

SVUCET SYLLABUS
Test - 25: MICROBIOLOGY / INDUSTRIAL MICROBIOLOGY
SECTION - A
(Introductory Microbiology, Microbial Physiology and Genetics)

1. History, contributions, importance and applications of microbiology.
2. Principles, types and applications of microscopy, types of staining and its utility for diagnosis of microbes.
3. Sterilization and disinfection techniques- physical and chemical methods.
4. Isolation, pure culture and preservation techniques of microbial cultures.
5. General characteristics of viruses, bacteria, archaea, mycoplasmas and cyanobacteria .
6. Classification of microorganisms- classification of bacteria, fungi, algae and protozoa.
7. Microbial nutrition: Nutritional groups of microorganisms, growth media, various phases of microbial growth and methods for measuring microbial growth.
8. Properties, catalytic activity and classification of enzymes.
9. Respiration : Aerobic and Anaerobic respiration; Fermentation; Oxygenic and anoxygenic photosynthesis in bacteria.
10. DNA and RNA as genetic material, structure of DNA, extra chromosomal genetic elements, Replication of DNA
11. Types of mutations, mutagens, DNA damage and repair mechanisms and genetic recombination in bacteria.
12. Concept of gene; RNA types and their functions; genetic code; Transcription ; translation; lac-Operon; .
13. Genetic engineering: Basic principles, enzymes, vectors, cloning methods, polymerase chain reaction, Genomic and cDNA libraries and applications in industry agriculture and medicine.

SECTION-B
(Immunology, Medical Microbiology and Applied Microbiology)

1. Immunology: Types of immunity, primary and secondary organs of immune system, cells of immune system.
2. Structure and properties of antigen and antibodies; antigens-antibody interactions, labeled antibody based techniques.
3. Types of hyper sensitivity and auto immunity, diseases/deficiencies.
4. Medical Microbiology: Normal flora of Human body, host pathogen interactions, nosocomial infections.
5. Principles of diagnostic microbiology: antibacterial, anti fungal and antiviral agents; Tests for antimicrobial Susceptibility; MRSA
6. Microbial disease: Bacterial, Fungal, Protozoan and viral diseases; Vaccines.
7. Extreme habitats; Role of microorganisms in nutrient cycling. Methods to detect potability of water.
8. Solid waste management: sources and types: methods of solid waste disposal liquid waste management.
9. Microorganisms role in environment, Microbial interactions, biodegradations.
10. Plant growth promoting bacteria; biological nitrogen fixation, biofertilizers , diseases caused by fungi, bacteria and viruses.
11. Microbial spoilage of foods; Food intoxication; food borne diseases: Micro organisms as food; fermented diary food; Typer of fermentation process; Microorganisms of industrial importance.

SVUCET-2018: SYLLABUS
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SECTION – C
(Fundamentals Chemistry)

1. Principles of chemical bonding: covalent, non- covalent, electro- valent, ionic bonds lengths, bond angles, bond dissociation energies.
2. Types of organic reagents and reactions- Electrophilic, mesophilic and free radical reagents. Fissions, substitution, addition and elimination reactions. Dissociation constants.
3. Acidity and basicity of organic molecules.
4. Concepts and types of isomerism and tautomerism. Chemical equilibrium and constants. Polymerization.
5. Polar and non-polar molecules.
6. Nitrogen compounds-Amino acids, methods of synthesis, physical and chemical properties.
7. Carbohydrates; classification, structures of glucose and fructose, interconversion of monosaccharides, optical activity, racemisation.
8. Application of UV and IR spectra for the structural determination of organic compounds.
9. Gas laws-Van der Wall's equation, critical constants-Joule Thomson effect.
10. Solutions: Solutions of gases in liquids, Binary liquid mixtures, azeotropic mixtures, complete and partial miscibility distribution law-applications.
11. Colloids: General features, Tyndall effect, Brownian movement, coagulation, electrophoresis.
12. Liquids: Vapour pressure, surface tension and viscosity and their variation with temperature.
13. Solids: Characteristics of crystalline state-laws of symmetry and crystal system-classification of solids.
14. Thermodynamics: Definition of terms-First and Second law of thermodynamics-Concept of entropy, Gibb's free energy and chemical potential – Equilibrium constant.
15. Osmosis-Osmotic pressure- laws of osmotic pressure- relationship between molecular weight and osmotic pressure.
16. Buffer solutions-Handerson equations-Applications of buffers- Hydrolysis of salts- pH calculation of salt solutions- pH variation in Acid –Base titrations –Acid- Base indicators.
17. Electromotive force – Measurement of EMF- single electrode potentials – Hydrogen and Calomel Electrodes, Oxidation and reduction potentials.
18. Chemical kinetics: Zero, first and second order reactions- Activation energy- Collision theory of biomolecular reactions.
19. Photochemistry: Laws of photochemistry – Beer Lambert's Law – Fluorescence- in Agriculture, Industry, Medicine and Chemical analysis.
20. Nuclear chemistry: Composition of nucleus-radioactive disintegrations-use of radioisotopes in Agriculture, Industry, Medicine and chemical analysis.
21. Inorganic metals in Biological systems: Importance of Na, K, Co and Zn – toxic metals and toxicity of Hg, Pb and As.

