ALLEN CAREER INSTITUTE KOTA (RAJASTHAN)

DISTANCE LEARNING PROGRAMMES

(Session : 2011 - 2012)

Pre-Medical

TEST WISE SYLLABUS FOR NURTURE TEST SERIES & JOINT PACKAGE COURSE

Test No.	PHYSICS
01	Basic mathematics used in physics, vectors, Units, Dimensions and Measurement
02	Motion in One dimension, Motion in Two Dimension (Projectile Motion & Circular Motion)
03	Laws of motion and friction
04	Syllabus of Test # 1, 2 & 3
05	Work, Energy, Power and Conservation laws, Centre of mass
06	Rotational Motion
07	Mode of Heat Transfer
08	Syllabus of Test # 5, 6 & 7
09	Calorimetry, Heat and Thermodynamics, Thermometry, Thermal Expansion, Humidity
10	Kinetic theory of gases
11	Elasticity, Surface Tension, Viscosity and Hydraulics
12	Syllabus of Test # 9, 10 & 11
13	Oscillations (SHM, damped oscillations, forced oscillation & Resonance)
14	Wave Motion, Doppler's Effect
15	Gravitation
16	Syllabus of Test # 13, 14 & 15

Test No.	CHEMISTRY
01	SOME BASIC CONCEPTS OF CHEMISTRY : Imortance of Chemistry, Physical Quantities and their Measurement in Chemistry, Measurement and SI units, Measurement and Significant Figures, Units and Dimensional Analysis, Matter, The mole concept, Laws of Chemical combination, Dalton's Atomic Theory, Atomic, Molecular and Molar Masses, Percentage Composition and Molecular Formula, Chemical Stoichiometry, Stoichiometry and Problem Solving. ATOMIC STRUCTURE : Earlier Atomic Models, Developments Leading to the Bohr model of atom, Bohr model of atom, Towards quantum mechanical model of the atom, Quantum Mechanical model of atom, Electronic Configurations of Atoms.
02	FIRST LAW OF THERMODYNAMICS AND CHEMICAL ENERGETICS : Some basic concepts in Thermodynamics, First law of Thermodynamics, Heat capacity and specific heat capacity, Measurement of ΔU and ΔH : Calorimetry, Standard Enthalpy Changes, Thermochemical Equations, Enthalpy changes during phase Transformations, Hess's law of constant heat summation, Standard enthalpies of formation, Bond Enthalpies, Sources of energy.
03	EQUILIBRIUM : Equilibrium in Physical processes, Equilibrium in Chemical processes – Dynamic Equilibrium, Law of chemical equilibrium and Equilibrium constant, Homogeneous equilibria, Heterogeneous equilibria, Application of equilibrium constants, Factors affecting equilibria. Acids, Bases and Salts, Ionization of Acids and Bases, The acid–base titration using indicators, Buffer solutions, Solubility equilibria of sparingly soluble salts.
04	Syllabus of Test # 1, 2 & 3
05	CLASSIFICATION OF ELEMENTS AND PERIODICITY IN PROPERTIES : Genesis of periodic classification : From Doebereiner to mendeleev, Modern periodic law and the present form of the periodic table, Nomenclature of the elements with atomic No. > 100, Electronic configurations of the elements and periodic table, Types of elements : s, p, d, f–Blocks, Periodic Trends in propeties of elements.
06	CHEMICAL BONDING AND MOLECULAR STRUCTURE : Kossel–lewis approach to chemical bonding, The ionic bond, The covalent bond, The valence shell electron pair repulsion (VSEPR) Theory – Shapes (Geometry) of molecules, Valence bond theory.
07	REDOX REACTIONS : Role of electrons in reduction – Oxidation reactions, Oxidation numbers, Balancing chemical equation, Electrochemical cells. PRINCIPLES AND PROCESS OF EXTRACTION OF ELEMENTS : Origin of elements, distribution of elements of earth, Abundance of elements in the earth's crust. Elements in biological world, Ocean as a source of elements, Modes of Occurrence of metals, Minerals found in India, Extraction of elements, Thermodynamics of metallurgy.
08	Syllabus of Test # 5, 6 & 7

