Syllabus for Recruitment of Lecturers in District Institute of Education and Training (DIET)
GEOPHYSY

Paper I Physical Geography (Geomorphology):

a. Landforms and their significance, formation and evolution of landforms
b. Weathering and Erosion-resultant physical features
c. River water erosion, Wind erosion, Glacial erosion, associated landforms
d. Rocks and Minerals their classification.

Paper II Social, Human and Economic Geography:

a. Human occupation, economic activities, Human settlements-rural/urban
b. Population Geography: Demography; Urbanization; Cultural and Political Geography
c. Natural resources-utilization and conservation; environmental degradation.

Paper III Population Geography:

a. Theories; Growth and distribution of population; composition
b. Migration; fertility/Mortality and population policies.

Paper IV Climatology:

a. Weather and climate
b. Air pressure belts
c. Heat budget
d. Wind circulation
e. Indian monsoon; mechanism of rainfall.

Paper V Biogeography:

a. Ecosystem and environment
b. Man’s interaction with environment and sustainable development

Paper VI Geography of India:

a. Physical feature; Sub-division at micro-meso and micro level
b. Soil; climate; natural vegetation and wild life (fauna & flora)
c. Natural resources; agricultural and irrigation
d. Indian population and policies
e. Indian Urbanization
f. Trade, Commerce & Transportation
Paper VII Maps and Scales:

a. Representation of physical features, climatic data and statistical data
b. Map Projection; Thematic Maps and Diagrams
c. Cartographical techniques; interpretation of topo maps
d. Aerial photography; Remote sensing; field survey
e. Use of weather maps and climographs
f. Statistical Techniques; Mean, Media, Mode to study geographical phenomenon, Measurement of Central Tendency.

Paper VIII Methodology:

a. Significance/understanding of discipline under study
b. Aims and objectives
c. Teaching methods – observation, excursion, laboratory, demonstration, lecture and project methods
d. Regional methods (regionalization).
e. Teachers’ role – various aspects of practical knowledge
f. Teaching aids – different kinds of aids such as photo and pictures, globes and maps, textbooks
g. Levels of teaching at primary, upper primary, secondary and senior secondary level
h. Lesson plan, examination system (according to the level).
ENGLISH

Unit: I Nature of Language

- What is Language; first, second and foreign language.
- A historical view of English as a second language.

Unit: II Language Policy

- Language Policy with special reference to Three – Language Formula.
- Language Policy of Sikkim.

Unit III: Listening and Speaking Skills

- Types of Listenning.
- Functions of Listening.
- Sound System of language – phonology and prosody.
- Stress – word stress, sentence stress in connected speech.
- Using dictionary for correct pronunciation and stress.

Unit IV: Reading Skill

- Reading with comprehension different types of texts (Levels of comprehension).
- Reading for global and local understanding.
- Reading strategies.
- Reading different Text types.

Unit V: Writing Skill

- Mechanics of writing
- Process of writing.
- Types of writing 1. Traditional (Essays, letters, applications, notices, invitation, paras composition, etc.), 2. Non-Traditional (Diaries, filling up forms, transformation of information, etc.)

Unit VI: Literature

- Role of Literature in Language learning.

Unit VII: Testing and Evaluation

- Testing Speaking and Listening.
- Testing Reading and Writing.
Unit VIII: Basic Grammar

Unit IX: Methodology

- Behaviorist and Cognitivist view of teaching language.
- Methods and Approaches of teaching language.
- Unit planning.
- Lesson planning – Prose, Poetry, Drama, Grammar.
- Importance and use of teaching aids.

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HISTORY OF INDIA


2. Evils of Hinduism and growth of Buddhism and Jainism. Reform movements in ancient Hinduism, Varna its evolution.

3. The Roman and the Greek civilization.

4. The Medieval India – Sociological and cultural evolution in medieval India, Tantrism, Languages in India – from Sanskrit to the modern Indian languages.

5. South India – The Vijaynagar empire.

6. Advent of the Mongols and the Muslims, Muslim Rule in India, expansion of Muslim empire in India, expansion in the south Decan.