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SVUCET SYLLABUS
TEST-24 : MATHEMATICS
Section – A

Differential Equations and Solid Geometry

Differential Equations:

Linear Differential equations, Differential equations reduced to Linear form, Exact differential equations, Integrating factors, Change of Variables, Orthogonal trajectories. Equations solvable for p and x (or y). Equations of the first degree in x and y- Clairaut's equation. Solution of homogeneous linear differential equations of order n with constant coefficients, Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators. Solution of the non homogeneous linear differential equations with constant coefficients. Method of variation of parameters, Linear differential equations with non constant coefficients, the Cauchy - Euler equation

Solid Geometry:

Equation of the plane through the given points, Length of the perpendicular from a given plane, Bisectors of angles between two planes, Combined equation of two planes, Orthogonal projection on a plane. Equation of a line, Angle between a line and a plane, the condition that a given line may lie in a given plane, the condition that two given lines are coplanar, the shortest distance between two lines, the length and equations of the line of shortest distance between two straight lines. Definitions and equation of the sphere, equation of the sphere through four given points, Plane sections of a sphere, Intersection of two spheres, equation of a circle. Sphere through a given circle. Intersection of a sphere and a line, Tangent plane touching spheres. Angle of intersection of two spheres, conditions for two spheres to be orthogonal, Radical plane. Coaxial system of spheres, Limiting points. Definitions of a cone, vertex, Quadric cones with vertex at the origin, cone and a plane through its vertex, cone with a base curve, Enveloping cone, Intersection of a line with a cone, Reciprocal cone. Definition of a cylinder; Equation to the cylinder whose generators intersect a given conic and are parallel to a given line; Enveloping cylinder of a sphere; The right circular cylinder; Equation of the right circular cylinder with a given axis and radius.

Section – B

Group theory, Ring theory, Matrices and Linear Algebra

Group theory:

Group definition and elementary properties – examples – order of a group. Composition tables with examples. Complex Definition – Multiplication of two complexes Inverse of a complex-Subgroup definition – examples-criterion for a complex to be a subgroups. Criterion for the product of two subgroups to be a subgroup-union and Intersection of subgroups. Cosets Definition – properties of Cosets–Index of a subgroups of a finite groups–Lagrange's theorem. Definition of normal subgroup – criterion for a subgroup to be a normal subgroup – intersection of two normal subgroups – Sub group of index 2 is a normal sub group – simple group – quotient group – criteria for the existence of a quotient group. Definition of homomorphism – Image of homomorphism elementary properties of homomorphism

– Isomorphism – automorphism. Definition and elementary properties – kernel of a homomorphism – fundamental theorem on Homomorphism and applications. Definition of permutation – multiplication of permutations – Inverse of a permutation – cyclic permutations – transposition – even and odd permutations – Cayley’s theorem. Definition of cyclic group – elementary properties – classification of cyclic groups.

Ring theory & Matrices:

Definition of Ring and basic properties, Boolean Rings, Zero Divisors of Ring - Cancellation laws in a Rings - Integral Domain Division Ring – Fields Examples. Characteristic of Ring – Characteristic of an Integral Domain – Characteristic of a Field, Characteristic of a Boolean ring. Sub ring Definition – Sub ring test – Union and intersection of sub rings – Ideals – Union and intersection of ideals .Definition of Homomorphism – Homomorphic image – Elementary Properties of homomorphism –Kernel of a homomorphism – Fundamental theorem of homomorphism. Maximal Ideals – Prime Ideals.

Linear algebra:

Vector Spaces, General properties of vector spaces, n-dimensional Vectors, addition and scalar multiplication of Vectors, internal and external composition, Null space, Vector subspaces, Algebra of subspaces, Linear Sum of two subspaces, linear combination of Vectors, Linear span, Linear independence and Linear dependence of Vectors. Basis of Vector space, Finite dimensional Vector spaces, basis extension, co-ordinates, Dimension of a Vector space, Dimension of a subspace, Quotient space and Dimension of Quotient space. Linear transformations, linear operators, Properties of L.T, sum and product of LTs, Algebra of Linear operators, Range and null space of linear transformation, Rank and Nullity of linear transformations – Rank – Nullity Theorem. Rank of a matrix – Elementary operations – Normal form of a matrix -Echolon form of a Matrix - Solutions of Linear Equations System of homogenous Linear equations – System of non Homogenous Linear Equations method of consistency. Characteristic Roots, Characteristic Values & Vectors of square Matrix, Cayley – Hamilton theorem. Inner product spaces, Euclidean and unitary spaces, Norm or length of a Vector, Schwartz inequality, Triangle Inequality, Parallelogram law. Orthogonal and orthonormal vectors, orthogonal and orthonormal Sets of Inner product Space.

Section – C

Real Analysis, Vector Calculus and Laplace Transforms

Real analysis:

Sequences and their limits, Range and boundedness of Sequences, Limit of a sequence and Convergent sequence. The Cauchy’s criterion, properly divergent sequences, Monotone sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences and the Bolzano-weierstrass theorem – Cauchy Sequences – Cauchy’s general principle of convergence theorem. Series, convergence of series. Cauchy’s general principle of convergence for series. Tests for convergence of series, Series of Non-Negative Terms. p-test, Cauchy’s n^{th} root test, D-Alembert’s test or ratio test, alternating Series – Leibnitz Test, absolute convergence and conditional convergence. Continuous functions, Combinations of continuous functions, Continuous Functions on

intervals, uniform continuity. The derivability of a function on an interval, at a point, derivability and continuity of a function, Graphical meaning of the Derivative, Mean value Theorems; Rolle's theorem, Lagrange's theorem, Cauchy's Mean value theorem. Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for R-integrability, Properties of integrable functions, Fundamental theorem of integral calculus, integral as the limit of a sum, Mean value Theorems.

Vector calculus:

Vector function of scalar variable, continuity of a vector function, partial differentiation, scalar point function vector point function – Gradient of a scalar point function, unit normal, directional derivative at a point – Angle between two surfaces. Vector differential operator – Scalar differential operator – Divergence of a vector – Solenoidal vector – Laplacian operator – curl of a vector – Irrotational vector – Vector identities. Definition – Integration of a vector – simple problems – smooth curve – Line integral – Tangential Integral – circulation problems on line Integral. Surface Integral. Gauss Divergence, Green's and Stoke theorems and their applications.