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Test No.	CHEMISTRY
09	STATES OF MATTER : Intermolecular forces versus thermal energy, The gaseous state, Gas laws, Kinetic molecular model of a gas, Real gases, Liquefaction of Gases and Critical point, The liquid state, Solids, Intermolecular forces.
10	HYDROGEN : Unique position of hydrogen in the periodic table, Dihydrogen, Preparation and commercial production of hydrogen, Properties of dihydrogen, Uses of dihydrogen, Hydrides, Water, Hard and Soft water, Hydrogen peroxide, Heavy water, Hydrogen Economy (Use of Liquid hydrogen as a Fuel)
11	THE S–BLOCK ELEMENTS : General characteristics of the alkali metals, Anomalous properties of lithium, The metals, General characteristics of the alkaline earth metals, Anomalous behaviour of beryllium, Magnesium metal, Some important compounds of the alkaline earth metals. SOME P–BLOCK ELEMENTS : Boron, Carbon, Nitrogen, Oxygen.
12	Syllabus of Test # 9, 10 & 11
13	ORGANIC CHEMISTRY SOME BASIC PRINCIPLES - I : Tetravalency of carbon : Shapes of organic compounds, Structural representations of organic compounds, Nomenclature of organic compounds, Classification of organic compounds, Isomerism, Steric hindrance, Inductive effect, Resonance structures, Hyperconjugation, Organic reactions and their classification
14	HYDROCARBONS : Alkane, Alkenes.
15	ALKYNES, AROMATIC HYDROCARBON PURIFICATION AND CHARACTERIZATION OF ORGANIC COMPOUNDS : Purification, Qualitative analysis, Quantitative analysis, Determination of molecular mass, Determination of empirical and molecular formulae. ENVIRONMENTAL CHEMISTRY : Environmental pollution, Atmospheric pollution, Water pollution, Land pollution, Strategy for control of environmental pollution.
16	Syllabus of Test # 13, 14 & 15
Test No.	**BIOLOGY**
01	DIVERSITY OF PLANT LIFE - I : Three kingdom, four kingdom and five kingdom (Monera, Protista, Mycota, Plantae & Animalia). Kingdom Monera (Diagnostic characters of procaryotes, Eubacteria, Actinomycetes, BGA, Archaebacteria, Mycoplasma, Rickettsia., Kingdom Protista (Dinoflagellates, Diatoms, Euglenoids & Slimemolds), Kingdom Mycota (Gen Characters of Fungi,Phycomycetes, Ascomycetes, Basidiomycetes & Duteromycetes).
02	DIVERSITY OF PLANT LIFE - II : Kingdom Plante (Algae, Bryophyta, Pteridophyta & Spermatophyta). Branches of Botany.
03	DIVERSITY OF ANIMAL LIFE - I : General features of animal classification, Classification of animals (Protozoa to Echinodermata).
04	Syllabus of Test # 1, 2 & 3
05	DIVERSITY OF ANIMAL LIFE - II : Classification of Animals (Chordata upto Mammalia).
06	CELL BIOLOGY : Tools and techniques in cell biology, Cell structure, Cell cycle, Mitosis, Meiosis, Amitosis. PROTOPLASM : Physical nature, Physical properties and Biological properties of protoplasm. Inorganic compounds of protoplasm, organic compounds of protoplasm – carbohydrates, Lipids, Protiens, Nucleic acid.
07	MORPHOLOGY OF FLOWERING PLANTS : Root, Stem, Leaf, Inflerescence, Flower, Fruit, Seed, Dispersal of fruit and seeds. FAMILIES OF ANGIOSPERMS : Brassicaceae, Solanaceae, Papilionatae, Liliaceae, Asteraceae, Poaceae. PLANT ANATOMY : Tissues, Tissue systems, Internal structure of Dicot and Monocot plants. Secondary growth.
08	Syllabus of Test # 5, 6 & 7
09	ANIMAL TISSUES, MORPHOLOGY OF ANIMALS : Earthworm, Cockroach and Frog.
10	PLANT PHYSIOLOGY - I : Diffusion, Osmosis and Imbibition, Absorption of water, Ascent of sap, Transpiration, Mineral nutrition and Absorption.
11	PLANT PHYSIOLOGY - II : Photosynthesis, Special Modes of Nutrition in Plants, Translocation of solutes, Respiration, Enzymes, Nitrogen Cycle, Growth Hormones & Plant Movements.
12	Syllabus of Test # 9, 10 & 11
13	HUMAN PHYSIOLOGY - I : Digestive System, Vitamins, Nutritional Imbalance and Deficiency Diseases, Limb Muscles, Excretory System.
14	HUMAN PHYSIOLOGY - II : Respiratory System, Circulatory System, Skeletal System.
15	HUMAN PHYSIOLOGY - III : Endocrine Glands, Eye and Ear, Nervous System.
16	Syllabus of Test # 13, 14 & 15

