



Dr A S RAO AWARDS COUNCIL
SYLLABUS FOR SCIENCE TALENT SEARCH EXAMINATION (30-STSE) - 2017

10th Class MATHEMATICS:

- (1) **REAL NUMBERS:** Fundamental theorem of arithmetic, rational numbers and their decimal expansion, no-terminal, recurring decimals in rational numbers, irrational numbers, properties of logarithms.
- (2) **SETS:** Roster and set builder forms, set types, universal and sub sets, Venn diagrams; union , intersection, disjoint, difference, equal, finite and infinite sets.
- (3) **POLYNOMIALS :** Degree, value zeroes of polynomial, geometrical meaning of zeroes of polynomial, graphical representation of linear and quadratic polynomial, relationship between zeroes, coefficients of a polynomial, cubic polynomials, zeros of cubic polynomial and geometrical meaning, division of algorithm for polynomials,.
- (4) **PAIR OF LINEAR EQUATIONS IN TWO VARIABLES:** Finding of unknown quantities, graphical method of solutions of pair of linear equations, solution and elimination methods of finding solutions, equations reducible to a pair of equations,
- (5) **QUADRATIC EQUATIONS:** Factorization and completing the square methods for solution, nature of roots.
- (6) **COORDINATE GEOMETRY:** Distance between any two points on a line parallel to coordinate axes, any two points in X-Y plane, section formula, trisection of points of a line, centroid and area of a triangle, Heron's formula, straight lines. Slope of line.
- (7) **SIMILAR TRIANGLES:** Similarity of triangles, proportionality theorem, division of line segment; AAA, SSS and SAS criteria for similarity, Areas of similar triangles, Pythagoras theorem, different forms of theoretical statements.
- (8) **TANGENTS, SECANTS TO A CIRCLE:** Tangent of a circle, length of tangent, number of tangent to a circle from any point, tangent to a circle from an external point, segment of circle formed by a secant, area of segment of a circle.
- (9) **MENSURATION:** Surface area and volume of combination of solids, conversion of solid of one shape to another.
- (10). **TRIGONOMETRY AND APPLICATIONS:** Trigonometric ratios and their definitions, Trigonometric ratios of 0° , 30° , 45° , 60° and 90° , trigonometric ratios of complementary angles, trigonometric identities, solution for two Triangles.
- (11). **STATISTICS:** Mean of ungrouped data, Mode, Mean of grouped data, which value of ventral tendency, Graphical representation of cumulative frequency distribution, Mean from given graph.



10th Class PHYSICS

- (1). HEAT :** Thermal equilibrium, heat and temperature, thermal kinetic energy, specific heat and its applications, principles of method of mixtures, condensation, humidity, dew, fog, melting.
- (2) SOUND:** Production of sound, propagation of sound, types of sound waves, Characteristic of sound waves, speed of sound, characteristics of musical sound, Reflection of sound wave and its applications, echo, reverberation, SONAR.
- (3). REFLECTION OF LIGHT BY PLANE AND CURVED SURFACES:** Reflection of light by plane mirrors, plane of reflection, formation of image by plane mirror, reflection by spherical mirrors, reflection by ray diagram for concave and convex mirrors, formula for curved mirrors, sign convention, relation between F, U and V , magnification, solar cooker.
- (4). REFRACTION OF LIGHT BY PLANE AND CURVED SURFACES:** Refraction of light, refractive index, light from denser medium to rarer medium, Snell's law, total internal reflection and applications, mirages, refraction through a glass slab, refraction at a curved surface, image formation, lenses, focal length, image formation and rules, image of object at different positions, lens formula, structure and functioning of human eye, common defects of vision and their remedy.
- (5) PRISM AND DISPERSION OF LIGHT:** Deviation, prism and ray diagram, i - d curve, formula for refractive index of prism, dispersion of light, rainbow, scattering of light.
- (6) STRUCTURE OF ATOM:** Wave nature of light, Electromagnetic spectrum, Bhor's model of hydrogen spectrum.
- (7) ELECTRIC CURRENT:** Conduction of electrons in conductor, potential difference, e.m.f, Ohm's law and its limitations, resistance and factors affecting it, series and parallel connection of resistors, Kirchhoff's laws, electric power, over load.
- (8) ELECTRO MAGNETISM:** Oersted experiment, magnetic field and lines of magnetic field, Magnetic flux and its density, Magnetic field due to current, magnetic force on moving charge and current carrying wire, Fleming right hand rule, electric motor, electro-magnetic induction, Faraday's law and its applications, Lenz law, Direct current, D.C generator.



