

DEVELOPMENTAL BIOLOGY AND GENETICS :

- Female reproductive cycles in mammals. Gametogenesis alongwith structure of sperm and ovum. Types of eggs, Fertilization, cleavage types of cleavage and blastula. development of mammals upto three germinal layers. Foetal membranestructure and functions.
- Growth, repair and ageing, amniocentesis.
- Chromosomes, Types of chromosome, Human karyotype and chromosomal abnormalities and syndromes, Hormonal, Chromosomal and Genic Balance theory of sex determination, Sex linkage and sex linked inheritance in Man. Blood Group and their significance, Blood Bank.
- Tissue culture, Genetic Engineering (Brief idea). Mutation gene mutation.
- Human population natality Mortality, Sex ratio Population explosion, dynamics of human life with respect to food supply, housing health and standard of living impact of population problems and their control.

TAXONOMY EVOLUTION ECONOMIC ZOOLOGY :

- Classification - Binomial and trinomial nomenclature, Basic features of classification, Classification of different animal phyla upto classes with characters and suitable examples.
- Origin of life, Theories of organic evolution-Darwin, Lamarck, Synthetic Evidence of organic evolution, Human Evolution.
- Economic Zoology/Sericulture, Apiculture, Lac culture, Poultry, Fishery and pearl industry.
- Protozoan disease in relation to man. Insect carrying diseases in relation to man.
- Cancer-types of cancer and cancer cell. Communicable diseases (Hepatitis, AIDS) STD, Immune Response, Vaccines and antisera allergies.
- Smoking, alcoholism and drug addiction, symptoms and control.
- Wild conservation.
- Pesticides - Uses, advantages and hazards.

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, syphon 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 pulley, lever, pulley. Simple wheel, their construction and working 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-ton's 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 magnetic 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 parallel plate condenser.
14. Ohm's law, Resistance, grouping of resistance, electromotive force and potential difference. Potentiometer its principle, comparison 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 :** Characteristics of electrovalent, Covalent and Co-ordinate Bonds.
3. **Ionic Theory :** Uses of ionisation, Solubility product, Hydrolysis, neutralisation, Ionic product 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 $\sin(C-D)$, $(C+D)$
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 polinated crops, (v) Methods of breeding field crops.
4. **Plant Physiology:** (i) Respiration, types function, (ii) Photosynthesis (iii) Transpirations (iv) Plant growth and development.
5. **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.

16. **Diseases of Poultry:** (i) preventive control measures, (ii) Bacillary White diarrhoea, Ranikhet Coccidiosis, Fowl, Pox, Fowl cholera, Ecto and endoparasites.

6- कृषि **AGRICULTURE (Arts and Science Group) (Ag.)**

1. Introduction (i) Importance and scope of Agriculture in our National Economy and Development. (ii) Measures to be adopted for increasing the yield of crops.
2. Meteorology (i) Distribution of crop Zones depending upon the rainfall in M.P. (i.e.) Weather recording-Rainfall, Temperature, Humidity and atmospheric pressure.
3. Soils (i) Importance of Soil, Soil texture, soil structure, mineral matter, soil organic matter, soil and organism (ii) Different soil of M.P. and their Characteristics (iii) causes of infertility and ways to improve them.
4. Tillage (i) Definition of tillage, tillage operations such as ploughing, harrowing interculture etc. (ii) Tillage implements-Country plough, improved plough, harrows, cultivators, threshers, winnowers and seed drills.
5. Manures and Fertilizers (i) Major and minor plant nutrients (ii) organic manures F.Y.M. compost, Green manures, Oil cakes (iii) Inorganic Fertilizers - Nitrogenous, phosphatic and Potash Fertilizers.
6. Weeds and weed Control (i) Definition of weeds, damage caused by weeds (ii) Weed control methods mechanical Biological and Chemical.
7. Irrigation and Drainage (i) Need Objects of irrigation and drainage (ii) Sources of irrigation and drainage.
8. Cropping Schemes: Importance and principles of Crop-rotation, mixed cropping, multi cropping, Dry farming.
9. Crop Production (i) Classification of crops (ii) Cultivation of following crops with reference to their land preparation, manuring, sowing, seed rate, irrigation, interculture, improved varieties, control of diseases and pests, yield per hectare, Major crops paddy, Wheat, Jowar, ground nut and cotton Minor Crops-Arhar, Moong, Soybean, Linseed and Mustard.
10. Introduction (i) meaning and scope of Horticulture (ii) Planting system, pruning, training and intercropping (iii) Elementary idea regarding ornamental plants, annuals, shrubs, trees hedges.
11. Cultivation of fruit plants (ii) propagation of plants-cutting, budding, layering, grafting and inarching (iii) Elementary idea regarding ornamental plants, annuals, shrubs, trees hedges.
12. Cultivation of vegetables (i) classification of vegetables as per family seasons and uses (ii) cultivation of Potato, Cauliflower, Radish, Onion, Tomato, Brinjal, bhindi and Chillies.
13. Fruit and vegetable preservation (i) General principles and methods of fruit and vegetable preservation.
14. Animal Husbandry (i) Important breeds of cow and buffaloes (ii) care maintenance and housing of cattle (iii) Principles of feeding and balanced ration of cattle.
15. Milk and milk testing (i) composition of milk of cows and buffaloes (ii) Testing of milk by lactometer.
16. Milk products and Dairy machines (i) Preparation of Cream, ghee, Butter, Khoya and Dahi (ii) Construction of working of cream separator.
17. Diseases of Cattle (i) Signs of sick animal (ii) Common diseases of cattle, their prevention and control.
18. Poultry Farming (i) Important Poultry breeds and their characteristics (ii) Warehousing and feeding of Poultry breeds (iii) Hatching of egg by natural and artificial methods (iv) Grading and marketing of eggs (v) Common diseases of poultry, their prevention and control.