Laplace transforms:

Definition of Integral Transform – Laplace Transform - Linearity Property, Piecewise continuous Functions, Existence of Laplace Transform, Functions of Exponential order and of Class A. Linear property, First Shifting theorem. Second Shifting Theorem, Change of Scale Property, Laplace Transform of the derivative of $f(t)$, Initial Value theorem and Final Value theorem. Laplace Transform of Integrals – Multiplication by t , Multiplication by t^n – Division by t . Laplace transform of Bessel Function Only. Definition of Inverse Laplace Transform. Linearity Property, First Shifting Theorem, Second Shifting Theorem, Change of Scale property, use of partial fractions – Examples - Inverse Laplace transforms of Derivatives – Inverse Laplace Transforms of Integrals – Multiplication by Powers of t – Division by powers of t – Convolution Definition – Convolution theorem and applications – Heaviside's expansion theorem and its applications.

SVUCET SYLLABUS
Test-21: HOME SCIENCE

SECTION A

Paper-I HUMAN PHYSIOLOGY AND GENERAL PSYCHOLOGY

The circulatory system-Blood-Composition-Development-Volume-Functions-anaemia-clotting of blood-Blood groups. Cardio vascular system-Anatomy of the Heart-Heart rate-Cardiac cycle; blood pressure-factors maintaining blood pressure. Defensive mechanisms of the body against disease and injury. Respiration-Structure of the respiratory organs-Mechanism and Chemistry of respiration, abnormal types of respiration-Oxygen want- Anoxia or Hypoxia, Asphyxia, Artificial respiration. The Nervous system - Neuron structure - Reflex action – spinal cord-Brain and their membranes-autonomic nervous system. Special senses-Vision (Eye), Hearing (Ear) perception of taste and smell and touch. Endocrine glands and hormones-structure and Chemical nature–their Influence on growth, metabolism and reproduction.

GENERAL PSYCHOLOGY:

Psychology as a science of behavior: Definition, scope, and methods used-observational, experimental, clinical and survey methods. Major approaches Neurobiological-behavioral - cognitive Psychoanalytical and branches of Psychology:(Developmental Psychology, Social psychology, Abnormal Psychology, Educational Psychology, Organizational Psychology. A brief introduction to their scope)

Perception and Awareness: Object perception and perceptual constancies, organization and perception- Attention types-determinants of attention. Learning and Remembering: Definition-classical and operant conditioning-acquisition of skills and problem solving - learning by imitation-cognitive learning. Kinds of remembering-nature of forgetting-improving memory.

Intelligence, Aptitude and Interest: Definition and its nature-tests of general intelligence-age changes-extreme of intelligence-Subnormal and the gifted, Genetic basis -definition of the terms, aptitude and interest-assessment through well known tests.

Personality: Definition-Psychoanalytical and social learning approach-Personality types-assessment of personality-normal and the abnormal personalities.

Social Behaviour: Elementary forms of social behaviour-Status and role-behaviour in small groups-broader aspect of collective behaviour.

SECTION B

Paper-II: FOOD SCIENCE AND NUTRITION

Introduction to foods and nutrition-nutrition related to health.

Classification of food - food groups-their structure, composition-nutrients-contribution of each food group.

Selection of food-socio-economic and socio-cultural factors affecting food selection.

Storage-methods of preparation and processing of foods.

- a) Cereals and cereal products and millets.
- b) Legumes (Pulses)
- c) Nuts and oil seeds.
- d) Milk and milk products.
- e) Flesh foods - meat, fish and poultry.
- f) Eggs
- g) Fruits and vegetables

- h) Beverages
- i) Spices and condiments
- j) Ready-to-eat foods

Food sanitation and hygiene-food poisoning.

Food spoilage-causes, prevention of spoilage and methods of food preservation, canning, freezing and fermentation, use of high concentration of sugar-food additives, standards for preserved foods-ISI and FPO.

Paper-III: SOCIOLOGY, MARRIAGE AND FAMILY RELATIONS SOCIOLOGY

Sociology-its relation to other social sciences, nature of society and cultures.

Society and individual, social interaction, socialization, Agents of socialization-Social institutions-Family, marriage, religion and educational institutions.

Social groups-primary-Secondary groups, in-groups and out-groups, formal and non-formal groups.

(a)in Indian village (social structure of the village, village panchayat joint and nuclear families, caste and status structure etc.) (b) In Indian city-consequence of planned and unplanned industrialization problems of providing basic amenities. Prevailing special practices-current special problems (delinquency, beggary, prostitution, communal problems). Areas needing social change-social progress with special reference to women. Role of individuals, organizations (Government and voluntary) in bringing about social reform and progress.

Concept of welfare state-Indian constitution-directive principles.

SECTION C

Paper-IV: HUMAN DEVELOPMENT

Growth and development.

Development concept and principles types and rates of change. Developmental characteristics, needs and tasks Factors affecting growth and development (Heredity maternal health, nutrition and environment).

Prenatal Development: Physiology of prenatal development during 1st, 2nd and 3rd trimesters Importance of Antenatal care and facilities available. Common complaints during pregnancy and how to handle them. Some maternal factors affecting prenatal development such as RG - incompatibility, diabetes, hyperthyroidism, excessive use of drugs & alcohol. Parturition- The process. Normal versus instrumental delivery-indicators, assistance required, Community facilities and availing of the same Postnatal care. Physical, physiological needs of neonate and how to meet them. Neonatal adjustment to the daily routine.

