UPSC SCRA Syllabus 2013 :

Section - II
Syllabus of Examination
Paper-I
(I) ENGLISH
The questions will be designed to test the candidates' understanding and command of the language.

(II) GENERAL KNOWLEDGE
The questions will be designed to test a candidate's general awareness of the environment around him/her and its application to society. The standard of answers to questions should be as expected of students of standard 12 or equivalent.
Man and his environment :-
Evolution of life, plants and animals, heredity and environment-Genetics, cells, chromosomes, genes. Knowledge of the human body-nutrition, balanced diet, substitute foods, public health and sanitation including control of epidemics and common diseases. Environmental pollution and its control. Food adulteration, proper storage and preservation of food grains and finished products, population explosion, population control. Production of food and raw materials. Breeding of animals and plants, artificial insemination, manures and fertilizers, crop protection measures, high yielding varieties and green revolution,main cereal and cash crops of India.

Solar system and the earth. Seasons, Climate, Weather, Soil—its formation, erosion. Forests and their uses. Natural calamities cyclones, floods, earthquakes, volcanic eruptions. Mountains and rivers and their role in irrigation in India. Distribution of natural resources and industries in India. Exploration of under—ground minerals including Oil Conservation of natural resources with particular reference to the flora and fauna of India.

History, Politics and Society in India—
Vedic, Mahavir, Budhdha, Mauryan, Sunga, Andhra, Kushan. Gupta ages (Mauryan Pillars, Stupa Caves, Sanchi, Mathura and Gandharva Schools, Temple architecture, Ajanta and Ellora). The rise of new social forces with the coming of Islam and establishment of broader contacts. Transition from feudalism to apitalism. Opening of European contacts. Establishment of British rule in India. Rise of nationalism and national struggle for freedom culminating in Independence.

Constitution of India and its characteristic features—

Democracy, Secularism, Socialism, equality of opportunity and Parliamentary form of Government. Major political ideologies—Democracy, Socialism, Communism and Gandhian idea of non-violence. Indian political parties, pressure groups, public opinion and the Press, electoral system. India's foreign policy and non-alignment-Arms race, balance of power. World organisation — political, social, economic and cultural. Important events (including sports and cultural activities) in India and abroad during the past two years.

Broad features of Indian social system — The caste system, hierarchy — recent changes and trends. Minority social institution — marriage, family, religion and acculturation. Division of labour, co-operation, conflict and competition, Social control — reward and punishment, art, law, customs, propaganda, public opinion, agencies of social control — family, religion, State educational institutions; factors of social change — economic, technological, demographic, cultural; the concept of revolution.

Social disorganisation in India — Casteism, communalism, corruption in public life, youth unrest, beggary, drugs, delinquency and crime, poverty and unemployment. Social planning and welfare in India, community development and labour welfare; welfare of Scheduled Castes and Backward Classes. Money — Taxation, price, demographic trends, national income, economic growth. Private and Public Sectors; economic and non-economic factors in planning, balanced versus imbalanced growth, agricultural versus industrial development; inflation and price stabilization, problem of resource mobilisation. India's Five Year Plans.

(iii) Psychological Test
The questions will be designed to assess the basic intelligence and mechanical aptitude of the candidate.

Paper-II
(I) PHYSICS
Length measurements using vernier, screw gauge, spherometer and optical lever. Measurement of time and mass.

Straight line motion and relationships among displacement, velocity and acceleration.

Newton's Laws of Motion, Momentum, impulse, work, energy and power.

Coefficient of friction.

Equilibrium of bodies under action of forces. Moment of a force, couple. Newton's Law of Gravitation. Escape velocity. Acceleration due to gravity.

Mass and Weight; Centre of gravity, Uniform circular motion, centripetal force, simple Harmonic motion. Simple pendulum.

Pressure in a fluid and its variation with depth. Pascal's Law. Principle of Archimedes.

Floating bodies, Atmospheric pressure and its measurement.

Temperature and its measurement. Thermal expansion, Gas laws and absolute temperature. Specific heat, latent heats and their measurement. Specific heat of gases.

Mechanical equivalent of heat. Internal energy and First law of thermodynamics, Isothermal and adiabatic changes. Transmission of heat; thermal conductivity.

Wave motion; Longitudinal and transverse waves. Progressive and stationary waves, Velocity of sound in gas and its dependence on various factors. Resonance phenomena (air columns and strings).

Reflection and refraction of light. Image formation by curved mirrors and lenses, Microscopes and telescopes. Defects of vision.

Prisms, deviation and dispersion, Minimum deviation. Visible spectrum.

Field due to a bar magnet, Magnetic moment, Elements of Earth's magnetic field.

Magnetometers. Dia, para and ferromagnetism.

Electric charge, electric field and potential, Coulomb's Law.

Electric current; electric cells, e.m.f. resistance, ammeters and voltmeters. Ohm's law; resistances in series and parallel, specific resistance and conductivity. Heating effect of current.

Wheatstone's bridge, Potentiometer.

Magnetic effect of current; straight wire, coil and solenoid electromagnet; electric bell.

