Marks Distribution for PAT /

पी.ए.टी. परीक्षा के लिये अंक विभाजन

A. **Science Group – विज्ञान समूह**

(i)	Physics भौतिकी	-	50 Marks
(ii)	Chemistry रसायन	-	50 Marks
(iii)	Mathematics गणित	-	50 Marks
	Total	-	**150 Marks**

OR

(i)	Physics भौतिकी	-	50 Marks
(ii)	Chemistry रसायन	-	50 Marks
(iii)	Biology जीव विज्ञान	-	50 Marks
	Total	-	**150 Marks**

OR

B. **Agriculture Group – कृषि समूह**

(i)	Elements of Science Mathematics useful for Agriculture. (Ag.-1) कृषि के लिए उपयोगी विज्ञान एवं गणित	-	50 Marks
(ii)	Crop Production and Horticulture. (Ag.-2) फसल उत्पादन एवं उद्यान शास्त्र	-	50 Marks
(iii)	Elements of Animal Husbandry and Poultry Farming (Ag.-3) पशुपालन एवं कुक्कुट पालन	-	50 Marks
	Total	-	**150 Marks**

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पी.ए.टी. / प्रवेश परीक्षा हेतु पाठ्यक्रम

भौतिकी (Physics) **(50 Marks)**

1. Units and dimensions, Dimensional analysis, S.I. Units, motion in two dimensions. Cases of uniform velocity and uniform acceleration, General relation among position and velocity. Uniform circular motion, Force and inertia, Newton's laws of motion, conservation of momentum and energy Static and kinetic friction.
2. Work energy and power, Elastic collisions, Potential energy, Gravitational potential energy and its angular conversion to kinetic energy. Potential energy of a spring. Rigid body rotation and conservation of its momentum, Moment of inertia, theorems of parallel and perpendicular axis, (Moment of inertia of uniform ring, disc thin rod and cylinder only).
3. Acceleration due to gravity and its variation. Universal law of gravitation, geostationary satellites escape velocity.
4. Hookes law, Young's modulus, shear and bulk modulus, surface energy and surface tension, kinetic theory of gases, gas laws, kinetic energy and temperature.
5. Specific heats at constant volume and constant pressure, Mechanical equivalent of heat isothermal and adiabatic processes.
6. Heat conduction in one dimension, convection and radiation. Stefan's law and Newton's law of cooling.
7. Periodic motion, simple harmonic motion, Oscillations due to spring. Wave motion principle of super position, progressive and stationary waves, beats and Doppler effect.
8. Wave nature of light. Interference, Young's double slit experiment, velocity of light and Doppler's effect in light.
9. Reflection, refraction, total internal reflection, curved mirrors, Lenses, mirror and lens formulae. Dispersion in prism, absorption and emission spectra.
10. The human eye, defects of vision, magnification and resolving power of telescope and microscope.
    'e' and '*e/m*' for an electron, Einstein's photoelectric equation, photocells.
11. Bohr model of the atom, Hydrogen spectrum, Composition of nucleus, atomic masses and isotopes, radioactivity, laws of radio active decay, decay constant, half life and mean life, Mass-energy relation, fission, X-Ray: properties and uses.
12. Elementary ideas of conductor, semi-conductor and insulator, intrinsic and extrinsic semi-conductors, pn junction as a rectifier.
13. Bar magnet lines of force, torque on a bar magnet due to magnetic field, earth's magnetic field, tangent galvanometer, vibration magnetometer.
14. Coulomb's law of electrostatics, dielectric constant, electric field and potential due to a point charge, dipole, dipole field, Guass's law in simple geometrics.
15. Electrostatic potential, capacitance, parallel plate and spherical capacitors, capacitors in series and parallel, energy of a capacitor.
16. Electric current, Ohm's law, Kirchoffs laws, resistances in series and parallel, temperature dependence of resistance, wheat ston bridge, potentiometer. Measurement of voltages and currents.
17. Electric power heating effects of currents, chemical effects and law of electrolysis, thermoelectricity, Biot-Savart law, Magnetic fields due to a st wire, circular loop and soienoid.
18. Force on a moving charge in a magnetic field (Lorentz force), magnetic moment of a current loop, effect of a uniform magnetic field of a current loop, forces between two currents; moving galvanometer, ammeter and voltmeter.

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19. Electromagnetic induction induced emf Faraday's law. Lenz's law, self and mutual inductance. Alternating currents impedence and reactance growth and decay of current in L-R circuit, elementary idea of dynamo and transformer.

