

Syllabus in Mathematics– Level II

Algebra:

1. Division of polynomial
2. Test of divisibility of polynomials $x \pm 1$, $x \pm a$
3. Graphs of simultaneous equation and solution of simultaneous equations by graphical method
4. Logarithm: a) Laws
b) Use of logarithm table
5. Word problems:
Linear equations, simultaneous equations, quadratic equations
6. Solution of quadratic equation: $ax^2 + bx + c = 0$, $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
7. Sets – types, operations, Venn diagram, relation – function
8. Surds
9. Statistics:
a) Classification, measures of central tendency, b) Mean, mode and median,
c) Frequency distribution, d) Graphical representation: Histograms, pie-chart, frequency polygon

Geometry:

1. Locus
2. Theorems on angle bisector, perpendicular bisector of segment
3. Theorems on triangle: Isosceles triangle, concurrency of medians, altitudes, perpendicular bisectors, Inequality theorems
4. Properties of quadrilaterals
5. Basic proportionality theorem
5. Circle: Theorems on chord, tangent, inscribed angle, secant tangent theorem
6. Trigonometry:
Ratios: Sine, cosine, tan, sec, cosec, cot
Standard angles: 30, 45, 60, 90
Angle of elevation and depression

Syllabus in Physics – Level II

Mechanics:

1. Dimensions, Approximation, Errors, Mistakes, Newton's law of gravitation, Equations of motion, Uniform circular motion,
2. Force, Impulse, Pressure,
3. Work and energy,
4. Types of forces, Relative measures, Short range and long range force, Balance, Centripetal and Centrifugal force,
5. Frictional force

Pressure:

1. Thrust, Pressure in fluids, Archimedes principle,
2. Gauge pressure and absolute pressure, Density of fluid by Archimedes's principle

Light:

1. Spherical mirrors, sign convention, Magnification, Parabolic mirror, Determination of focal length of concave mirror by parallax method,

Electricity:

2. Static electricity
3. Electrical charges and its properties, Electroscope, Lightning,
4. Charging by friction and Induction etc.,
5. Current electricity
6. Electric current, potential, Potential difference, Voltage, Circuit, Series and parallel, Ohm's law, Resistance, internal resistance, e.m.f., Switches, Plugs, Sockets

Heat

1. Heat transfer in matter, Calorimetry, Anomalous expansion of water, Evaporation, Factors affecting evaporation,:
2. Effect of pressure on boiling point and melting point, Regeletion,

Sound – waves:

1. Characteristics of sound waves, Reflection of sound waves and echo, Velocity of sound in different media, Human ear, Ultrasonics, Infrasonics, Applications
2. SONAR, Audible range

Astrophysics:

1. Sun core, diameter, Energy source of the sun, sun spots
2. Constellations, Comets, Meteors Meteorites
3. Moon, phases of moon, Tides

Syllabus in Biology – Level II

Life Processes

1. Introduction
2. Role in animals
3. Variations for different life processes in animals

Digestive system

1. Organs involved and their functions
2. Structure of tooth
3. Process of digestion- physiology
4. Glands associated with digestive system

Circulatory system

1. Organs involved and their functions
2. Structure of heart
3. Blood components and their functions
4. Process of blood purification and its path
5. Heart muscles
6. Heart valves
7. ECG pulse rate and BP
8. Cholesterol- disorders and prevention

Respiratory system

1. Types of respiration – aerobic, anaerobic
2. Organs involved and their functions
3. Structure of lungs
4. Process of respiration
5. Lung capacities

Excretory system

1. Need for excretion
2. Organs involved and their functions
3. Structure of kidney and nephrons
4. Process of excretion- physiology
5. Urine composition
6. Osmoregulation
7. Accessory excretory organs – sebaceous and sweat glands, lungs

Nervous system

1. Introduction
2. Organs involved
3. Examples of nervous control
4. Voluntary –involuntary actions

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Sensory organs

1. Introduction
2. Role of senses and response to them
3. Sensory organs- skin
 - a. structure
 - b. Process of response
 - c. functions
4. Eyes
 - a. Structure
 - b. Process for vision
 - c. Focal disorders
5. Ears
 - a. Structure
 - b. Working
 - c. Functions

