Sher-e-Kashmir University of Agricultural Sciences & Technology of Kashmir (SKUAST-K), Shalimar, Srinagar (J&K).

Syllabus for University Entrance Test (UET) for admission to UG Programmes – 2026

Stream (PCA-Physics,Chemistry&Agriculture)

PHYSICS | Class XI

Unit I: Physical World and Measurement

Units and Measurements - Need for measurement: Units of measurement; systems of units; SI units, fundamental and derived units. Significant figures. Dimensions of physical quantities, dimensional analysis and its applications.

Units II: Kinematics

Motion in a straight Line - Frame of reference. Motion in a straight line, Elementary concepts of differentiation and integration for describing motion, uniform and non-uniform motion, and instantaneous velocity, uniformly accelerated motion, velocity-time and position-time graphs. Relations for uniformly accelerated motion (graphical treatment).

Motion in a Plane - Scalar and vector quantities; position and displacement vectors, general vectors and their notations; equality of vectors, multiplication of vectors by a real number; addition and subtraction of vectors, unit vector; resolution of a vector in a plane, rectangular components, Scalar and Vector product of vectors. Motion in a plane, cases of uniform velocity and uniform acceleration projectile motion, uniform circular motion.

Unit III: Laws of Motion

Laws of Motion - Intuitive concept of force, Inertia, Newton's first law of motion; momentum and Newton's second law of motion; impulse; Newton's third law of motion. Law of conservation of linear momentum and its applications. Equilibrium of concurrent forces, Static and kinetic friction, laws of friction, rolling friction, lubrication. Dynamics of uniform circular motion: Centripetal force, examples of circular motion (vehicle on a level circular road, vehicle on a banked road).

Unit IV: Work, Energy and Power

Work done by a constant force and a variable force; kinetic energy, work energy theorem, power. Notion of potential energy, potential energy of a spring, conservative forces: non-conservative forces, motion in a vertical circle; elastic and inelastic collisions in one and two dimensions.

Unit V: Motion of System of Particles and Rigid Body

System of Particles and Rotational Motion - Centre of mass of a two-particle system, momentum conservation and Centre of mass motion. Centre of mass of a rigid body; centre of mass of a uniform rod. Moment of a force, torque, angular momentum, law of conservation of angular momentum and its applications. Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motions. Moment of inertia, radius of gyration, values of moments of inertia for simple geometrical objects (no derivation).

Unit VI: Gravitation

Kepler's laws of planetary motion, universal law of gravitation. Acceleration due to gravity and its variation with altitude and depth. Gravitational potential energy and gravitational potential, escape speed, orbital velocity of a satellite.

Unit VII: Properties of Bulk Matter

Mechanical Properties of Solids - Elasticity, Stress-strain relationship, Hooke's law, Young's modulus, bulk modulus, shear modulus of rigidity (qualitative idea only), Poisson's ratio; elastic energy.

Mechanical Properties of Fluids - Pressure due to a fluid column; Pascal's law and its applications (hydraulic lift and hydraulic brakes), effect of gravity on fluid pressure. Viscosity, Stokes' law, terminal velocity, streamline and turbulent flow, critical velocity, Bernoulli's theorem and its simple applications. Surface energy and surface tension, angle of contact, excess of pressure across a curved surface, application of surface tension ideas to drops, bubbles and capillary rise.

Thermal Properties of Matter - Heat, temperature, thermal expansion; thermal expansion of solids, liquids and gases, anomalous expansion of water; specific heat capacity; Cp, Cv - calorimetry; change of state - latent heat capacity. Heat transfer-conduction, convection and radiation, thermal conductivity, qualitative ideas of Blackbody radiation, Wein's displacement Law, Stefan's law.

Unit VIII: Thermodynamics

Thermal equilibrium and definition of temperature, zeroth law of thermodynamics, heat, work and internal energy. First law of thermodynamics, Second law of thermodynamics: gaseous state of matter, change of condition of gaseous state -isothermal, adiabatic, reversible, irreversible, and cyclic processes.

Unit IX: Behaviour of Perfect Gases and Kinetic Theory of Gases

Kinetic Theory - Equation of state of a perfect gas, work done in compressing a gas. Kinetic theory of gases - assumptions, concept of pressure, Expression for pressure exerted by a gas. Kinetic interpretation of temperature; rms speed of gas molecules; degrees of freedom, law of equipartition of energy (statement only) and application to specific heat capacities of gases; concept of mean free path, Avogadro's number.