रसायन (CHEMISTRY) (50 Marks)

GENERAL AND PHYSICAL CHEMISTRY (20 Marks)

1. Structure of Atom: Constitution of nucleus: Bohr's atom model: quantum numbers aufbau principle electronic configuration of elements (upto-kr) : de-Broblic relation, shapes of orbitals.
2. Chemical bond: Electrovalent covalent and co-ordinate bonds, hybridisation (sp): hydrogen bond: shapes of molecules (VSEPR theory) : bond polarity resonance. Elements of VBT a M.O.T.
3. Solutions: Modes of expressing concentrations of solutions: Types of solutions, Raoults law of coUigative properties, non-ideal solution, abnormal molecular weights.
4. Solid State : Crystal lattices, unit celts, Structure of ionic compounds close packed structure Ionic radii, imperfections (Point defects) : properties of solids.
5. Nuclear chemistry: Radio active radiations: Half-life, radioactive decay, group displacement law, Structure and properties of nucleus: Nuclear reactions, disintegration series, artificial transmutation: isotopes and their uses: Radio-carbon dating.
6. Chemical equilibrium: Chemical equilibrium, Law of mass action Kp and Kc: Le-Chatelier principle and its applications.
7. Ionic Equilibria in solutions, Solubility product, common ion effect; theories of acids and base hydrolysis of salts: pH: buffers.
8. Thermo chemistry and Thermodynamics: Energy changes during a chemical reaction intrinsic energy, enthalpy; First law of thermodynamics: Hess's law Heats of reactions; Second law of thermodynamics; entropy; free energy; spontaneity of a chemical reaction, free energy change and chemical equilibrium; free energy as energy available for useful work.
9. Chemical Kinetic: Rate of a reaction, factors affecting the rate, rate constant, rate expression, order of reaction, first order rate constant-expression and characteristics, Arrhenous equation.
10. Electrochemistry: Oxidation, Oxidation number and ion-electron methods, Electrolytic conduction, Faraday's laws: voltaic cell, electrode potentials, electromotive force, Gibb's energy and cell potentials. Nernest equation, commercial cells, fuel cell, electrochemical theory of corrosion.
11. Surface chemistry, Colloids and Catalysis-, Adsorption, Colloids (types preparation and properties), Emulsions, Micelles Catalysis: Types and characteristics.

INORGANIC CHEMISTRY (20 Marks)

12. Principles of metallurgical operations: Furnaces, ore concentration, extraction, purification metallurgies of Na, Al, Fe, Cu, Ag, Zn and Pb and their properties.
13. Chemical periodicity: s, p, d and f-block elements, periodic Table, periodicity, atomic and ionic radii valency, ionization energy, electron affinity, electronegavivily, metallic character.
14. Comparative study of elements: Comparative study of the following families of elements: (i) Alkalimetals (ii) Alkaline earth metals (iii) Nitrogen family (iv) Oxygen

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family (v) Halogens (vi) Noble gases.

15. Transition metals: Electronic configuration of 3rd-Metal ions, oxidation states, other general characteristic properties, potassium permanganate, potassium dichromate.

16. Co-ordination compounds: Simple nomenclature, bonding and stability, classification and bonding in organometallics.

17. Chemical analysis: Chemistry involved is simple inorganic qualitative analysis: calculations based on acid base titrimetry.

ORGANIC CHEMISTRY (10 Marks)

18. Calculation of empirical and molecular formulae of organic compounds, Nomenclature of organic compounds, common functional groups, isomerism, Structure and shapes of alkanes, alkenes and benzene.

19. Preparation properties and uses of alkynes, alkynes and alkylnes , benzene petroleum, cracking, octane number, gasoline additives.

20. Nomenclature. Physical Chemical properties, correlation of physical properties with structures properties and uses of heloalkanes, halobenzenes, alcohols and phenols : General ideas of some polyhalogen compounds viz. dichloroethanes, dicholoroethers, chloroform,carbon tetrachloride, D.D.T., benzene, hexachloride.

21. Nomenclature, methods of preparation, Chemical properties, correlations of physical properties with structures and uses of ethers, aldehydes, ketones, carboxylic acids and their derivatives. Brief account of the chemistry of Cyanides, isocyanides, amines and nitro compounds.

22. Polymeys Classification : Preparation and uses of common natural and synthetic polymeys.

23. Biomolecules : Classification, Structures and biological importance of carbohydrates, amino acids, peptides, proteins and enzymes, nucleic acids and lipids

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गणित (MATHEMATICS) (50 Marks)

1. ALGEBRA: Algebra of complex numbers. Graphical representation complex numbers. moduls and argument of complex. numbers, conjugated of a complex number Triangle inequality. Cube roots of unity. Arithmetic, geometric and harmonic progression. Arithmetic geometric and harmonic means between two numbers. Sum of squares and cubes of firstn Natural numbers.Theory of geometric equations relations between roots and coefficients. Quadratic expressions, quadratic equations in onevariable,permutations and combinations,binomial Theorem (any index) exponential and logarithmics series. Determinants upto third order and their order and their elementary properties matrices types of matrices,adjoint and inverse of matrix, elementary properties of matrices. Application in solving simultanceous equations upto three variables.
2. TRIGONOMETRY : Trigonometry functions and their graphs, addition and subtraction Formula involving multiple and submultiples angles, general solutions of triangles equations, Relations between sides and angles of a triangles. Solutions of triangles, inverse; trigonometrical functions, height and distance (Simple Problems).
3. CO-ORDINATE GEOMETRY OF TWO DIMENSIONS : Rectangular Cartesian coordinates. Straight line pair to straight line, distance of a point from a line angle between two lines.