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Path to Success

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Test No.	PHYSICS
01	Basic mathematics used in physics, vectors, Units, Dimensions and Measurement, Motion in One dimension, Motion in Two Dimension (Projectile Motion & Circular Motion)
02	Laws of motion and friction, Work, Energy, Power and Conservation laws, Centre of mass
03	Electrostatics, Capacitors
04	Syllabus of Test # 1, 2 & 3
05	Current electricity,Thermal and Chemical effects of current
06	Magnetic effect of current and Magnetism
07	Electromagnetic Induction (EMI), Electromagnetic Waves (EMW), Alternating current (AC) and LC Oscillations
08	Syllabus of Test # 5, 6 & 7
09	Ray optics and optical Instruments, Wave optics (Interference, Diffraction & Polarisation), Nature of Light, Photometry
10	Gravitation, The Universe, Atomic and Nuclear Physics
11	Digital Electronics (Logic Gates), Vaccum Tube Electronics,Semiconductor Electronics, Principle of Communication
12	Syllabus of Test # 9, 10 & 11
13	Rotational Motion, Elasticity, Surface Tension, Viscosity and Hydraulics
14	Kinetic theory of gases, Heat and thermodynamics, Mode of Heat Transfer, Thermometry, Thermal Expansion, Humidity, Dew point
15	Oscillations (SHM, damped oscillations, forced oscillation & Resonance), Wave Motion, Doppler's Effect
16	Syllabus of Test # 13, 14 & 15
Test No.	**CHEMISTRY**
01	Organic Chemistry-some Basic Principle, Nomenclature, Isomerism, Classification of Organic Compounds, Reaction Mechanism
02	Alkane, Alkene, Alkyne, Aromatic Hydrocarbon.
03	Halogen Derivatives, Mono, Di & Tri Hydric alc., Phenol, Ether, Carbonyl Compound, Carboxylic acid & its Derivatives
04	Syllabus of Test # 1, 2 & 3
05	Amine, Aniline, Nitro Benzene, Nitro Alkane, Cyanides, Isocyanides, Environmental Chemistry, Biological process, Polymers, Chemistry in action, Purification of Organic Compounds.
06	Atomic Structure, Nuclear Chemistry, Periodic Table & Periodicity in Properties. Heavier Metals occurance and Extraction
07	Chemical Bonding, Hydrogen and its Compound
08	Syllabus of Test # 5, 6 & 7
09	d Block Elements, Coordination Chemistry, f-Block Elements, Organo Metalic Compounds.
10	s Block ElementsChemistry of Lighter Elements. p-Block Elements.
11	Atom, Molecule and Chemical Arithmatic, State of Matter (Solid State, Liquid and Gaseous State), Redox Reactions, Chemical Thermodynamics and Energetics.
12	Syllabus of Test # 9, 10 & 11
13	Electrochemistry, Surface Chemistry
14	Chemical Equillibrium, Chemical Kinetics
15	Ionic Equilibrium, Acid-Base (Concepts), pH-Buffer Solution, Indicators, Volumetic Analysis, Solution
16	Syllabus of Test # 13, 14 & 15