7. India under the Mughals – Sher Sah Suri and defeat of Humayun, Akbar and his successors, Advent of British, European expansion, Colonization, trade and India under the British, Dutch, French and British in India, Socio-economic condition of the country during the Guptas-Rajputs, Muslims, Mughals an the British.

8. (a) Indian trade and foreign relations in ancient, Modern India, India after Independence.
   (b) History of Freedom Movement in India.


10. History could be more related to society, civilization, language, culture, economy.

Pedagogy

1. Blooms taxonomy of instructional objective, cognitive, affective and psychomotor domains.


4. Teaching Aids – Useful aid in teaching Social Science especially History, Geography and Civics.

5. Stages in human development with special reference to adolescents – problems, needs and aspiration of adolescence, guidance and counseling.

6. Personality – Theories of personality.
7. Structure and scope of History & Civics. History & Civics as basic discipline of individual.
8. Regional History – Approaches to curriculum organization.
ECONOMICS

1. Concept of production: Factors of production, consumption, capital formation.
2. People as a resource: economic activities done by men and women, quality of human resource, role of health and education, unemployment, its sociopolitical implications.
3. Poverty as a challenge facing India: Who is poor, rural and urban indicators of poverty, absolute poverty, causes of poverty, unequal distribution of resources, comparison between countries; steps taken by Government for poverty alleviation.
4. Food Security: Source of food grains, variety across the nation, famines in the past, need for self-sufficiency, role of Govt. in food security, procurement of food grains, public distribution system, role of cooperatives in food security.
5. The story of development: The traditional notion of development; National Income and per capita income; Growth of National Income; critical apprise of existing development indicators (PCI, HDI, IMR, SR and other income and health indicators). The need for health and educational development, Human Development indicators. (Can study of three states Kerala, Punjab and Bihar) or (Countries like India, China, Srilanka and one developed country).
6. Sectors of the Indian Economy: Sectors of Economic activities; Historical change in sectors; Rising importance of tertiary sector; Employment generation; Division of sectors – organized and unorganized; Protective measures for unorganized sector workers.
7. Money and Credit: Role of money in an economy; Historical origin; Formal and informal financial institutions for savings and credit – General introduction; Select one formal institution such as a Nationalized Commercial bank and a few informal institutions; Local money lenders, landlords, self-help groups, chit funds and private finance companies.
8. Globalization: What is globalization? (Simple examples); How is India being globalised and why? Development strategy prior to 1991. State Control of industries; Textile goods as an example for elaboration; Economic reforms 1991. Strategies adopted in reform measures (easing of capital flows, migration, investment flows); Different perspectives on globalization and its impact on different sectors; Political impact of globalization.
9. Consumer Awareness: How consumer is exploited (two simple case studies); Factors causing exploitation of consumers, rise of consumer awareness; How a consumer should be in a market; role of Govt. in consumer protection.

METHODOLOGY OF TEACHING

1. General Methods of teaching.
2. General Principles of teaching method (Brief study).
3. The main Maxims of teaching and their importance (Brief study).
4. Modern trends/tendencies in Education (Brief study).
5. Aims & objectives of teaching Economics at secondary level.
6. Methods of lesson planning.
7. Lesson planning in Economics.
8. Preparation of a lesson plan on any one topic of Class IX (nine) in Economics, according to Herbartian approach.
9. Preparation of a lesson plan on any one topic of class X (ten), in Economics, according to Evaluation approach.

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EDUCATION (FOUNDATION COURSE)

Part I- Education in Emerging Indian Society

- Education: meaning aims and functions.
- Agencies of education- Family, School, Society, Religious Institutions and State.
- Role of philosophy in Education- Idealism, Naturalism and Pragmatism.
- Education and social change- meaning and nature, factors of social change, constraints on social change.
- Freedom and Discipline- concept, interrelation between discipline, liberty and democracy, maintaining discipline through reward and punishment.
- Curriculum-concept, principles of curriculum construction, selection and organization of content, curriculum evaluation, Text books- importance and evaluation of text book.
- Current educational trends in Indian Education- Impact of science and technology, Role of education in relation to problems of casteism, environmental degradation, education of the underprivileged groups- SC/ST/minorities/ women, globalization.
- Innovations that emerged from educational experiments- Tagore- Santiniketan, Gandhiji- Basic Education, Rousseau-Negative Education, Montessori- Sense Experience, Froebel- Kindergarten, Child-centric education.