Unit X: Oscillations and Waves

Oscillations - Periodic motion - time period, frequency, displacement as a function of time, periodic functions and their applications. Simple harmonic motion (S.H.M) and its equations of motion; phase; oscillations of a loaded spring- restoring force and force constant; energy in S.H.M. Kinetic and potential energies; simple pendulum derivation of expression for its time period.

Waves - Wave motion: Transverse and longitudinal waves, speed of travelling wave, displacement relation for a progressive wave, principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics, Beats.

PHYSICS |Class XII

Unit I: Electrostatics

Electric Charges and Fields - Electric charges, Conservation of charge, Coulomb's law-force between two- point 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, electric field due to a dipole, torque on a dipole in uniform electric field. Electric flux, statement of Gauss's theorem and its applications to find field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell (field inside and outside).

Electrostatic Potential and Capacitance - Electric potential, potential difference, electric potential due to a point charge, a dipole and system of charges; equipotential surfaces, electrical potential energy of a system of two-point charges and of electric dipole 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 in parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor (no derivation, formulae only).

Unit II: Current Electricity

Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current; Ohm's law, V-I characteristics (linear and non-linear), electrical energy and power, electrical resistivity and conductivity, temperature dependence of resistance, Internal resistance of a cell, potential difference and emf of a cell, Kirchhoff's rules, Wheatstone bridge.

Unit III: Magnetic Effects of Current and Magnetism

Moving Charges and Magnetism - Concept of magnetic field, Oersted's experiment. Biot - Savart law and its application to current carrying circular loop. Ampere's law and its applications to infinitely long straight wire. Straight solenoid (only qualitative treatment), force on a moving charge in uniform magnetic and electric fields. Force on a current-carrying conductor in a uniform magnetic field, force between two parallel current-carrying conductors-definition of ampere, torque experienced by a current loop in uniform magnetic field; Current loop as a magnetic dipole and its magnetic dipole moment, moving coil galvanometer- its current sensitivity and conversion to ammeter and voltmeter.

Magnetism and Matter - Bar magnet, bar magnet as an equivalent solenoid (qualitative treatment only), magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis (qualitative treatment only), torque on a magnetic dipole (bar magnet) in a uniform magnetic field (qualitative treatment only), magnetic field lines. Magnetic properties of materials- Para-, dia- and ferro - magnetic substances with examples, Magnetization of materials, effect of temperature on magnetic properties.

Unit IV: Electromagnetic Induction and Alternating Currents

Electromagnetic Induction - Electromagnetic induction; Faraday's laws, induced EMF and current; Lenz's Law, Self and mutual induction.

Alternating Current - Alternating currents, peak and RMS value of alternating current/voltage; reactance and impedance; LCR series circuit (phasors only), resonance, power in AC circuits, power factor, wattles current. AC generator, Transformer.

Unit V: Electromagnetic waves

Electromagnetic Waves - Basic idea of displacement current, Electromagnetic waves, their characteristics, their transverse nature (qualitative idea only). Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses.

Unit VI: Optics

Ray Optics and Optical Instruments - Ray Optics**:** Reflection of light, spherical mirrors, mirror formula, refraction of light, total internal reflection and optical fibers, refraction at spherical surfaces, lenses, thin lens formula, lens maker's formula, magnification, power of a lens, combination of thin lenses in contact, refraction of light through a prism. Optical instruments: Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.

Wave Optics - Wave optics: Wave front and Huygen's principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws of reflection and refraction using Huygen's principle. Interference, Young's double slit experiment and expression for fringe width (No derivation final expression only), coherent source and sustained interference of light, diffraction due to a single slit, width of central maxima (qualitative treatment only).

Unit VII: Dual Nature of Radiation and Matter

Dual Nature of Radiation and Matter - Dual nature of radiation, Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation-particle nature of light. Experimental study of photoelectric effect Matter waves-wave nature of particles, de-Broglie relation.

Unit VIII: Atoms and Nuclei

Atoms - Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model of hydrogen atom, Expression for radius of nth possible orbit, velocity and energy of electron in nth orbit, hydrogen line spectra (qualitative treatment only).

