geometric and harmonic means between two numbers. Sum of squares and cubes of first natural numbers. Theory, geometric equation, relations between roots and coefficients. uadratic expressions, quadratic equations in one variable, Permutations and combinations. Bionomial Theorem (any index) exponential and logarithmic series. determinants upto third order and their order and their elementary properties matrices types of matrices, adjoint and inverse of matrix, elementary. Application in solving simultaneous equation upto three variables.

2. **TRIGONOMETRY:** Trigonometry functions and their graphs, addition and subtraction formulae; formulae involving multiple and submultiple angles, general solutions of trignometrical equations. Relations between sides and angles of a triangle. Solutions of triangles, inverse; trigonometrical functions, height and distance (Simple Problems).

3. **CO-ORDINATE GEOMETRY OF TWO DIMENSIONS**: Rectangular cartesain coordinates. Straight line, pair to straight lines, distance of a point from a line, angle between two lines. Circle, tangents and normals, system of circles. Conic section; Parabola, Ellipse and Hyperbola in standard forms with elementary properties, tangents and normals.

4. **CO-ORDINATE GEOMETRY OF THREE DIMENSIONS:** Rectangular co-ordinate system. Direction cosines and direction ratios, equation of place in standard forms. Perpendicular distance from a point, equation of a line angle between two lines.

5. **VECTOR ALGEBRA:** Definition of vector, addition of vector, components in three dimensional space. Scalar and vector products. Triple products, simple application in geometry and mechanics.

6. **DIFFERENTIAL CALCULUS:** Function, polynomial, rational trignometric, logarithmic and exponential,inverse functions. Limit continuity and differentiability of functions, differentiation of rational, trigonometric and exponential functions. Application of derivative in elementary problems in mecharics, increasing and decreasing frunctions. Maxima and Minima of function of one variable. Roll's theorem and mean value theorem.

7. **INTEGRAL CALCULUS:** Integration as the inverse process of differentation. Integration by parts. By substitution and by partial fraction. definite integral. Areas under simple curves.

8. **DIFFERENTIAL EQUATIONS:** Formulation of differential equation, ordered degree. Solution of differential equations by seperation of variable method. Homogeneous form. Linear differential equation of first order.

9. **STATISTICS :** Probability, addition and multiplication laws. Conditional probability. Binomial distribution. simple problems in correlation and regression.

10. **NUMERICAL METHODS:** Solution of equation by the methods of bisection, false position and Newton-Raphson. Numerical integration by trapezoided and Simpson's Rule.

11. **LINEAR PROGRAMMING:** Definition and formation of linear programming problems. Solution by graphical method.

3. BIOLOGY (Compirising Botany & Zoology)

(A) वनस्पति शास्त्र (BOTANY)

Structural organization of cell, cell theory. Light and Electron Microscopic view of cell. Structure and functions of cell organelles : Nucleus Mitochondria, Chloropast Endoplasmic reticulum, Golgi complex-lysosome, microbodies microfilaments Ribosomes. Centrioles and Plasmids, Eukaryotic

Chromosome (Morphology) cell and plasma membrane. Difference between plant and animal cell Division, cell cycle significance of mitosis and meiosis.

Mendel's Laws of inheritance, Monohyobrid and dihybrid cross; linkage and crossing over of genetic material DNA relication, genetic code transcription transcription and gene regulation.

Difference between prokaryote and Eukaryotes : Structure reproduction and economic importance of viruses Mycoplasma, Bacteriophage, Cynobacteria (Nostoc) and Bacteria.

Five Kingdom classification Binomial Nomenclature : Extrenal morophology and life cycle of Spirogyra mucor, Funaria Selaginella and pinus.

Elementary knowledge of microsporogenesis megasporogenesis. Fertilisation endosperm and embroyo development in Angiosperms.

Tissue and tissue systems, meristematic and permanent tissue, Mineral nutrition-essential elements and their functions: uptake of minerals transport of water and solutes. Transpiration Photosynthesis and Respiration: Importance, mechanism and factors affecting these processess: Photorespiration.

Enzymes and growth hormones with reference to their classification. Chemical nature, mode of action importance. Elementary idea of photoperiodism and phytochrome.

Ecosystem - Structures and function, Major ecosystems i.e. lake and Forest; Food chain, Food Web and Energy flow, Ecological crisis- Role of man in polluting Environment - Air Water and Soil.

Role of plants in human welfare : A general knowledge of plant products of economic value-Drugs, Fibers, Cereals.

Wheat and Rice, Pulses (gram), Oil seeds (Ground nut), Sugarcane, Coal and Petroleum.

Food preservation-Methods and importance.

Principle of plant breeding and its role in improvement of crops. Biotechnolgy; scope and importance in Agriculture and industries manufacture of cheese. Yoghurt Alcohol Antibiotics.

(B) प्राणीशास्त्र (Zoology)

MULTICELLULARITY - STRUCTURE AND FUNCTION OF ANIMAL LIFE:

- Structure and function of Animal tissues Epithelial, Connective Muscular, Skeletal and Nerve.
- Histology of Mammalian organs - Stomach, Intestine, Liver, Kidney, Lung, Testes and Ovary.
- Structure and Physiology of different organ systems of Human body. Skin, Digestive system, Respiratory System. Criculatory system.
- Skeleton, Joints, Muscles on the basic of movement Receptors.
- Endocrine system with special reference to various Endocrine glands of man and Hormonal co-ordination.
- Vitamin & minerals (source and disorders due to deficiencies).

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, Hormanal, 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 humaan life with respect to food supply, housing health and standard of living impact of population problems and their control.

TAXONOMY EVOLUTION ECONOMIC ZOOLOGY :

- Classification - Bionomial 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.
- Protozaon disease in relation to man. Insect carying 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, 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 and working mechanical advantages, Velocity ratio efficiency of machine.