Force on a current-carrying conductor in magnetic field; moving coil galvanometers; conversion to ammeter or voltmeter.

Chemical effects of current; Primary and storage cells and their functioning, Laws of electrolysis.

Electromagnetic induction; Simple A.C. and D.C. generators. Transformers, Induction coil, Cathode rays, discovery of the electron, Bohr model of the atom. Diode and its use as a rectifier.

Production, properties and uses of X-rays. Radioactivity; Alpha, Beta and Gamma rays.
Nuclear energy; fission and fusion, conversion of mass into energy, chain reaction.

(II) CHEMISTRY
Physical Chemistry
1. Atomic structure; Earlier models in brief. Atom as at three dimensional model. Orbital concept. Quantum numbers and their significance, only elementary treatment. Pauli's Exclusion Principle. Electronic configuration. Aufbau Principle, s.p.d. and f. block elements.
Periodic classification only long form. Periodicity and electronic configuration. Atomic radii, Electro-negativity in period and groups.

2. Chemical Bonding, electro-valent, co-valent, coordinate covalent bonds. Bond Properties, sigma and Pie bonds, Shapes of simple molecules like water, hydrogen sulphide, methane and ammonium chloride. Molecular association and hydrogen bonding.
3. Energy changes in a chemical reaction. Exothermic and Endothermic Reactions. Application of First Law of Thermodynamics, Hess's Law of constant heat summation.

4. Chemical Equilibria and rates of reactions. Law of Mass action. Effect of Pressure, Temperature and concentration on the rates of reaction. (Qualitative treatment based on Le Chatelier's Principle). Molecularity; First and Second order reaction. Concept of Energy of activation. Application to manufacture of Ammonia and Sulphur trioxide.

5. Solutions : True solutions, colloidal solutions and suspensions. Colligative properties of dillute solutions and determination of Molecular weights of dissolved substances. Elevation of boiling points. Depressions of freezing point, osmotic pressure. Raoult's Law (non-thermodynamic treatment only).

6. Electro-Chemistry : Solution of Electrolytes, Faraday's Laws of Electrolysis, ionic equilibria, Solubility product.

Strong and weak electrolytes. Acids and Bases (Lewis and Bronstead concept). pH and Buffer solutions.

7. Oxidation — Reduction; Modern, electronics concept and oxidation number.

8. Natural and Artificial Radioactivity: Nuclear Fission and Fusion. Uses of Radioactive isotopes.

Inorganic Chemistry
Brief Treatment of Elements and their industrially important compounds :
1. Hydrogen : Position in the periodic table. Isotopes of hydrogen. Electronegative and electropositive character. Water, hard and soft water, use of water in industries, Heavy water and its uses.

2. Group I Elements : Manufacture of sodium hydroxide, sodium carbonate, sodium bicarbonate and sodium chloride.

3. Group II Elements : Quick and slaked lime. Gypsum, Plaster of Paris. Magnesium sulphate and Magnesia.

4. Group III Elements: Borax, Alumina and Alum.

5. Group IV Elements : Coals, Coke and solid Fuels, Silicates, Zolitis semi-conductors. Glass (Elementary treatment).

6. Group V Elements. Manufacture of ammonia and nitric acid. Rock Phosphates and safety matches.

7. Group VI Elements. Hydrogen peroxide, allotropy of sulphur, sulphuric acid. Oxides of sulphur.

8. Group VII Elements. Manufacture and uses of Fluorine, Chlorine, Bromine and Iodine, Hydrochloric acid. Bleaching powder.

9. Group O. (Noble gases) Helium and its uses.

10. Metallurgical Processes : General Methods of extraction of metals with specific reference to copper, iron, aluminium, silver, gold, zinc and lead. Common alloys of these metals; Nickel and manganese steels.

Organic Chemistry

1. Tetrahedral nature of carbon, Hybridisation and sigma pie bonds and their relative strength. Single and multiple bonds. Shapes of molecules. Geometrical and optical isomerism.

2. General methods of preparation, properties and reaction of alkanes, alkenes and alkynes, Petroleum and its refining. Its uses as fuel. Aromatic hydrocarbons : Resonance and aromaticity. Benzene and Naphthalene and their analogues. Aromatic substitution reactions.

3. Halogen derivatives : Chloroform, Carbon Tetrachloride, Chlorobenzene, D.D.T. and Gammexane.

4. Hydroxy Compounds : Preparation, properties and uses of Primary, Secondary and Tertiary alcohols, Methanol, Ethanol, Glycerol and Phenol, Substitution reaction at aliphatic carbon atom.

5. Ethers; Diethyl ether.

6. Aldehydes and ketones : Formaldehyde, Acetaldehyde, Benzaldehyde, acetone, acetophenone.

7. Nitro compounds amines: Nitrobenzene TNT, Anlline, Diazonium Compounds, Azodyes.

8. Carboxylic acid : Formic, acetic, denezoic and salicylic acids, acetyl salicylic acid.

9. Esters : Ethylacerate, Methyl salicylates, ethylbenzoate.

10. Polymers : Polythene, Teflon, Perpex, Artificial Rubber, Nylon and Polyester fibers.

11. Nonstructural treatment of Carbohydrates, Fats and Lipids, amino acids and proteins - Vitamins and hormones.

Paper-III
MATHEMATICS
1. Algebra :
Concept of a set, Union and Intersection of sets, Complement of a set, Null set, Universal set and Power set, Venn diagrams and simple applications. Cartesian product of two sets, relation and mapping — examples, Binary operation on a set — examples. Representation of real numbers on a line.