Nuclei - Composition and size of nucleus, nuclear force Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission, nuclear fusion.

Unit IX: Electronic Devices

Semiconductor Electronics - Materials, Devices and Simple Circuits Energy bands in conductors, semiconductors and insulators (qualitative ideas only) Intrinsic and extrinsic semiconductors- p and n type, p-n junction Semiconductor diode - I-V characteristics in forward and reverse bias, application of junction diode -diode as a rectifier.

CHEMISTRY | Class XI

UNIT-1: SOME BASIC CONCEPTS OF CHEMISTRY

General Introduction: Importance of studying chemistry, Historical approach to particulate nature of matter, Laws of Chemical combination (numerical), Dalton's Atomic Theory, Concept of elements, atoms & molecules. Atomic and molecular masses, Mole concept and molar mass, percentage composition, empirical and molecular formula; chemical reactions, stoichiometry and calculation based on stoichiometry.

Unit-II: STRUCTURE OF ATOM

Discovery of electron, proton and neutron, atomic number, isotopes and isobars. Thompson's model and its limitations, Rutherford's model and its limitations. Bohr's model & its limitations, concept of shells and sub-shells. Dual nature of matter and light, de-Broglie's relationship. Heisenberg's uncertainty principle, concept of orbitals, quantum numbers, shapes of s, p and d- orbitals. Rules for filling electrons in orbitals- Aufbau's principle, Pauli's exclusion principle and Hund's rule. Electronic configuration of atoms, stability of half-filled and completely filled orbitals.

Unit-III: CLASSIFICATION OF ELEMENT AND PERIODICITY IN PROPERTIES

Significance of classification, brief history of the development of periodic table. Modern periodic law and the present form of the periodic table, periodic trends in properties of elements: atomic radii, ionic radii, inert gas radii, ionization enthalpy, electron gain enthalpy, electronegativity, valency.

Unit-IV: CHEMICAL BONDING AND MOLECULAR STRUCTURE

Valence electrons, ionic bond, covalent bond, bond parameters, Lewis structure, polar character of covalent bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridization involving s, p and d-orbitals and shapes of some simple molecules, molecular orbital theory of homonuclear molecules (Qualitative idea only), hydrogen bond.

Unit-V: THERMODYNAMICS

Concepts of system, types of systems, surrounding, work, heat; energy intensive and extensive properties, state functions. First Law of Thermodynamics, internal energy, enthalpy, heat capacity, specific heat, molar heat capacity, measurement of ΔE and ΔH, Hess's law of constant heat summation, enthalpy of bond dissociation, combustion; formation, atomization, sublimation, phase transition ionization and dilution. Introduction of entropy as a state function, free energy change for spontaneous and non-spontaneous process and equilibrium.

Unit-VI: EQUILIBRIUM

Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium: Le-Chatelier's principle ionic equilibrium-ionization of acids and bases, strong and weak electrolytes, degree of ionization, Concept of pH. Hydrolysis of salts (elementary idea), buffer solutions. Solubility product, common ion effect (with suitable examples).

Unit-VIII: REDOX REACTIONS

Concept of oxidation and reduction, redox reactions, oxidation number, balancing of chemical equations in redox reactions, applications of redox reactions.

Unit-IX: ORGANIC CHEMISTRY-SOME BASIC PRINCIPLES AND TECHNIQUES

General introduction to organic chemistry, methods of purification, qualitative and quantitative analysis, classification and IUPAC nomenclature of organic compounds.

Electronic displacement in a covalent bond: inductive effect, electromeric effect, resonance and hyper-conjugation. Homolytic and heterolytic fission of a covalent bond, free radicals, electrophiles, nucleophiles, carbocations and carbanions. Types of organic reactions.

Unit-X: HYDROCARBONS

Classification of hydrocarbons

Alkanes: Nomenclature, isomerism, conformations (ethane only), Methods of preparation, physical properties. Chemical reactions including free radical mechanism of halogenation, combustion and Pyrolysis

Alkenes: Nomenclature, structure of double bond (ethene), geometrical isomerism, methods of preparation, physical properties, chemical reactions- addition of hydrogen. halogen, water, hydrogen halides (Markownikov's addition and peroxide effect). ozonolysis, oxidation, mechanism of electrophilic addition. Alkynes: Nomenclature, structure of triple bond (ethyne), physical properties, methods of preparation, chemical reactions: acidic character of alkynes, addition reaction of hydrogen, halogens, hydrogen halides and water, Aromatic hydrocarbons introduction, IUPAC nomenclature, Benzene resonance, aromaticity, chemical properties, mechanism of electrophilic substitution-nitration, sulphonation, halogenations Friedel Craft's alkylation and acylation, directive influence of functional group in mono substituted benzene.