Part II-Understanding the learner

- Meaning, nature and scope of educational Psychology-Significance of educational psychology to teacher, learner and teaching learning process, methods of studying learners’ behavior.
- Growth and Development-meaning, principles, similarities and differences; Stages of development with special stress on education for social, emotional and intellectual, Fundamentals of Piagetian developmental psychology.
- Concept of Individual Differences- meaning, nature and types, areas of individual differences, causes of individual differences.Intelligence –meaning, nature and theories ( Uni- factor, Spearman’s two factor theory, Multifactor theory), Types of intelligence test( verbal, non-verbal, individual and group).- Creativity- meaning, nature, scope and promotion of creativity. Personality- concept, development of personality, type and trait theory of personality. Concept of mental health and
hygiene. Adjustment - defense mechanisms, mental illness. Guidance and Counseling- concept, types, counseling techniques.

- Learning-meaning and nature, factors affecting learning, learning and maturation, learning and motivation, laws of learning, theories of learning, transfer of learning. Memory and Forgetting.
- Educational Statistics- importance of statistics in education, measures of central tendency, measures of variability, Co-efficient of correlation - Product moment and Rank difference.

**Part III- Development of Education**

- Education in ancient India- Vedic education, Buddhist education, Islamic education – (aims, process, curriculum and organization.)
- Education in British India- Growth of modern system of education up to 1947.

**Part IV- Educational Technology**

- Concept of educational Technology- meaning, nature and scope of educational technology, components of educational technology- hardware, software and system approach.
- Communication Process- meaning, types, principles of effective communication, barriers of communication.
- Teaching and teacher behavior- concept of teaching, stages, process and levels of teaching (memory, understanding and reflective). Planning teaching- Year plan, Unit plan, Lesson plans, Taxonomy of educational objectives, Test and measurement - Teacher made test, Prognostic and Diagnostic tests.
- Computer in education - meaning, definition, features of computer, uses of computer, computer as non-print media, tele- conferencing.
- Information Technology- E-learning, concept of internet and email.

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MATHEMATICS

Paper-II Teaching methodology in Mathematics


Need and importance of teaching Mathematics in school curriculum: Social aspect, Mathematical aspect, Applications of Mathematics


Contribution of Indian Mathematicians

Basic principles of Methods of teaching of Mathematics: Principles of child development and learning, Trends in organizing content, Problem solving approach to teaching.

Methods of teaching Mathematics: Induction and deduction, Analytic and synthetic methods, Heuristic/ Discovery method

Techniques in Teaching Mathematics: Drill and practice, Oral and written work, Play way Technique, Assignment and Home work, Teaching – Learning materials and teaching aids, Laboratory approach to teaching Mathematics

Unit planning and Lesson planning: Meaning, need and importance of planning, Steps involved, Development of a plan, Limitations of a plan, Methods of lesson planning, Features of a good lesson plan

Planning for effective instruction of Mathematics

Evaluation in Mathematics

Teaching of Arithmetic and Commercial Mathematics, Algebra and Geometry.

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POLITICAL SCIENCE

1. Political Theory and Thought:
   - Ancient Indian Political Thought: Kautilya and Shanti Parva, Greek Political Thought: Plato and Aristotle, Modern Indian Thought: Gandhi, Aurobindo Ghosh.

2. Comparative Politics and Political Analysis:

3. Indian Government and Politics:

4. International Relations:
   - Cold war, Alliance, Non-alignment, End of Cold war, Globalisation, Rights and Duties of states in international law, intervention, Treaty-law, prevention and abolition of war, Administrative Culture; Administrative Corruption and Administrative Reforms, Panchayati Raj, Impact of Liberalization on Public Administration, Theories of International Relations, Ideology, Power and Interest, Conflicts and Conflict-Resolution, Changing concept of National Security and Challenges to the Nation-State System, Arms and Arms-control, Determinants and Compulsions of India’s
Foreign Policy; India’s Nuclear Policy, India’s Relations with Neighbours and USA, India’s Role in the UN, India and Regional Organizations (SAARC, ASEAN) and Indian Ocean.