Development Through childhood

- a) Physical, motor, social and emotional development during infancy

Development during pre-school period

- a)Cognitive development during pre-school period
- b) Importance of play – types of play
- c) Play needs and during late childhood
- d) Interests-Influence of peer group
- e) Identity crisis - adjustment problems in the home and community during adolescence.

PRE-SCHOOL EDUCATION

Aims and objectives of pre-school Education Needs and characteristics of a crèche and a pre-school

- a) Space
- B) Equipment
- c) The programmer-planning, desirability of flexibility
- d) Staff personality, qualifications.

The daily programme of a Nursery School.

- a) Medical checkup
- b) Outdoor play
- c) Snack
- d) Rest
- e) Indoor play
- f) Story and Rhyme
- g) Creative activity.

Paper- V: HOME SCIENCE EXTENSION:

What is Extension-concept, characteristics, basic philosophy and principles.

Role and qualities of extension worker.

Motivation-adult psychology and learning. Communication - Concept, scope and principles. Importance of communication in extension work.

Teaching aids (one of experience-audio, visual and audio-Visual teaching aids). Principles of preparation, selection and use of teaching aids.

Community-its characteristic urban, rural and tribal.

Principles of programme planning:

- a) Methods to be used to find out felt and unfelt needs of the community:
- b) Methods of teaching (lecture, demonstration, Participatory approach and workshop)
Appropriate for a specific group;
- c) Planning lessons for specific groups;
- d) Principles and methods of evaluating individual/group performance;
Contribution of voluntary organizations in extension.

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SVUCET SYLLABUS
TEST - 47: GENERAL TEST

SECTION - A

INDIAN HERITAGE:

Fundamental unity of Indian Culture Harappan and Vedic Culture Evolution of Caste System - Jainism and

Buddhism - Gandhara Art.

Political unification of India under Mauryas and Guptas.

Cultural achievements.Cultural conditions under the Satavahanas.

Contribution of Pallavas and Cholas to Art and letters, Chola Administrative System.

Influence of Islam on Indian culture - The Sufi, Bhakti and Vishnavite movements.

Cultural achievements of Vijayanagara rulers.

Contribution of Shershah and Akbar to the evolution of administration system in India-Cultural Development under Mughals.

Western Impact on India - Introduction of Western Education-Social and Cultural awakening and social reform movements-Raja Ram Mohan Roy - Dayananda Saraswathi - Theosophical Society - Ramakrishna Para mahamsa and Vivekananda - Iswarachandra Vidyasagar and Veeresalingam-Emancipation of women and struggle against caste.

Rise of Indian Nationalism - Mahatma Gandhi - Non-violence and Satyagraha-Eradication of untouchability – Legacy of British Rule.

INDIAN CULTURE:

1) (a)On the nature of Culture: Meaning, Definition and various interpretations of culture.

(b) Culture and its salient features.

2) The vedic-Upanishadic Culture and society, Human aspirations in those societies-Values-Chaturvidha purusharthas-Chaturvarna theory-Chaturasrama theories.

3.The culture in Arth Sastra.

Kautliyas conception of the State, Religion and King.

4.Culture in Ramayana and Mahabharatha. a) The Ideal Man and Woman. b) Concepts of Maitri, Karuna, Seela, Vinaya, Kshama, Santi Anuraga- as exemplified in the stories and anecdotes of the

Epics.

5.a) The culture of Jainism Jain conception of soul, Karma and liberation.

b)Buddhism as a Humanistic culture,

The four noble truths of Buddhism;

6.Vedanta and Culture:

Religion and Ethical practices : The Hindu view.

SECTION - B

Current Affairs: Regional, National & International Events - Who's who - Sports - Books - Awards - Honours.

SECTION - C

General Knowledge: Social studies up to 10th class level-Inventions-Discoveries-Capital Cities-Abbreviations Social.

Problems (Corruption, Beggary, Casteism)-Verbal & Analytical Reasoning.

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SVUCET SYLLABUS
MSc : TECH HYDROGEOLOGY
Test No - 22, Hydrogeology

SECTION-A

GEOMORPHOLOGY

UNIT-I: Volcanoes & Volcanism –Nature and Origin of volcanoes – Products of volcanism. Eruptive styles and associated landform. Volcanic Hazards and mitigation. Earthquakes and Earth's Interior. Causes, occurrence and effects of Earthquakes. Earth's interior according to seismic theory.

UNIT–II: Mass wasting – Factors influencing mass wasting, types of mass movements – Recognizing and minimizing the effects of mass wasting. Plate tectonics – theory of plate tectonics – nature and origin of ocean floor, origin and shaping of continents.

UNIT–III: Geological action and resulting forms of Glaciers, wind and groundwater.

UNIT–IV: Geological action and resulting landforms of River. Drainage patterns – Morphometric analysis.

MINERALOGY & STRATIGRAPHY

UNIT–I: Structure of silicates, Isomorphism and polymorphism, Structure, Chemistry, Physical and optical characters and paragenesis of the following mineral groups; Olivine, pyroxene, Amphibole, Mica.

UNIT–II: Structure, chemistry, physical and optical characters and paragenesis of the following mineral groups; Quartz, Feldspars, Feldspathoids, Aluminium silicates, Garnet.

UNIT–III: Introduction-Physiographic Divisions of India – Structure and Tectonics of India. Critical study of the following stratigraphic units: - Gondwanas, Deccan traps, Cretaceous of Trichinapalli & Siwaliks.

STRUCTURAL GEOLOGY AND GEOTECTONICS

UNIT-I: Concept of stress and strain. Analyses of stress, stress ellipsoid. Analysis of deformation, strain ellipsoid. The response of rock to stress. Behaviour of materials, Factors controlling the behaviour of rock materials.