CHEMISTRY | Class XII

Unit-I: SOLUTIONS

Types of solutions, expression of concentration of solutions of solids in liquids, solubility of gases in liquids, solid solutions, colligative properties: relative lowering of vapor pressure of a solution, Raoult's law, elevation of boiling point, depression in freezing point temperature and osmotic pressure), determination of molecular masses using colligative properties. Abnormal molecular mass, Van't Hoff factor and calculations involving it.

Unit-II: ELECTROCHEMISTRY

Redox reactions, conductance in electrolytic solutions, specific conductivity, molar conductivity, variation of conductivity with concentration, Kohlrausch's law and its applications Electrolysis and laws of electrolysis (elementary idea), 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 Gibb's energy change and emf of a cell, fuel cells, corrosion

Unit-III: CHEMICAL KINETICS

Rate of reaction (average and instantaneous rate of a reaction), factors affecting rate of reactions: (concentration, temperature, catalyst), rate law, specific rate constant and order, molecularity of a reaction, integrated rate expression of zero and first order reactions and their derivations, half-life period. Concept of collision theory (elementary idea, no mathematical derivation). Activation energy, Arrhenius equation.

Unit-IV: d and f-BLOCK ELEMENTS

General introduction, electronic configuration, occurrence and characteristics of the transition meals, general trends in properties of first row transition metals (metallic character, IE, electrode potential, oxidation state, ionic radii, catalytic properties, colored ions, complex formation, magnetic properties, interstitial compounds, alloy formation). Preparation and properties of K2Cr2O7 and KMnO4, Lanthanides: electronic configuration, oxidation state, chemical reactivity and lanthanide contraction and its consequences. Actinides- electronic configuration, oxidation states and comparison with lanthanoids.

Unit- V: CO-ORDINATION COMPOUNDS

Co-ordination compounds: Introduction, ligands, co-ordination number, color, magnetic properties and shapes, IUPAC nomenclature of mononuclear co-ordination compounds. Bonding (Werner's theory, VBT and CFT), structural and stereoisomerisms, importance of coordination compounds in qualitative inclusion of analysis, extraction of metals and biological systems.

Unit-VI: HALOALKANES AND HALOARENES

Haloalkanes: Nomenclature, nature of C-X bond, physical & chemical properties, mechanism of substitution reactions. Stability of carbocations, R-S and D-L configurations Haloarenes: Nature of C-X bond, substitution reactions (directive influence of halogens for mono substituted compounds only), Uses and environmental effects of-dichloromethane, trichloromethane, tetrachloromethane, iodoform, freon, and DDT

Unit- VII: ALCOHOLS, PHENOLS AND ETHERS

Alcohols: Nomenclature, methods of preparation, physical & chemical properties (of primary alcohols only), identification of primary, secondary & tertiary alcohols; mechanism of dehydration of alcohols. Uses, some important compounds - methanol and ethanol.

Phenols: Nomenclature, methods of preparation, physical & chemical properties, acidic nature of phenol, electrophillic substitution reactions, uses of phenols.

Ethers: Nomenclature, methods of preparation, physical & chemical properties and uses.

UNIT-VIII: ALDEHYDES, KETONES AND CARBOXYLIC ACIDS

Aldehydes and Ketones: Nomenclature, nature of carbonyl group, methods of preparation, physical & chemical properties & mechanism of nucleophilic addition reaction to C=O group, reactivity of alpha hydrogen in aldehydes, uses

Carboxylic Acids: Nomenclature, acidic nature, methods of preparation, physical & chemical properties and uses

UNIT-IX: ORGANIC COMPOUNDS CONTAINING NITROGEN

Amines: Nomenclature, classification, structure, methods of preparation, physical & chemical properties, uses, identification of primary, secondary & tertiary amines.

Cyanides and Isocyanides: Structures of cyanide and isocyanide groups, nomenclature, preparation, physical properties and chemical reactions.