Methodology

- Scope of Social Studies / Science and definition in the importance of studying social sciences, Concept of Social Studies.

Principles of Designing Social Studies Curriculum:


Approaches in Organizing Social Studies Curriculum:

General Requirements of a Good Organization, Approaches to Organizing the Curriculum, Correlation Approach, Correlated Curriculum, Concentric Approach, Concentric Curriculum Design.

Instructional Strategies:


Strategies of Teaching Social Studies:


Techniques of Teaching

Role of Playing, Story Telling, Simulation.

Objectives, Purposes of Teaching Social Studies:

Objectives of Teaching Social Studies, General Objectives of Teaching Social Studies, Instructional Objectives of Teaching Social Studies and its Aims and Values.
Planning of Instruction in Social Studies:

Importance of Lesson Planning, Steps in Lesson Plan, Yearly Plan or Semester Plan, Unit Plan, Unit Plan Table, Lesson Planning in India, Classification of Lesson Plans, Writing of Lesson Plans and Black Board summary.

Micro Teaching Lesson Plans for Developing Skills

Micro-Teaching, Teaching Skills, Developing the Skill of Introduction, Observation and Evaluation Sheet for Introduction Skill, Pattern of Observation Sheet for Introduction Skill, Developing the Skill of Questioning, Developing Skill of Demonstration, Developing Skill of Providing Illustration, Developing Skill of Explanation, Developing Skill of Stimulus Variation, Developing Reinforcement Skill.

Arranging and Organizing Field Trips:

Field Trips, Purpose of Field Trips, Example of Field Trips, Limitations of Field Trips.

Team Teaching:

Definition of Team Teaching, Characteristics of Team Teaching, Objectives of Team Teaching, Principles of Team Teaching, Types of Team Teaching, Procedure of Team Teaching, Advantages of Team Teaching, Limitations of Team Teaching.

Organizing Social Studies Clubs:

Constitution of Social Studies Club, Circle for the Club.

The Social Studies Laboratories, Museum:

Essentials of Social Studies Laboratory, Learning Process in the Laboratory and use of ICT lab in teaching process.

Audio-Visual Aids:

Correct Use of Audio-Visual Aids, Field-Trips and Excursions, Chalk Board, Bulletin Board, Social Studies Bulletin Board, Flannel Board, Charts, Time Lines, Tables, Graphs, Maps, Models, Globe, Histrionics, Social Studies Laboratory, Resource Visitors, Celebration of Festivals, Fairs and National Days, Pictures, Motion Pictures or Films, Film Strips or film Slides, Television, Tape-Recorder, Radio and Broadcasting, Newspapers, Reference Books, Dramatization, etc.
Thought Provoking Programmes: Purpose of Evaluation in Social Studies:


Remedial Teaching:

Meaning and Definition of Remedial Teaching, Functions of Remedial Teaching, objectives of Remedial Teaching.

Objectivity in Essay Type Examination:

Improvement in Essay Type Examination, Essay Type Questions and Learning Objectives, Essay Type Questions in Teaching Technology, The Essay Type Questions in History, Essay Type Questions in Geography, Essay Type Questions in Political Science/History/ Economics Civics and Sociology.

Construction of Norm Referenced and Criterion Referenced Tests


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SOCIOLOGY

Sociological Concepts:
• Nature of Sociology, Definition, Sociological Perspective.

Basic Concepts:
• Community, Association, Norms and Values, Institution, Culture.

Social Structure:
• Status and role, their inter-relationship.

Social Group:
• Meaning, Types: Primary-Secondary, Formal-Informal.

Social Institutions:
• Marriage, Education, Family.

Socialization:
• Socialization, Agencies of Socialization.

Social Stratification:
• Social differentiation, Forms of stratification: Caste, Class, Gender, Ethnicity, Theories of social stratification, Social Mobility.