UNIT-II: Mechanics of folding and buckling, geometry of superimposed folding, fold systems. Classification and recognition of faults. Strike slip faults, normal faults. Unconformities and their recognition.

UNIT-III: Tectonic aspects of Igneous rocks. Geometric classification of plutonic igneous rocks, Structures in metamorphic rocks, Foliation, Axial plane foliation, transported foliation, other metamorphic foliation. Structural association, salt domes, diapirs, nappe, tectonic mélanges.

UNIT-IV: Plate tectonics-Dynamic evolution of continental and oceanic crust. Sea-floor spreading, Islands arcs, orogeny and epirogeny. Geo-dynamics of Indian plate, evolution of Himalayas, Isostasy and neotectonics.

SECTION – B

COMPUTER APPLICATIONS & GEOSTATISTICS

UNIT – I: COMPUTE FUNDAMENTALS

Introduction to computers: Definition – Characteristics – History and Generations of computers – Classifications of computers – Block diagram – Peripheral devices – Merits and demerits of the computers – Hardware and Software – Data and Information.

UNIT – II: Operation System

Introduction to operating system: Windows. MS Office: MS Word – MS Excel – MS Access – MS Power Point.

UNIT – III: DATA IN EARTH SCIENCES

Classification – Tabulation – Representation of field and laboratory data. Statistical analysis of geological data.

UNIT – IV: QUANTITATIVE TECHNIQUES

Central tendency and dispersion, Correlation and regression, Theoretical distribution analysis of one way variance

REMOTE SENSING & GIS

UNIT-I: Basic concepts and fundamentals of aerial photography scale of photography, Aerial cameras, factors influencing image quality, procurement of aerial photographs, side lap and over lap, Information to be recorded on Aerial photographs and their numbering. Aerial photo interpretation for Geology. Techniques of interpretation. Recognition elements, Geotechnical land forms, drainage, vegetation analysis and land use analysis through remote sensing.

UNIT-II: Basic concepts and fundamentals of Remote sensing. Electromagnetic energy and its sources, Interaction of EM radiation with atmosphere. Interaction of EM radiation with earth surface. Atmospheric

UNIT-III: Sensors - platforms, multispectral Remote sensing in micro wave regions, Remote sensing in thermal infrared regions, Present remote sensing satellites and their pay load characteristics.

UNIT-IV: GIS : Development and definitions – Hardware and software in GIS trends-spatial and non spatial data, GISDATABASE: Data structure-Raster and vector data structures – Data conversions-

comparison of raster and vector data bases-data compression of spatial objects. Elements of GIS– Data capture – Verification and processing – data storage. .

PETROLOGY

Unit-I : Definition and scope of Igneous petrology Classification of Igneous rocks: mode, Norm, CIPW Norm calculations, IUGS classification Irvine – Barager classification. Structures and textures of Igneous rocks.

UNIT-II: The behaviour of major and trace elements in magmatic crystallization and their relation to tectonics. Correlation between tectonic setting and igneous rock suites. Petrographic provinces and associations.

UNIT-III: Metamorphism, Introduction, metamorphic processes, kinds of metamorphism, classification and nomenclature of metamorphic rocks, structures and textures of metamorphic rocks. Metamorphic differentiations, Anatexis and origin of migmatities, Regional metamorphism and paired metamorphic belts, mineralization associated with metamorphic processes.

UNIT-IV: Introduction – Scope of Sedimentology. Processes of weathering – Surface processing and rock weathering. Source of sediments. Classification of sedimentary environments. Non-marine environments-Glacial, Eolian, Lacustrine and Fluvial environments Marine: Shelf and Deep sea sediments.

SECTION – C

HYDROGEOLOGY

UNIT-I: Hydrological cycle-precipitation, runoff, infiltration, evaporation, transpiration. Hydrological properties of rocks-Porosity, permeability, storativity, specific yield and specific retention. Hydraulic conductivity. Hydrographs, water table contour maps. Ground water:- Origin occurrence, vertical distribution of ground water.

UNIT-II: Classification of aquifers: Confined, unconfined, leaky and coastal aquifers: Geological formations as aquifers, springs. Ground water movement: Darcy's Law, determination of hydraulic conductivity. Dispersion of ground water tracers.

UNIT-III: Quality of ground water: Measures of water quality, physical analysis, biological analysis. Chemical analysis, graphic representations. Interpretation of chemical analysis. Classification of waters, pollution of ground water, pollution in relation to water use.

UNIT-IV: Groundwater exploration: Surface and subsurface geological and geophysical methods of groundwater exploration. Hydrogeomorphic mapping using various remote sensing techniques. Artificial recharge of groundwater, consumptive and conjunctive use of surface and ground water.

ENVIRONMENTAL GEOLOGY

UNIT-I: Dimensions of Environmental Stress, History of Environmental degradation. Scope and Objectives of Environmental geology. Biogeochemical cycling and provinces.

UNIT-II: Air pollution–Pollution due to burning of fossil fuels, Acid rain, Greenhouse effect, Ozone depletion, Air pollution control technologies.

UNIT-III: Medical geology-Introduction. Basic principles. Excess and deficient of Trace Elements in Environment. Controls on Elemental intake-Fluorine, Iodine, Zinc

GEOCHEMISTRY

UNIT-I: Definition, scope and development of geochemistry, geochemical classification of elements, Goldschmidt's geochemical principles, geochemical cycle. Meteorites –classification, mineralogy, age and origin.

UNIT-II: Atmosphere-structure, composition and evolution, Biosphere-composition biogenetic deposits – geochemical cycle of carbon. Hydrosphere – nature, physicochemical properties of water, structure and bonding.

