2.3	Preposition	5
		Unit 2.4	Conjunction	5
		Unit 2.5	Tenses (Verb –Main verb and Auxiliary verb)	5
		Unit 3	Unseen passage for comprehension (Based upon the passage, following aspects may be covered • Questions from the passage • One-word substitution • Prefixes and Suffixes • Antonyms and Synonyms etc.	10
		Unit 4.4	Circular	5
		Unit 4.5	Basics of Report Writing	5
		Unit 4.6	Resume Writing	5
		Unit 4.7	Writing E-mail	5
		Unit 4.8	Paragraph Writing	5
		Unit 4.9	Picture Composition	5