Diazonium Salts: Preparation and chemical reactions (mechanism of diazotization), and importance aesthetic organic chemistry

UNIT-X: BIOMOLECULES

Carbohydrates: Classification (aldoses and ketoses), mono saccharides: Glucose, fructose: structure, preparation and chemical reactions, oligosaccharides (sucrose, lactose & maltose) Polysaccharides: (starch cellulose and glycogen); importance.

Proteins: Elementary idea of amino acids: peptide bond, polypeptides and primary, secondary, etary and qualemary structure of proteins (Qualitative idea only), denaturation of proteins; enzymes, lips & hormones, their classification & functions.

Nucleic Acids: DNA and RNA (purines and pyrimidines, nucleosides, nucleotides and fragments up to four nucleotides).

Vitamins: Classification and functions, sources and deficiency diseases.

Syllabus for UET UG-2026 (Agriculture)

AGRONOMY

Cultivation of common crops-wheat, paddy, cotton, jowar, bajra, maize, soybean, arhar, mustard, sunflower, pea, groundnut., gram, tobacco, berseem, potato and sugarcane under the following heads:

Recommended varieties and their main characteristics, suitable areas, seed rate, time and method of sowing, irrigation, fertilizer use, control of weeds, insect-pests and diseases, harvesting, processing and yield.

Soils-origin and classification loam, silt, clay, sandy loam, etc.; physical and chemical properties; soil conservation. Use of fertilizers, essential nutrients-nitrogen, phosphorus and potassium uptake by different crops, organic and inorganic fertilizers and their effects on crops and soil, methods of using fertilizers,

Farmyard manure, composting, green manuring, study of organic and inorganic fertilizers/ manures.

Pollution of soil, water and air in modern agriculture and remedial measures.

Irrigation and Drainage- water requirement of crops, measurement of water discharge, prevention of loss of water: quality of water; different methods of irrigation- flooding, basin method, border/strip method sprinkler and drip irrigation- their advantages and limitations. Necessity for drainage, damage to soil and crops due to excess moisture, prevention of formation of acidic and alkaline soils and their management; natural calamities- floods and drought and their management.

HORTICULTURE

Study of following horticulture crops including recommended varieties and their main features, suitability for different regions, time and method of sowing, fertilizer use, irrigation, diseases and pests and their control.

Crops- cabbage, cauliflower, onion, garlic, cucurbits, bitter gourd, bottle gourd, muskmelon, squash, ridge gourd; root crops-carrot, radish sweet potato, turnip: peas, tomato, brinjal, lady's finger, spices; fruit crops such as banana, apple, mango, litchi, citrus, guava, papaya, peach etc.

AGRICULTURAL ENGINEERING

Type of iron and steel, wood, plastic and tin used in agricultural implements and their forms and properties.

Study of different types of ploughs-their merits and demerits; mechanical devices such as cultivator, harrow, sprayer, seed drill, threshers etc., their management and cost, selection of prime movers, water lifting devices, discharge, command area, cost of different system; soil preparation, methods of ploughing, need for village kinds of tillage interculture equipment for interculture.

Power transmission through belts, pullies and gears questions relating to number of teeth in gears according to speed and size of pullies, hand operated chaff cutters, cane crusher etc., draught and its measurement.

AGRICULTURAL ECONOMICS

Introductory agricultural economics- meaning and scope, significance of agricultural economics in national planning, production- meaning factors of production such as land, labour, capital and management, properties of factor of production; law of returns; intensive and extensive agriculture; exchange - meaning types, advantages types of markets general price determination; money and credit; banks and their functions principle of international trade distribution-meaning rent wages interest and profit consumption meaning wants and their properties law of diminishing marginal

utility law of demand relative prices and standard of living; Cooperation- meaning, principles of cooperative types of cooperative societies in agriculture single purpose and multi- purpose cooperative societies, land development banks: Agriculture- place in five year plans; statistics of agricultural production in the state; major programmes of agricultural development.

ANIMAL HUSBANDARY AND VETERINARY SCIENCE

Study of major breeds of cows, buffaloes, goat, sheep and poultry; elementary physiology and anatomy of cows and bullocks; estimate of their age; characteristics of good milch cows and buffaloes, bulls and bullocks.

Care and management of pregnant cow, during calving, newborn calves, young calves, mulch cows; poultry management.

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