UNIT-III: Isotope geology-Isotopes and the periodic table. Stable Isotopes-oxygen Isotopes, sulfur Isotopes, carbon Isotopes-Radioactivity and geochronology brief outline of Rb Sr, K-Ar and radiocarbon (C^{14}) systems.

UNIT-IV: Thermodynamics-historical development-basic concepts and terms, first law of thermodynamics, entropy and second law of thermodynamics, Gibbs phase rule. Activity and fugacity.

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SVUCET SYLLABUS

Test - 17: GEOLOGY

SECTION: A

Paper-I PHYSICAL GEOLOGY, CRYSTALLOGRAPHY AND MINERALOGY

PHYSICAL GEOLOGY: General aspects, Definition of Geology - Basic assumptions of Geology. Its relationship with other sciences - Branches of Geology - Aim and Application of Geology. Earth as a planet: Its shape, size, density, movements and their effects.

Geological processes: Exogenic and Endogenic; Definition of weathering - types of weathering of rocks - physical and chemical; definition of erosion and denudation; cycle of erosion; erosion, transportation and deposition; Agents of erosion.

Rivers: Erosion, transportation and deposition of river (fluvial) cycle in different stages - development of typical landforms by river erosion and deposition - V shaped valley. Waterfall, alluvial fans, meander, ox-bow lake, flood plain, natural levees, peneplain and delta. Types of rivers.

Glaciers: Definition of glacier - types of glaciers - development of typical landforms of glacial erosion and deposition - Cirque, U-shaped valley - Hanging valley, Roches - moutains. Moraines, drumlins, kame, eskers and varves, characteristic features of glaciated regions.

Ground water: Storage of ground water - porosity, permeability, aquifer; water table - zone of saturation, artesian well, spring and geysers; development of typical and forms by erosion and deposition by ground water (Karst topography) sinkhole, caverns, stalactites and stalagmites. sea cliff, sea cave, spit, bar marine deposits - coral reefs, lakes - origin of lakes, importance of lakes, latchstring deposits.

Wind: Development of characteristic features by winds (arid cycle) erosion and deposition - pedestal rock, mushroom topography, inselberg, ventifacts - loess and dunes.

Earthquakes: Causes, kinds of earthquake waves, mode of propagation, intensity of earthquakes, Scale, seismograph and Richter's seismogram. Effects of earthquakes, earthquake zones.

Interior of the earth: Structure and constitution of Volcanoes - Parts of a typical volcanoes, products of volcanoes, origin of volcanoes.

Mountains: Types, causes of mountain building; geo-synclines, Basic concepts of isostasy, continental drift and plate tectonics.

CRYSTALLOGRAPHY

Definition of a crystal - amorphous and crystalline states; morphology of crystals - face, edge, solid angle, interfacial angle

Forms: Simple, combination, closed and open forms.

Symmetry: Plane, axis, and center. Crystallographic axes, parameters, indices; Crystallographic Notation - parameter system Weiss, index system of Miller.

Classification of crystals into 7 systems.

Morphological study of the following classes of symmetry.

I. Cubic system - Galena Type

II. Tetragonal System - Zircon Type

III. Hexagonal System - Beryl Type

IV. Trigonal System - Calcite Type

V. Orthorhombic system - Baryte type.

VI. Monoclinic system - Gypsum type

VII. Triclinic system - Axinite type.

Twinning in crystals: Definition of twin, twin plane, twin axis and Composite plane.

MINERALOGY: Definition of a mineral - classification of minerals into rock forming and ore forming minerals. Physical properties of minerals- colour, streak, play of colours, Opalescence, asterism, transparency, lustre, luminiscence, fluorescence; form, hardness, tenacity, cleavage parting, fracture; spgravity; magnetic properties, electrical properties-pyro and piezoelectricity.

Modes of mineral formation; occurrence and association of minerals. Chemical properties of minerals - isomorphism - solid solution, polymorphism - allotropy, pseudomorphism, radioactivity, silicate structure. Descriptive Mineralogy - study of physical properties, chemical properties and mode of occurrence of the following mineral groups. Nesosilicate - Olivine & garnet, Aluminium Silicates, Sorosilicate -Epidote, Cyclosilicate-Beryl, Inosilicate - Pyroxene, Amphibole Phyllosilicate, Mica and Hydrous magnesium silicates; Tectosilicate - Feldspars, feldspathoid, and Miscellaneous - staurolite, Tourmalin, Zircon, Calcite, Corundum, apatite.

OPTICAL MINERALOGY: Optical properties of minerals. Isotropic and anisotropic substances; polarized light, refractive index, total reflection, double refraction, uniaxial and biaxial minerals; Nicol prism and its construction, concept of crossed nicols, Petrological microscope (Polarizing) its mechanical and optical parts, behaviour of isotropic and anisotropic minerals between crossed nicols extinction, pleochroism, interference colours. Optical properties of important minerals.

SECTION: B

Paper-II PETROLOGY AND STRUCTURAL GEOLOGY

PETROLOGY

Nature and scope of petrology - definition of rock; Classification of rocks into igneous, Sedimentary and metamorphic; distinguishing features of the three types of rocks

Igneous Rocks: Classification into plutonic, hypabyssal and volcanic rocks; forms - Lava Flows, intrusions - sills, Laccolith, lopolith, dykes, ring dykes, cone sheets, volcanic necks, phacolith, batholiths. Structures - Vesicular, amygdaloidal, block lava and ropy lava, pillow, flow, jointing, sheeting, plates, columnar, prismatic. Textures - definition of textures, microstructures, devitrification, allotriomorphic, hypidiomorphic, panidiomorphic, ophitic, intergranular, intersertal, trachytic, graphic, micrographic. Reaction structures-Coronas, Myrmekite, Orbicular, Spherulitic, perilitic. Classification of igneous rocks-CIPW and Tyrrel tabular classifications and constitution of magma, crystallization of magma, unicomponent, binary system with eutectic, solid solutions; Origin of igneous rocks; Bowen's reaction principle; differentiation and assimilation. Descriptive study of the following igneous rocks - granite, granodiorite, syenite, nepheline syenite, diorite, porphyry, pegmatite, aplite, gabbro, anorthosite, peridotite, Pyroxenite, dunite, dolerite, rhyolite, obsidian, pumice, trachyte, andesite, basalt.

