

4. कृषि के लिए उपयोगी विज्ञान एवं गणित तत्व [ELEMENTS OF SCIENCE AND MATHEMATICS]

(USE FOR AGRICULTURE) AG.-1

(I) AGRICULTURE PHYSICS :

1. Principle of Archimedes, Floating bodies' density and relative density, determination of R.D. by Hydrometers.
2. Atmospheric pressure. Fortins barometer and its relation to weather condition manometer.
3. Pumps - Force and vacuum pumps, symphon suction pumps.
4. Friction - Laws of Friction, angle of friction, coefficient of friction and its determination, advantages and disadvantages of friction.
5. Machine - simple machines such as plas, lever, pully. Simple wheel, their construction andworking mechanical advantages, Velocity ratio efficiency of machine.
6. Gravitation and gravity; Relation between 'G' and 'g' simple harmonic motion simple pendulum law of gravitation.
7. Unit of heat, Specific heat, thermal capacity, water equivalent of heat, determination of Specific heat of solid and liquid, Latent heat, determination of latent heat of ice and steam.
8. Transmission of Heat-Conduction, Convection and Radiation. Conductivity, good and bad conductor, New-tons law of cooling-simple idea.
9. Light, Rectilinear propagation of light, Shadow and eclipse, pinhole camera, reflection through Prism, Dispersion of light, dispersive power spectrum, their type, spectrometer.
10. Optical instruments, Human eye, its defects, photographic camera, simple and compound microscope Telescope.
11. Magnetism, Magnetic Field, Intensity of magnatic field, lines of forces; Neutral point, Couple acting on magnet placed in a uniform magnetic field. Magnetic movement of magnet, tangent law and its limitation.
12. Electric charge- electric potential, electric field and its intensity due to a point, potential inside a conductor.
13. Electrical capacity, its unit, its value for a Spherical conductor, principle of condensers capacity of spherical and parellel plate condenser.
14. Ohm's law, Resistance, grouping of resistance, electromotive froce and potential difference. Potentiometer its principle, comparision of EMF of two cells by potentiometer.
15. Elementary idea of heating effect of current, Joule's law determination of 'J' by Joules Calorimeter, elementary, idea of the house wiring electric iron, electric power and energy.

(II) AGRICULTURE CHEMISTRY :

1. **Atomic Structure:** Bohr's atomic model, Distribution of electrons according to Bohr- Bory Rules. Radioactivity and atomic disintegration.
2. **Chemical Bonds :** Characterstics of electrovalent, Covalent and Co-rodinate Bonds.
3. **Ionic Theory :** Uses of ionisation, Solubility product, Hydrolysis, neutralisation, Ionicproduct of water. Determination of pH Buffer Solution, Nutritional importance of Soil pH.
4. **Colloids:** Lyophilic and Lyophobic, properties of colloids, colloidal solutions, protective colloids, gold number, Soil colloids clay and humus.
5. Introduction of important minerals present in soil and their chemical composition.
6. **Chemical Fertilizers:** Manufacture of different fertilizers of N.P.K. and their utilization Micronutrients.

7. **Volumetric analysis** : Strength of solution, Normality, determination of equivalent weight of acid, base and salt.
8. Introduction to Organic Chemistry, Determination. of empirical, molecular and structural formula of simple organic compounds.
9. Classification and nomenclature of organic compounds, Isomerism.
10. Saturated and unsaturated Hydrocarbons, Methane, Ethylene, Chemistry of gobar Gas.
11. Fermentation, ethyl alcohol, Aliphatic carboxylic acid-Acetic acid, Urea.
12. Oil and fats, extraction, Composition and properties, manufacture of soap, Vanaspati Ghee, use of oil in paints.
13. Elementary Biochemistry, Carbohydrates, proteins, Lipids, Vitamins and enzymes.

(III) AGRICULTURE MATHEMATICS:

1. **Arithmetic Progression:** Definition, formula to find the nth term. Formula to find sum of n terms. Definition of arithmetic mean. Insertion of given number of mean between two given quantities. Finding of remaining quantity when any three of S, a, d, n are given.
2. **Geometric Progression:** Definition, Formula to find the nth term, sum of n terms, geometric mean insertion of geometric means between two given Quantities. Finding of remaining quantity when any three of k, a, n are given.
3. **Logarithms and Common Logarithms:** Definition of product division of number raised to any power characteristics of the logarithm of any number greater than unity. Characteristics of the Logarithm of a decimal fraction.
4. Trigonometrical functions of angles of any size and sign. Trigonometrical ratios of an angle (90+) (190) (80+)
5. Trigonometrical ratio for the sum and difference of two angles. Geometrical proof for $\sin(A+B)$, $\cos(A-B)$ product formula for $\sin(C+D)$, $\sin(C-D)$, $\cos(C+D)$, $\cos(C-D)$
6. Statistics: Calculation of mean, mode, median and standard deviation, variance and mean deviation for grouped data using various formula.

(IV) AGRICULTURE, BOTANY, ZOOLOGY:

1. **Plant Anatomy** :- (i) Root-Structure and Functions (ii) Stem-Structure and Functions (iii) Leaf Structure and Functions.
2. **Agri Botany Zoology** : Classification of plants, (i) Outline of classification of plants, (ii) Study of the following families, (a) Compositae (b) Leguminosae (c) Cucurbitae (d) Solanaceae (e) Mavaceae (f) Cruciferae (g) Gramineae.
3. **Plant Breeding and Genetics** : (i) Definition of Genetics and plant breeding and role of Genetics in plant breeding (ii) Cell-its structure and cell division (iii) Principle of inheritance (iv) Self and cross pollinated crops, (v) Methods of breeding field crops.
4. **Plant Physiology:** (i) Respiration, types function, (ii) Photosynthesis (iii) Transpirations (iv) Plant growth and development.

Animal Kingdom: (i) Classification of animal kingdom, (ii) Useful and harmful insects of agriculture Silk worm, Honey bee, LAC insect, Termites, Grass hopper, grass caterpillar. Anatomy and physiology, elementary internal anatomy of grass hopper, earthworm and cockroach with reference to digestive. Respiratory and reproductive system.