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TEST WISE SYLLABUS FOR LEADER TEST SERIES & JOINT PACKAGE COURSE

Test No.	BIOLOGY
01	**UNITY OF LIFE :** Cell structure, Cell division, PROTOPLASM - Small molecules and Macro molecules.
02	**DIVERSITY OF PLANT LIFE :** Scientific Nomenclature, Binomial System, ICBN, Trinomial System, Taxonomic Hierarchy (taxon), Species concept, Types of Classification, Botanical Gardens and Herbaria, History of Plant Taxonomy, Two Kingdom, Four Kingdom and Five Kingdom Systems of Classification, Diagnostic Characters of Procaryotes, Bacteria, Virus, Mycoplasma Diagnostic Characters of Thallophyta (Algae and Fungi), *Ulothrix, Spirogyra, Albugo, Mucor*, Lichen and Mycorrhiza, Diagnostic Characters of Bryophyta, *Riccia, Funaria* Diagnostic Characters of Pteridophyta, *Pteridium, Selaginella*, Diagnostic Characters of Spermatophyta, Pinus, Branches of Botany
03	**DIVERSITY OF ANIMAL LIFE :** Classification of Animals (Protozoa to chordata upto Mammalia). Brief knowledge of *Amoeba, Plasmodium, Hydra, Ascaris*, Earthworm and Cockroach.
04	Syllabus of Test # 1, 2 & 3
05	**ORGANISMS AND ENVIRONMENT** : Origin and concept of species, population; interaction between environment and populations, community. Biotic community, interaction between different species, biotic stability, changes in the community, succession. Ecosystem; Interaction between biotic and abiotic components; major ecosystems, man made ecosystem-Agroecosystem. Biosphere; flow of energy, trapping of solar energy, energy pathway, food chain, food web, biogeochemical cycles, calcium and sulphur, ecological imbalance and its consequences. Conservation of natural resources; renewable and non-renewable (in brief). Water and land management, wasteland development. Wild life and forest conservation; causes for the extinction of some wild life, steps taken to conserve the remaining species, concept of endangered species-Indian Examples, conservation of forest; Indian forests, importance of forests, hazards of deforestation, afforestation, Environmental pollution; air and water pollution, sources, major pollutants of big cities of our country, their effects and methods of control, pollution due to nuclear fallout and waste disposal, effect and control, noise pollution; sources and effects. Ecological adaptations-Hydrophytes and Xerophytes. Plant tissues, Primary Structure of Root, Stem and Leaves, Anomalous Pri. Structure, Sec. growth.
06	Morphology of Angiosperms - Families of Angiosperms, Important Characters and Economic Importance of Cruciferae, Malvaceae, Solanaceae, Leguminosae, Liliaceae, Gramineae, Compositae, Cucurbitaceae and Ranunculaceae. Reproduction and Development of Angiosperms (Life History of Angiosperms). Seed dormancy and Seed Germination. Medicinal Plants.
07	Mineral and Water relation of Plants, Photosynthesis, Mineral Nutrition, Respiration, Enzymes, Growth, Growth Hormones, Plant Movements.
08	Syllabus of Test # 5, 6 & 7
09	Animal Tissues, **MAMMALIAN SYSTEMS -** Digestive System, Vitamins, Nutritional Imbalance and Deficiency Diseases,Excretory System, Limb Muscles,Reproductive System, Embryology.
10	**MAMMALIAN SYSTEM** - Respiratory System, Integumentary System, Circulatory System,Skeletal System.
11	**MAMMALIAN SYSTEM -** Endocrine Glands, Nervous System, Eye and Ear.
12	Syllabus of Test # 9, 10 & 11
13	**CONTINUITY OF LIFE : HEREDITY AND VARIATION :** Introduction Mendel's Experiment with pea and idea of factors, Mendel's law of inheritance incomplete dominance/Co-dominance extranuclear gene (Cytoplasmic inheritance) viral genes linkage (genetic) map. Sex determination and sex linkage, gene manipulation (Genetic Engineering) Viral gene, Bacterial chromosome, Plasmid. Gene expression (Lac operon), gene regulation molecular basis of differentation, gene intereaction, polygenic inheritance multiple allel/Lethal gene/special type of gene, paedigree analysis, cloning, PCR technology, DNA fingerprinting population genetics,Genetic material and it's replication, genetic code transcription and translation.