Social Change:
• Concepts and Types: Evolution, Diffusion, Progress, Revolution, Transformation Change in structure and Change of structure.

Sociological Theory
• Radeliffe Brown, Emile Durkheim, Max Weber, Karl Marx.

Methodology: Meaning and Nature of Social Research:
• Nature of social phenomena, The scientific method.

Quantitative Methods:
• Survey, Research Design and its types. Hypothesis, Sampling.

**Qualitative Methods:**

• Participant observation, Case study, Content analysis.

**Statistics in Social Research:**

• Measures of Central Tendency, Mean, Median, Mode.

**Conceptualizing Indian Society:**

• People of India; Groups and Communities, Unity in diversity, Cultural diversity: Regional, Linguistic, Religions and Tribals.

**Contemporary Issues Socio-Cultural:**

• Poverty, Inequality of caste and gender, Dowry, Divorce.

**Contemporary Issues Developmental:**

• Population, Regional disparity, Slums, Displacement, Ecological degradation and environmental pollution.

**Issues Pertaining to Deviance:**

• Deviance and its forms, Crime and delinquency, White collar crime and corruption, Drug addiction, Suicide.

**Current Debates:**

• Tradition and Modernity in India, Problems of Nation Building, Secularism, Pluralism and Nation Building.

**The Challenges of Globalisation:**

• Indigenisation of Sociology, Privatisation of Education, Science and Technology Policy of India.

**Rural Sociology:**

• Rural Urban differences, Jajmani system and Jajmani relations, Agrarian class structure.
Panchayati Raj Institution:

- Panchayat before and after 73rd Amendment.

Rural Development and Change:

- Trends of changes in rural society, Processes of change: Migration Rural to Urban and Rural to Rural Mobility: Social/ Economic.

Industrial Relations:

- Changing profile of labour, Changing labour management about relations, Trade Unions.

Industrialisation and Social Change in India:

- Impact of Industrialization on family, Education and Stratification.

Sociology of Development Conceptual Perspectives on Development:

- Economic growth, Human development, Social development, Sunstainable development: Ecological and social.

Theories of Underdevelopment: Paths of Development:

- Modernization, Globalisation, Socialist, Mixed, Gandhian.

Population and Society Theories of Population Growth:

- Malthusian, Demographic transition.

Concepts of Fertility, Mortality and Migration:

- Age and sex, composition and its consequences, Determinants of fertility, Determinants and consequences of migration.

Population Control:

- Population policy Problems and perspectives, Population education, Measures taken for population control.

Women and Development in India:

- Indicators of women's status: Demographic, social, economic and cultural, Special
schemes and strategies for women's development, Voluntary sector and women's development, Globalisation and women’s development.

**Methodology**

- Scope of Social Studies / Science and definition in the importance of studying social sciences, Concept of Social Studies

- **Principles of Designing Social Studies Curriculum**

  What is Curriculum, Importance of the Curriculum, Objectives of Social Studies Curriculum, Contents of Social Studies Curriculum, Principles of Designing Social Studies Curriculum, Patel

  Committee Curriculum of Social Studies, History, Civics, Geography, History of Mankind, Critical Observations on NCERT Syllabus.

- **Approaches in Organizing Social Studies Curriculum**

  General Requirements of a Good Organization, Approaches to Organizing the Curriculum, Correlation Approach, Correlated Curriculum, Concentric Approach, Concentric Curriculum Design.

- **Instructional Strategies**


- **Strategies of Teaching Social Studies**


- **Techniques of Teaching**

  Role of Playing, Story Telling, Simulation

- **Objectives, Purposes of Teaching Social Studies**

  Objectives of Teaching Social Studies, General Objectives of Teaching Social Studies, Instructional Objectives of Teaching Social Studies and its Aims and Values.
• **Planning of Instruction in Social Studies**

Importance of Lesson Planning, Steps in Lesson Plan, Yearly Plan or Semester Plan, Unit Plan, Unit Plan Table, Lesson Planning in India, Classification of Lesson Plans, Writing of Lesson Plans and Black Board summary.