Sedimentary Rocks: Sources of Sediments - Mechanical and chemical weathering, modes of transportation, sedimentary environments.

Definitions of diagenesis: lithification and cementation, stratification.

Sedimentary structures: types of bedding, surface marks, deformed bedding, solution structures. Classification of sedimentary rocks clastic - rudaceous, arenaceous, argillaceous, non-clastic - calcareous, carbonaceous, ferruginous, phosphatic, evaporites. Descriptive study of the following sedimentary rocks - conglomerate, breccia, sandstone, grit, arkose, greywacke, Shale, limestone, shelly limestone.

Metamorphic Rocks: Definition of metamorphism, agents of metamorphism, types of metamorphism, grades and zones of metamorphism. Metamorphic minerals - stress and anti stress minerals. Structures of metamorphic rocks - cataclastic, maculose, schistose, granulose and

gneissose. Textures of metamorphic rocks - Crystalloblastic, palimpsest, xenoblastic, idioblastic. Classification of metamorphic rocks - concept of metamorphic facies. Cataclastic metamorphism of argillaceous and arenaceous rocks. Thermal metamorphism of argillaceous, arenaceous and calcareous (limestones) rocks. Dynamothermal metamorphism of argillaceous, arenaceous and basic igneous rocks. Plutonic metamorphism, metasomatism and additive processes; Definition of anatexis and palingenesis. Descriptive study of the following metamorphic rocks - gneiss, Schist, Slate, phyllite, quartzite, marble, granulite, eclogite, amphibolite, migmatite. Indian rocks - khondalite, charnockite, gneiss.

STRUCTURAL GEOLOGY: Definition of structural geology, aims and Objectives of the structural geology; Importance of study of structures. Primary and secondary structures; outcrop, attitude of beds strike, dip, apparent dip; use of clinometer. Primary structures as markers, Folds - description, geometric classification of folds, recognition of folds in the field. Joints-geometrical and genetic classification of joints. Faults -Geometrical and genetic classification of faults, recognition of faults in the field effects of faults on the outcrops.

Unconformities - definition of unconformity - types of unconformities, recognition of unconformities in the field distinguishing the faults from unconformities. Definition of overlap, of flap, outlier, inlier, cleavage, schistosity, foliation and lineation.

SECTION: C

Paper-III PALAEOLOGY, INDIAN GEOLOGY AND ECONOMIC GEOLOGY

PALAEOLOGY: Definition of Palaeontology and fossils, conditions for preservation, modes of preservation, uses of fossils. Study of Taxonomy, classification, Morphology and Geological and geographical distribution of the following invertebrate fossils. Phylum Echinodermata, Phylum Brachiopoda, Phylum Mollusca, Phylum Arthropoda, Monograpthus, Calceola, Cidaris, Micraster, Spirifera, Products, Terebratula, Turritella, Pecten, Gryphea, Nautilus, Belemnites, Calymene, Paradoxides, Glossopteris, Gangamopteris, Ptillophyllum.

INDIAN GEOLOGY: Definition of stratigraphy; stratigraphic principles; definitions of geologic timescales; principles of correlation. Physiographic sub division of India with their stratigraphic and structural characteristics, a Brief study of type area, distribution in India, lithology, fossil content and economic importance of the following geological groups of India - Dharwar, puranas - cuddapahs, Vindhyan, Kurnool, Gondwanas, Triassic of spiti, Jurassic of kutch, cretaceous of Trichy, Deccan traps and their age, siwaliks with vertebrate fossils.

ECONOMIC GEOLOGY: Definition of Economic Geology, mineral resources and their peculiarities, ore, gangue, tenor, syngenetic deposits, epigenetic deposits, endogenetic and exogenetic deposits. Classification of Mineral deposits - Bateman's classification modified by Jessen. Processes of formation of mineral deposits - magmatic concentration, contact metasomatism, hydrothermal - cavity fillings and replacement, sedimentation, residual and mechanical (placer) concentration, oxidation and supergene enrichment, metamorphism; Study of important ores - their chemical composition Physical properties mode of occurrence, distribution in India and uses of the following metals - Gold, Copper, lead, Zinc, Aluminium, Iron, manganese, chromium, uranium and thorium (radio active minerals) Chemical composition, Physical properties, mode of occurrence and distribution in India; Minerals required for the following industries. Refractories, Abrasives, Steel, Cement, Ceramic and Insulators.

Fuels - Coal and Petroleum, their origin, occurrence and distribution in India. Major mineral resources of Andhra Pradesh - asbestos, barytes, coal, mica, clays, limestone, bauxite, petroleum, manganese and gemstones.