10th Class CHEMISTRY

- (1). CHEMICAL REACTIONS AND EQUATIONS:** Formation of hydrogen gas, balancing of chemical equations with examples and interpretation, types of chemical reactions (Combination, decomposition, displacement, double displacement, Oxidation and reduction, corrosion),Rancidity.
- (2) ACIDS, BASES AND SALTS:** Chemical properties of Acids and bases, Reaction of acids and bases with metals, neutralization of reaction, reaction of metal oxides with acids, reaction of non-metal oxide with a base, commonality among acids, Properties of bases, strength of acid or base, pH scale and importance of pH in daily life, chemicals form of common salt, sodium hydroxide from common salt, bleaching powder, baking soda, uses of sodium hydrogen carbonate, washing soda and its uses, plaster of paris.
- (3) STRUCTURE OF ATOM:** Bhor- Sommerfeld model of atom, quantum mechanical model of atom, quantum numbers, electron shells, Pauli's exclusion principle, electronic configuration, Aufbau principle, Hund's rule.
- (4) CLASSIFICATION OF ELEMENTS, PERIODIC TABLE:** Need for periodic table, Dobereiner's law of triads, Newland's law of Octaves, Mendeleef's periodic table, Modern periodic table, groups, periods, metals and non metals, periodic properties of elements, metallic and non metallic properties.
- (5) CHEMICAL BONDING:**[Lewis symbols (dot structure), electronic theory of valence, Ionic bond and properties, anion and cation formation, arrangement of ions in ionic compounds, Covalent bond and properties, formation of oxygen, nitrogen, methane, ammonia, water molecules, draw backs of electronic theory of valence, shape of covalent molecules.



10th Class BIOLOGY

- (1) **FOOD SUPPLYING SYSTEM** (Nutrition): Autotrophic nutrition, where does Photosynthesis take place, Mechanism of Photosynthesis, nutrition in human beings, enzymes chart, health aspects of the alimentary canal, diseases due to malnutrition, vitamin deficiency diseases.
- (2) **RESPIRATION AND RESPIRATORY SYSTEMS** (Respiration): Steps in respiration, breathing, pathway of air, epiglottis and path of air, mechanism of respiration in human beings, gaseous exchange, transportation of gases, cellular respiration, anaerobic respiration, fermentation, respiration versus combustion, changes during combustion of sugar, heat production by living organism, evolution in gases exchanging system, respiration in plants, conduction with in plant, aeration of roots, photosynthesis versus respiration.
- (3) **CIRCULATORY SYSTEM**(Transportation): Internal structure of heart, blood vessels and circulation, arteries and veins, blood capillaries, cardiac cycle, single/double circulation, lymphatic system, evolution of circulatory system, blood pressure, coagulation of blood, root pressure, mechanism of travelling of water in plants.
- (4) **WASTAGE DISPOSING SYSTEM** (Excretion):Excretion in human beings, excretory system in human beings, kidneys and structure, mechanism of urine formation, composition of urine, dialysis and kidney transplantation, excretion in other organisms, excretion and of substance in plants, excretion versus secretion.
- (5) **LINKING SYSTEM** (coordination):Structure of nerve cell, efferent or motor neurons, knee jerk reflex, reflex arc, central nerve system (CNS)(brain, spinal cord, peripheral nervous system, autonomous nervous system) coordination without nerves, feedback mechanism, control mechanisms in plants, tropic and nastic movements in plants.
- (6) **GENERATING SYSTEM**(Reproduction): Asexual mode of reproduction, vegetative propagation, (natural and artificial), reproduction in placental mammal(human), male and female reproductive systems, child birth, sexual reproduction in plants, structure of ovule, seed germination, cell division and continuation of life, cell division in human beings, cell cycle, different stages of mitotic cell division, process of meiosis, birth controlling methods.
- (7) **COORDINATION IN LIFE PROCESSES**: Taste and smell, mouth the munching machine, action of saliva, pH value of mouth, stomach, travel of food through oesophagus, travel of food from stomach to intestine, vomiting and belching.
- (8) **HEREDITY** (from parent to progeny): Characters and variations, Mendel experiments, self pollination in F1-generation, F2-generation, phenol and geno type, parent to progeny and how traits get expressed, sex determination in human beings, evolution(acquired and inherited), Darwin's theory of evolution in a nutshell, speciation, homologous and analogous organs, fossils.