• **Micro Teaching Lesson Plans for Developing Skills**

Micro-Teaching, Teaching Skills, Developing the Skill of Introduction, Observation and Evaluation Sheet for Introduction Skill, Pattern of Observation Sheet for Introduction Skill, Developing the Skill of Questioning, Developing Skill of Demonstration, Developing Skill of Providing Illustration, Developing Skill of Explanation, Developing Skill of Stimulus Variation, Developing Reinforcement Skill.

• **Arranging and Organizing Field Trips**

Field Trips, Purpose of Field Trips, Example of Field Trips, Limitations of Field Trips.

• **Team Teaching**

Definition of Team Teaching, Characteristics of Team Teaching, Objectives of Team Teaching, Principles of Team Teaching, Types of Team Teaching, Procedure of Team Teaching, Advantages of Team Teaching, Limitations of Team Teaching.

• **Organizing Social Studies Clubs**

Constitution of Social Studies Club, Circle for the Club.

• **The Social Studies Laboratories, Museum**

Essentials of Social Studies Laboratory, Learning Process in the Laboratory and use of ICT lab in teaching process.

• **Audio-Visual Aids**

Correct Use of Audio-Visual Aids.

• **Thought Provoking Programmes**

• **Purpose of Evaluation in Social Studies**

Objectives of Evaluation in Social Studies, Formative and Summative Evaluations, Formative and Summative Test.

- **Remedial Teaching**

Meaning and Definition of Remedial Teaching, Functions of Remedial Teaching, Objectives of Remedial Teaching.

- **Objectivity in Essay Type Examination**

Improvement in Essay Type Examination, Essay Type Questions and Learning Objectives, Essay Type Questions in Teaching Technology, The Essay Type Questions in History, Essay Type Questions in Geography, Essay Type Questions in Political Science /History/ Economics/Civics and Sociology.

- **Construction of Norm Referenced and Criterion Referenced Tests**


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SCIENCE

A. BIOLOGY

UNIT 1 – STRUCTURAL ORGANIZATION IN PLANTS AND ANIMALS.

- Biological classification – animal kingdom and plant kingdom
- Structural organization in animals – Animal tissues (Epithelial tissues, connective tissues, muscle tissues, neural tissues), organ and organ system of earthworm, frog, and cockroach.

UNIT 2 – HUMAN PHYSIOLOGY

- Digestion and absorption – human digestive system, digestive glands, absorption of digested food, disorder of digestive system
- Breathing and exchange of gases – human respiratory system, mechanism of breathing, respiratory volumes and capacities, disorders of respiratory system.
- Excretory products and their elimination
- Locomotion and movement – human excretory system, disorders of excretory system.
- Neural control and co-ordination – neuron as structural and functional unit of neural system.

UNIT 3 – PLANT PHYSIOLOGY

- Morphology of flowering plants – modification of root, modification of shoot, modification of leaves, parts of flower, the fruit, structure of dicotyledons seed and monocotyledon seed, semi description of a typical flowering plant. (e.g. solanaceae, liliaceae)
- Anatomy of flowering plants – The tissue (Meristematic and Permanent tissue), The tissue system (Epidermal tissue system, Ground tissue system, vascular tissue system), Anatomy of Dicotyledonous and monocotyledonous plants, Secondary growth (vascular cambium and cork cambium)
- Mineral nutrition – role of macro and micro nutrients, metabolism of nitrogen cycle,
- Photosynthesis in higher plants – where does photosynthesis take place, light reaction, C3 and C4 pathway, photorespiration, factors affecting photosynthesis.
UNIT 4 – CELL STRUCTURE AND FUNCTION

- Cell – the unit of life - structure of Prokaryotic cells and Eukaryotic cells,
- Cell cycle and cell division – phases of cell cycle, significance of mitosis and meiosis.

UNIT 5 – ECOLOGY

- Ecosystem – structure and function, energy flow, Nutrient cycling (carbon cycle, phosphorous cycle)
- Biodiversity and conservation – patterns of biodiversity, how do we conserve biodiversity.