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SVUCET SYLLABUS
Test-16:GEOGRAPHY

SECTION-A

PAPER-1 GEOGRAPHY OF INDIA

India-location, relief, drainage system, climate, soils and natural vegetation Population. Distribution, density, growth . green revolution ,problems of Indian agriculture Industries: iron and steel cotton textiles, sugar and petrochemical industries .Transport types in india

PAPER-2 PHYSICAL GEOGRAPHY

Geomorphology: Definition nature and scope of physical geography geological timescale rocks earth moments. Earth quakes and volcanoes. Wegner's theory of Continental drift plate tectonics theory weathering: causes,impacts and types mass movements: causes types and impacts cycle of erosion. Davis and penck theory landforms made by wind, rivers ,underground water ,glaciers and sea waves

SECTION-B

CLIMATOLOGY AND OCEANO GRAPHY (PHYSICAL GEOGRAPHY)

. Weather and Climate; Origin, composition and structure of atmosphere. Insolation, Global heat budget, Horizontal and vertical distribution of temperature, inversion of temperature. Atmospheric pressure- measurement and distribution, pressure belts, planetary winds, Monsoon and Local winds. Humidity- measurement and variables, evaporation, condensation, precipitation forms and types and distribution. Climate classification by Koppen; Climatic change and global warming. Configuration of oceanic floors, Temperature and Salinity of ocean, Land and water distribution. Tides, waves, ocean currents and oceanic resources

HUMAN GEOGRAPHY

Nature and scope of Human Geography. Spatial distribution of Human races. Human adaptation to the environment (i) Cold region - Eskimo (ii) Hot region- Bushman (iii) Plateau - Gonds (iv) Mountains - Gujjars. Meaning, and Definitions of resources, Classification of resources - permanent renewal and non- renewable ; biotic and abiotic. Conservation of resources and Management. Distribution and density of world population, population growth, fertility and mortality patterns. Concept of over, under and optimum population; Population theories: Malthus. Settlements: Definition, types of classification. Rural settlements; origin and evolution Urban settlements: Origin and evolution.

SECTION-C

PAPER-PRINCIPLES OF REMOTE SENSING

Principles of remote sensing- Definition, History and Development. Stages in Remote sensing process, Types of Remote sensing Types of Aerial Photographs: - Vertical, Low oblique Photographs, High oblique Photographs ,Composite photographs, Time trogon photographs and Sonne's Photographs .Geometry ,Scale and Resolution of Aerial Photographs.

Satellites:Types of Satellites – Geostationary Satellites and Sun synchronous Satellites. characteristics of satellites. Satellite orbits:- Definition and Characteristics of Orbit

Sensors: - Definition, Active sensors: - RADAR, Laser Scanner and LIDAR. Passive Sensors:- Photographic Camera, Television Camera, Return Beam Videocon(RBV), Electro Optical Scanner and Multi Spectral Scanner(MSS).

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SecondaryActivities: Manufacturingindustries(cotton textile Iron and Steel) Concept of Manufacturing Regions, Special Economic Zones and Technology Parks.

Teritary Activities:.Transport,.Trade And Services.

PAPER-1-GEOGRAPHICAL INFORMATIONAL SYSTEM(G.I.S)

Geographical Information System(GIS): Definition, history and development Hardware requirements and GIS Software's Functions of GIS. Data input methods: Keyboard, Scanners, GPS data, Aerial photographs and satellite images Database generation: Spatial and non -spatial Definition of data, Metadata and Database. Data Base management System (DBMS). Data types: Raster data and Vector data Raster Data Structures Vector Data Structures Data Analysis: Spatial Measurement Methods, Buffering and overlay Data Models: DTM and TIN

Paper-2-REGIONAL GEOGRAPHY OF ANDHRA PRADESH

FORMATION OF ANDHRA PRADESH-2014: location Physiographic divisions, Soils, climate regions, vegetation and drainage. Population: Distribution, Densityand Growth Agriculture:paddy,groundnut,jowar,cotton,horticulture,vegetables Irrigation: Major, and Minor Dams lift irrigation Canal ,Tank, Well, Tube well and Drip Irrigation.

Transport: Road Railway, Air and Water transport Mineral resources: Iron ore, lime stone, bauxite, granite, petroleum and gas Industries: Iron and steel, Cement Industries, cotton, state economic zones(SEZ),

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Nature, Scope, Content and Evolution of Political Geography, Relation with other branches of Social Sciences Politics, Power and Political Geography: Nation, State and Territory as the central organising principle of Political Geography Evolution of Political Geography: Classical Phase - Ratzel, German Geopolitics Mackinder and Spykeman, Modern Phase (1930 - 1970), Postmodern Phase - (After1970) Indian Political Structure Colonial Structure of India, Bases of Reorganization of Indian States since Independence.

Paper-4-GEOGRAPHICAL THOUGHT: Nature and Evolution of Geographical Thought in the Ancient , Medieval and modern Period Contribution of arab geographers Contribution of greeks geographers Contributions of Indian geographers Contribution of roman and German geographers.

SVUCET :SYLLABUS
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SVUCET SYLLABUS
Test No - 15: Food Technology

SECTION – A

Basic Food Groups – Classification of foods based on Nutritive value – Food group systems: basic 5, basic 7 and basic 9 groups. Functional classification of foods and food grouping. Nutrients : water, proteins, fats, minerals and vitamins – functions of nutrients.

SECTION – B

Fundamentals of Food science : Physico – chemical components and properties of foods : Changes on processing of cereals – pulses and legumes – milk and milk products – fruits and vegetables.

SECTION – C

Food and Nutrient requirements during rapid growth and developments stages of the life span– pregnancy, lactation, infancy and childhood stages. Importance of Macro and Micro nutrients during growth and development. Basic concepts of food spoilage and food adulteration – simple methods of food processing and preservation.

REFERENCES:

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2. Vijaya khader, Food Processing and Preservation, kalyani publishers, 2000.
3. Srilakshmi. B., (a) Food science, (2nd edition)., (b) Food science & Nutrition. New age international (P) Ltd. pub. Bangalore, Chennai, Hyderabad, 2001
4. Swaminathan. M. Essentials of Food and Nutrition , Vol. I & II. Ganesh publishers & Bangalore printing publishing co. ltd, Bangalore, 1985.

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