Complex numbers:

Modulus, Argument, Algebraic operations on complex numbers. Cube roots of unity. Binary system of numbers, Conversion of a decimal number to a binary number and vice-versa. Arithmetic, Geometric and Harmonic progressions. Summation of series involving A.P., G.P., and H.P.. Quadratic equations with real co-efficients.

Quadratic expressions: extreme values. Permutation and Combination, Binomial theorem and its applications.

Matrices and Determinants: Types of matrices, equality, matrix addition and scalar multiplication - properties. Matrix multiplication — non-commutative and distributive property over addition. Transpose of a matrix, Determinant of a matrix. Minors and Cofactors. Properties of determinants. Singular and non-singular matrices. Adjoint and Inverse of a square-matrix, Solution of a system of linear equations in two and three
variables-elimination method, Cramers rule and Matrix inversion method (Matrices with m rows and n columns where m, n < to 3 are to be considered). Idea of a Group, Order of a Group, Abelian Group. Identitiy and inverse elementsIllustration by simple examples.

2. Trigonometry :
Addition and subtraction formulae, multiple and sub-multiple angles. Product and factoring formulae. Inverse trigonometric functions — Domains, Ranges and Graphs. DeMoivre's theorem, expansion of Sin n0 and Cos n0 in a series of multiples of Sines and Cosines.

Solution of simple trigonometric equations. Applications: Heights and Distance.

3. Analytic Geometry (two dimensions):
Rectangular Cartesian. Coordinate system, distance between two points, equation of a straight line in various forms, angle between two lines, distance of a point from a line. Transformation of axes. Pair of straight lines, general equation of second degree in x and y — condition to represent a pair of straight lines, point of intersection, angle between two lines. Equation of a circle in standard and in general form, equations of
tangent and normal at a point, orthogonality of two cricles. Standard equations of parabola, ellipse and hyperbola — parametric equations, equations of tangent and normal at a point in both cartesian and parametric forms.

4. Differential Calculus:

Concept of a real valued function — domain, range and graph. Composite functions, one to one, onto and inverse functions, algebra of real functions, examples of polynomial, rational, trigonometric, exponential and logarithmic functions. Notion of limit, Standard limits - examples. Continuity of functions - examples, algebraic operations on continuous functions. Derivative of a function at a point, geometrical and physical interpretation of a derivative - applications. Derivative of sum, product and quotient of functions, derivative of a function with respect to another function, derivative of a composite function, chain rule. Second order derivatives. Rolle's theorem (statement only), increasing and decreasing functions. Application of derivatives in problems of maxima, minima, greatest and least values of a function.

5. Integral Calculus and Differential equations :
 Integral Calculus : Integration as inverse of differential, integration by substitution and by parts, standard integrals involving algebraic expression, trigonometric, exponential and hyperbolic functions. Evaluation of definite integrals- determination of areas of plane regions bounded by curves - applications.

 Differential equations : Definition of order and degree of a differential equation, formation of a differential equation by examples. General and particular solution of a differential equation, solution of first order and first degree differential equation of various types - examples. Solution of second order homogeneous differential equation with constant co-efficients.

6. Vectors and its applications :
 Magnitude and direction of a vector, equal vectors, unit vector, zero vector, vectors in two and three dimensions, position vector. Multiplication of a vector by a scalar, sum and difference of two vectors, Parallelogram law and triangle law of addition.

 Multiplication of vectors — scalar product or dot product of two vectors, perpendicularity, commutative and distributive properties. Vector product or cross product of two vectors. Scalar and vector triple products. Equations of a line, plane and sphere in vector form - simple problems. Area of a triangle, parallelogram and problems of plane geometry and trigonometry using vector methods. Work done by a force and moment of a
 force.

7. Statistics and probability :
 Statistics : Frequency distribution, cumulative frequency distribution - examples.

Graphical representation - Histogram, frequency polygon - examples. Measure of central tendency - mean, median and mode. Variance and standard deviation - determination and comparison. Correlation and regression.

Probability : Random experiment, outcomes and associated sample space, events, mutually exclusive and exhaustive events, impossible and certain events. Union and Intersection of events. Complementary, elementary and composite events. Definition of probability : classical and statistical - examples. Elementary theorems on probability - simple problems. Conditional probability, Bayes' theorem - simple problems. Random variable as function on a sample space. Binomial distribution, examples of random experiments giving rise to Binomial distribution.

Personality Test
Each candidate will be interviewed by a Board who will have before them a record of his career both academic and extramural. They will be asked questions on matters of general interest. Special attention will be paid to assessing their potential qualities of leadership, initiative and intellectual curiosity, tact and other social qualities, mental and physical energy, power of practical application and integrity of character.