UNIT 6 – GENETICS AND EVOLUTION

- Principles of inheritance and variation – Mendel’s law of inheritance, law of dominance and law of segregation, sex determination, genetic disorders, chromosomal disorders,
- Molecular basis of inheritance – the structure of DNA, properties of genetic material (DNA versus RNA), transcription.

B. CHEMISTRY

UNIT 1 – ATOMIC STRUCTURE, PERIODIC CLASSIFICATION AND CHEMICAL BONDING.

- Structure of atom
- Classification of elements
- Chemical bonding and molecular structure.

UNIT 2 – CHEMICAL REACTION

- Types of chemical reaction and representation of chemical reaction.
- Mole concept
- Energy changes during the chemical reaction.
- Chemical equilibrium.

UNIT 3 – EXTRACTION OF THE METALS AND THE NON-METALS

- Occurrence of metals
- Concentration of ores
- Reduction of concentrated ore
- Purification of metal
• Extraction of non-metal

UNIT 4 – STATES OF MATTER

• Three states of matter, intermolecular inheritance, types of bonding, melting and boiling points, role of gas law in elucidating the concept of the molecule, Charle’s law, Gay lussac’s law, avagadro’s law, ideal behavior, empirical derivation of gas equation, avagadro’s number, ideal gas equation, kinetic energy and liquefaction of gases, critical temperature.
• Liquid state – vapor pressure, viscosity and surface tension.

UNIT 5 – BIOMOLECULES

• Carbohydrates – classification (aldoses and ketoses), monosaccharide (glucose and fructose), D-L configuration, oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen), their importance.
• Proteins – elementary idea of amino acid, peptide bond, polypeptide, primary structure, secondary structure, tertiary structure and quaternary structure, denaturation of proteins, enzymes.
• Hormones – elementary idea
• Vitamin – classification and function
• Nucleic acid – DNA and RNA.

UNIT 6 – THERMODYNAMICS

• Concept of system, types of system, work, heat, energy, extensive and intensive properties, state function
• First law of thermodynamics – internal energy and enthalpy, heat capacity and specific heat. Hess’s law of constant heat summation, enthalpy of bond dissociation, combustion, formation, atomization, sublimation, phase transition, ionization, solution and dilution.
• Introduction of entropy as a state function, second law of thermodynamics, Gibbs energy change for spontaneous and non-spontaneous process, criteria for equilibrium
• Third law of thermodynamics.

UNIT 7 – ELECTROCHEMISTRY

• Redox reaction, conductance in electrolytic solution, specific and molar conductivity variation of conductivity with concentration.
• Kohlrausch’s law, electrolysis and law of electrolysis, dry cell – electrolytic cells and galvanic cells, lead accumulator, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells.
• Relation between Gibbs energy change and EMF of a cell, fuel cells, corrosion.

UNIT 8 – d and f BLOCK ELEMENTS

• General introduction, electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first row transition metals-metallic characteristics, ionization, enthalpy, oxidation states, ionic radii, catalytic property, magnetic properties of K2Cr2O7 and KMnO4
• Lanthanoids – electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction and its consequences, (d) actinoids.

C. PHYSICS

UNIT 1 – FORCE AND MOTION

• Relation of motion and force
• Newton’s laws of motion
• Conservation of momentum
• Application of one’s laws of motion in daily life

UNIT 2 – LIGHT – IMAGE FORMATION BY MIRRORS AND LENSES

• Image formation by spherical mirrors and concave mirror
• Reflection and refraction of light
• Image formation by spherical lenses
• Application of refraction of light in daily life
• Optics

UNIT 3 – ELECTROMAGNETISM

• Magnetic effects of current.
• Need for displacement current
• Electromagnetic wave and their characteristics, transverse nature of electromagnetic waves.
• Electromagnetic spectrum (radio waves, microwaves, infra red, ultra violet, x-rays, gamma rays) including elementary facts about their uses
• Electromagnetic induction

UNIT 4 – THERMODYNAMICS
• Thermal equilibrium and definition of temperature (zeroth law of thermodynamics). Heat work and internal energy.
• First law of thermodynamics, isothermal and adiabatic processes.
• Second law of thermodynamics, reversible and irreversible processes.