Dietary disorders

1. Importance of balanced diet
2. Deficiency disorders
 - a. Carbohydrate
 - b. Proteins
 - c. Fats
 - d. Vitamins- A,B,C,D,E and K
 - e. Minerals – Fe, Ca, F, etc
3. Disorders due to over intake of nutrients
 - a. Carbohydrate
 - b. Proteins
 - c. Fats
 - d. Vitamins- A,B,C,D,E and K
 - e. Minerals – Fe, Ca, F, etc
4. Preventive measures for disorders

Biogeo cycles

1. Introduction
2. Nitrogen cycle
3. Carbon Cycle
4. Oxygen cycle
5. Water cycle

Cell cycle

1. Introduction
2. Steps in cell cycle – G1, S, G2 and division
3. Importance of each step

Syllabus in Chemistry – Level II

Structure of atom:

1. Discovery of atom: Dalton's atomic theory, Thomson's model of an atom, Rutherford's model of an atom, Bohr's model of an atom, Merits and demerits of above models
2. Composition of atom: proton, neutron, electron and their properties
3. Atomic number
4. Mass number
5. Isotopes: definition and examples
6. Isobars: definition and examples
7. Electronic configuration of elements
8. Concept of Valency
9. Radioactivity
10. Nuclear fusion and fission
11. Hazards of nuclear energy

Chemical reactions:

1. Concept of physical change
2. Concept of chemical change
3. Effects of chemical change
4. Thermo chemical reactions
5. Types of chemical reactions: Combination reactions, Decomposition reactions, Displacement reactions, Double decomposition reactions, Neutralization reactions, Redox reactions, Slow and Fast reactions, Exothermic and Endothermic reactions, Homogeneous and Heterogeneous reactions
6. Rate of chemical reaction:
7. *Factors affecting rate* : nature of reactant, size of particles, concentration, temperature, catalyst
8. Effects of oxidation reaction in everyday life: Corrosion, Rancidity

Periodic classification of elements:

1. Theories of classification of elements: Dobereiner's triads, Newlands law of Octaves, Lothar Meyer's atomic volume curve, Mendeleev's periodic law and periodic table, Moseley's contribution and modern periodic law

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2. Modern periodic table:
 - a. IUPAC numbering of groups
 - b. Periods in modern periodic table
 - c. Groups in modern periodic table
 - d. Trends in physical and chemical properties of elements
3. Electronic configuration and major types of elements: Inert elements, Representative elements, Transition elements, Inner transition elements, Characteristic properties of above elements
4. Study of selected groups: group-1, group-17

Metals and non-metals:

- 1) Physical properties of metals and non-metals: Malleability, Ductility, Conduction of heat and electricity, Density, Melting points, boiling points
 - 2) Chemical properties of metals and non-metals: Reactions with - oxygen and other non-metals, water, acids, bases, displacement reactions
 - 3) Noble metals: Noble metals, Uses of noble metals, Purity of gold
 - 4) Uses of metals and non-metals:
 - 5) Corrosion: theory of corrosion, hazards and preventive measures
 - 6) Reactivity series and its use:
 - 7) Types of compounds: ionic and covalent
- *Properties of ionic and covalent compounds*: Physical nature, Melting and Boiling points, Solubility, Conduction of electricity
- 8) Alloys: composition, properties and uses

Acids, bases and salts

1. Arrhenius theory of acids and bases and electrolytic dissociation
2. Acids: Definition, General methods of preparation, Properties,
 - i. *Chemical reactions with* - metals, metal carbonates, hydrogen carbonates, bases, metallic oxides, non- metallic oxides
 - ii. Domestic uses, Industrial uses
3. Bases: Definition, General methods of preparation, Properties,
 - i. *Chemical reactions with* - metals, metal carbonates, hydrogen carbonates, acids, metallic oxides, non- metallic oxides

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ii. Uses of bases

4. Neutralization: Concept and Reactions
5. Indicators: Acid-Base indicators and their use
6. Oxides of elements: Classification and reactions
7. Strength of acids and bases: The pH scale
8. Salts :General methods of preparation, Properties, Uses
9. Crystals: Deliquescence, Efflorescence, Hygroscopic