Test No.	BIOLOGY
14	**THE LIVING WORLD :** Nature and scope of Biology . Methods of Biology. Our place in the universe. Laws that govern the universe and life. Level of organisation. Cause and effect relationship. Being alive. What does it mean ? Present approach to understand life processes molecular approach; life as an expression of energy; steady state and homeostasis; self duplication and survival; adaptation; death as a positive part of life. An attempt to define life in the above. Origin of life and its maintenance. Origin and diversity of life. Physical and chemical principles that maintain life processes, the living crust and interdependence. The positive and negative aspects of progress in biological sciences. The future of the living world, identification of human responsibility in shaping our future. **ORIGIN AND EVOLUTION OF LIFE** : Living and non-living, chemical evolution, organic evolution; Oparin ideas, Miller-Urey experiments. Interrelationship among living organisms and evidences of evolution : fossil records including geological time scale, Morphological evidence- homology, vestigial organs, embryological similarities and biogeographical evidence. Darwin's two major contributions. Common origin of living organisms and recombination as sources of variability, selection acts upon variation, adaptation (Ledergerg's replica plating experiment for indirect selection of bacterial mutants), reproductive isolation, speciation. Role of selection change and drift in determining genetic composition of population. Selected examples : industrial melanism; drug resistance, mimicry, malaria in relation to G-6-PD deficiency and sickle cell disease. Human evolution : Paleontological evidence, man's place among mammals. Brief idea of Dryopithecus, Australopithecus, Home erectus, H.neanderthalensis, Cromagnon man and Homosapiens. Human chromosomes, similarity in different racial groups. Comparison with chromosomes of nonhuman primates to indicate common origin; Cultural vs. biological evolution. **MUTATION** - Their role is speciation. Their origin in speciation, their origin in organisms . **APPLICATION OF BIOLOGY-I :** Introduction, Role of Biology in the amelioration of human problems. Domestication of plant- a historical account, improvement of crop plants; Principles of plant breeding and plant introduction. Use of fertilizers and economic and ecological aspects. Use of pesticides : advantages and hazards. Biological methods of pest control. Crops today, Current concerns, gene pools and genetic conservation. Underutilized crops with potential uses of oilseeds, medicines, beverages, spices, fodder, New crops-Leucaena (Subabul), Jojoba, Guayule, winged bean, etc. Bio-fertilisers-green manure, crop residues and nitrogen fixation (symbiotic, non symbiotic). Applications of tissue culture and genetic engineering in crops. Domestication and introduction of animals, Livestock, poultry, fisheries (fresh water, marine, aquaculture). Improvement of animals : principles of animal breeding. Major animal diseases and their control. Insects and their products (silk, honey, wax and lac).
15	**APPLICATION OF BIOLOGY-II :** Bioenergy-biomass, wood (combustion, gasification, ethanol). Cow dung cakes, gobar gas, plants as sources of hydrocarbons for producing petroleum, ethanol from starch and lignocellulose, Biotechnology, a brief historical account-manufacture of cheese, yoghurt, alcohol yeast, vitamins, organic acids, antibiotics, steroids, dextrins. Scaling up laboratory findings to Industrial production. Production of insulin, human growth hormones, interferon. Communicable diseases including STD and diseases spread through 'blood transfusion (hepatities, AIDS, etc) Immune response, vaccines and antisera. Allergies and Inflammations. Inherited diseases and dysfunctions, sex-linked diseases, genetic incompatibilities, and genetic counselling. Cancer- major types, causes, diagnosis and treatment Tissue and organ transplantation. Community health services and measures. Blood banks, Mental health, smoking, alcoholism and drug addiction-physiological symptoms and control measures. Industrial wastes, toxicology, pollution-related diseases. Biomedical engineering-spare parts for man, instruments for diagnosis of diseases and care. Human population related diseases. Human population growth problems and control, inequality between sexes, control measures; test-tube babies, amniocentesis, Growth, Repair and Ageing.
16	Syllabus of Test # 13, 14 & 15