UNIT 5 – ELECTROSTATICS

• Electric charges and their conservation. Coulomb’s law – force between two point’s charges, forces between multiple charges, superposition principle and continuous charge distribution.
• Electric field – electric field due to a point charge, electric field lines, electric dipole, torque on a dipole in a uniform electric field.
• Electric flux – statement if Gauss’s theorem and its application to find field due to infinitely long straight wire, uniformly charges infinite plane sheet and uniformly charged thin spherical shell (field inside and outside).
• Electric potential due to a point charge, a dipole and system of charges, equipotential surfaces, electric potential energy of a system of two charges and of electric dipoles in an electrostatic field.
• Conductors and insulators, free charges and bound charges inside a conductor. Dielectrics and electric polarization, capacitors and capacitance, combination of capacitors in series and parallel, capacitance of parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor, Van de Graaff generator.

UNIT 6 – ATOMS AND NUCLEI

• Alpha particle scattering experiment, Rutherford’s model of atom, Bohr model, energy levels, hydrogen spectrum. Composition and size of nucleus, atomic masses, isotopes, isobars and isotones.
• Radioactivity – alpha, beta and gamma particles/rays and their properties, radioactive decay law.
• Mass energy relation, mass defect; binding energy per nucleon and its variation with mass number, nuclear fission and fusion.

UNIT 7 – ELECTRONIC DEVICES

• Energy bonds in solid conductors, insulators and semi-conductors.
• Semiconductors diode – I-V characteristics in forward and reverse bias, diode as a rectifier, I-V characteristics of LED, photodiode, solar cell and Zener regulator.
• Junction transistor, transistor action, characteristics of transistor, transistor as an amplifier and oscillator. Logic gates (OR, AND, NAND and NOR).
METHODS FOR TEACHING SCIENCE

UNIT 1 – AIMS AND OBJECTIVES OF TEACHING SCIENCE

- Taxonomy of educational objectives – cognitive, affective, psychomotor, specification of each objective in terms of pupil behavior.
- Relationship between the cognition and affective domain.
- Behavioral objectives – stating the condition, stating the criterion, Behavioral terms for stating specific objectives – knowledge, comprehension, application, analysis, synthesis, evaluation, and test items.

UNIT 2 – METHODS OF TEACHING SCIENCE

- Constructivist approach of teaching-learning.

UNIT 3 – USE OF AUDIO-VISUAL AIDS IN TEACHING SCIENCE

- Importance of audio-visual aids.
- Different kinds of audio-visual aids – 1) Direct purposeful experience, 2) Contrived experiences – Objects and specimens, 3) Dramatic participation, 4) Demonstration, 5) Field trip or excursion, 6) Exhibits – museum, 7) Motion pictures and television, 8) Radio recordings and still pictures – bulletin boards, projected pictures, opaque projector or episcope, slide cum film strip projector, 9) Visual symbols- chalk board, overhead projector, 10) verbal symbols
- Effective use of audio-visual aids
- Development of improvised teaching aids/apparatus – selection, preparation and use teaching aids.

UNIT 4 – MICROTEACHING

- Concept and definition of micro-teaching
- Identification of teaching skills
- Integration of teaching skills
- Comparison of conventional student teaching and microteaching based student teaching.
UNIT 5 – LESSON AND UNIT PLANNING

- Objectives, content, methods, evaluation, art of questioning, stimulating learning, steps involved in lesson planning – preparation, introduction, aim, method, application, recapitulation,
- Unit planning- characteristics of unit plan, steps involved in unit plan, Performa of a unit plan.

UNIT 6 – EDUCATIONAL TECHNOLOGY

- Concept of educational technology
- Educational technology and Instruction technology
- Educational technology and Teaching technology
- Types of educational technology – Educational technology I – Hardware approach
  Educational technology II – Software approach
  Educational technology III – System approach

UNIT 7 – EVALUATION

- Assessment – purpose of assessment, teachers’ activities for assessment of pupil’s abilities, aptitudes, and interests.
- Criteria of test – tools and techniques of evaluation, steps in test construction.
- Diagnostic testing and remedial teaching in science.

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