   Circle, tangents and normal system of circles.

   Conic section Payabola Ellipse and Hyperbola in standard forms with elementary, properties tangents and normals.
4. CO-ORDINATE GEOMETRY OF THREE DIMENSIONS: Rectangular co-ordinate system, Direction consines 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 vectors.Components in three dimensional space. Scalar and vector products. Triple products. Simple application in geometry and mechanics.
6. DIFFERENTIAL CALCULUS : function polynomial, rational trigonometric, logarithmic and exponential. Inverse function, Limit continuity and differentiability of functions, differentiation of rational, trigonometric and exponential functions. Application of derivative in elementary problems in mechanics increasing and decreasing functions. Maxima and Minima of function of one variable. Roll's theorem and mean value theorem.
7. INTEGRAL CALCULUS : Integrations as the inverse process of differentiation. Integration by parts. By substitution and by partial fraction. Definite integral. Areas under simple curves.
8. DIFFERENTIAL EQUATIONS : Formulation of differential equation, order and degree. Solution of differential equations by separation 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 Simpsons's Rule.
11. LINEAR PROGRAMMING : Definition and formation of linear programming problems. Solution by graphical method.

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जीव विज्ञान (BIOLOGY) (50 Marks)

वनस्पति विज्ञान (BOTANY) (भाग - 1) (25 Marks)

1. Structural Organisation of cell, theory : Light and Electron Microscopic view of cell Structure and functions of cell organelles : Nucleus, Mitochondria. Chloropast. endoplasmic reticulum, Golgi complex, lysosome, microbodies, microfilments. Ribo somes. Centrioles, and plasmids. Eukaryotic Chromosome (Morphology) cell and plasma membrane. Differences between plant and animal cell Cell Division, Cell
2. cycle singnifice of Mitosis and Meiosis.
Mendel's Laws of inheritance, Monohybrid and dihydrid cross; Linkagae and crossing
3. over of genetic material; DNA replication, genetic code, transcription, translation and gene regulation.
Difference between prokaryote and Eukaryotes; Stucture, reproduction and economic
4. importance of virouses, Mycoplasma, Bacteriophage, Cynobacteria (Nostoc) and Bacteria.
Five kingdom classification; Binomial nomenclature; External morphology and life cycle
5. of Spirogyra, Mucor, Funaria, Selaginella and pinus.
Elementary knowlege of Microsporogenesis, megasporogenesis, Fertilisation, endosperm
6. and embryo development in Arigiosperms.
Tissue and tissue systems. Meristeniatic and permanent tissue. Mineral nutrition essential elements and their functions. Uptake of minerals transport of water arid solutes. Transpiration Photosynthesis and Respiration-Importance, mechanism arid factors
7. affecting these processes; photorespiration.
Enzymes and growth hormones with reference to their classification. Chemical nature,
8. mode of action and 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 crists-Role of man in Polluting Environment-Air, Water and Soil.
9. 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.
10. Principles of plant breeding and its role in improvement of crops. Biotechnology; scope and importance in Agriculture and Industries Manufacture of cheese, Yoghurt Alcohol Antibiotics.

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प्राणीशास्त्र (ZOOLOGY) (भाग - 2) (25 Marks)

MULTICELLULARITY - STRUCTURE AND FUNCTIONS OF ANIMAL LIFE :

1. Structure an function of Animal tissues-Epithelial, Connective, Muscular, Skeletal and Nerve.
2. Histology of Mammalian organs- Stomach, Intestine, Liver Kidney, Lung, Testis and Ovary.
3. Structure and physiology of different organ systems of Human body-skin, Digestive System, Respiratory System, Circulatory System, Excretory system, Nervous system, Reproductive system.
4. Skeleton, joints, Muscles on the basis of movement, Receptors.
5. 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:

6. Female reproductive cycles in mammals. Gametogenesis alongwith structure of Sprerm and ovum.
7. Types of eggs. Fertilization, cleavage, types of cleavage and blastula. Development of mammals upto three germinal layers, Foetal membranes-Structure and functions in mammals.
8. Growth, repair and ageing, amniocentesis.
9. Chromosomes, types of chromosome, Human Karyotype and chromosomal abnormalities and syndromes. Hormonal, Chromosomal and Genie balance theory of sex determination. Sex linkage and Sex linked inheritance in Man.
10. Blood Groups and their significance, Blood bank.
11. Tissue culture, Genetic engineering (Brief idea). Mutation, gene mutation.
12. 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:

13. Classification-Binomial and trinomial nomenclature, Basic features of classification.
14. Classification of different animal phyla upto classes with characters and suitable examples.
15. ORIGIN OF LIFE. Theories of Organic evolution-Darwin, Lamarck, Synthetic. Evidences of organic evolution. Human evolution.
16. Economic Zoology Sericulture, Apiculture, Lac culture, Poultry, fishery and peral industry.
17. Protozoan disease in relation to man. Insect carrying diseases in relation to man.
18. Cancer-types of cancer and cancer cell.
19. Communicable diseases (Hepititis, AIDS) STD, Immune Response, Vaccines and antisera, Allergies.
20. Smoking, alcoholism and drug addiction, symptoms and control.
21. Wild life conservation.
22. Pesticides-Uses, advantages and hazards.

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कृषि के लिए उपयोगी विज्ञान एवं गणित तत्व
(Elements of Science Mathematics Useful for Agriculture) Ag-1 (50 Marks)

I. AGRIL PHYSICS: (10 Marks)

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 Vaccum pumps, syphon suction pumps.
4. Friction-Laws of Friction, angle of friction, coefficient of friction and its determination, advantages and disadvantages of friction.
5. Machines- simple machines such as plas, lever, pully, 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, Newtons 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. Ohms 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 healing effect of Current, Joule's law, Determination of 'j' by Joule's Calorimeter, elementary idea of the house wiring electric iron, Electric power and energy.

II AGRIL. CHEMISTRY : (15 Marks)

1. Atomic Structure : Bohr's atomic model Distribution of Electrons according to Bohr-Bory Rules, Radio activity and atomic disintegration.
2. Chemical Bonds: Characteristic of electroyalent, Covalent and co-ordinate Bonds.
3. Ionic Theory : Uses of ionization, Solubility product, Hydrolysis, neutralization, Ionic product of water, Determination of pH. Buffer Solution. Nutritional Importance of Soil pH.
4. Colloids: Lyophilic and Lyophobic, properties of colloids, colloids, colloidal solutions, protective colloids, Gold number, soil colloids clay and humus.
5. Introduction of important minerals present in soil and their chemical composition.

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6. Chemical Fertilizers Manufacture of different Fertilizers of N.P.K. and their utilization. Micronutrients.
7. Volumetric analysis Strength of solution, normality, Molarity, 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, Acetylene, 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 AGRIL. MATHEMATICS :

(10 Marks)

1. Arithmetic progression : Definition, formula to find the nth term. Formula to find, sum off n terms. Definition of arithmetic mean. Insertion of given number of means 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, geometric mean insertion of geometric means between two given Quantities-Finding of remaining quantity when any three of k, s, a, n, are given.
3. Logarithms and Common Logarithms : Definition logarithm of product division of number raised to any power, characteristics of the logarithm of any number greater than unity. Characteristics of the Logarithm of decimal fraction.
4. Trigonometrical functions of angles of any size and sign. Trigonometrical ratios of an, angle (90+) (180+)
5. Trigonometrically ratio of the sum and difference of two angles. Geometrical proof forSin (AB) Cos (AB) product formula for Sin C, Sin D, Cos C, Cos D
6. Statistics : Calculation of mean, mode median and standard deviation, variance and mean deviation for grouped data using various formula

IV AGRIL. BOTANY ZOOLOGY:

(15 Marks)

1. Plant anatomy, (i) Root-Structure and Functions (ii) Stem-Structure and Functions (iii) Leaf Structure and Functions.
2. Agril Botany Zoology : Classification of plants. (i) Outline of classification of plants, (ii) study of the Following families, (a) Compositeae) (b) Leguminoseae (c) Cucurbitae (d) Solanaceae. (e) Malvaceae (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 arid 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.

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CROP PRODUCTION AND HORTICULTURE (Ag. 2) : (50 Marks)

1. (i) Introduction and activities of agriculture and crop production, (ii) Importance of crop production in National Economy (iii) Different Branches of Farming and their importance.
2. Soil and Soil Fertility : (i) Soil and its constituents (ii) physical properties of Soil-Soil texture and Structure porespace, specific gravity, plasticity, cohesion and soil temperature (iii) Formation of soil-classification of soil in C.G. and their characteristics (iv) Soil corrosion its kinds, their causes and control, measures of soil conservation (v) Soil acidity and alkalinity and their reclamation, soil-pH.
3. Tillage : (i) object of tillage, tillage operations, ploughing, leveling, harrowing, intercultivation (ii) Tillage implements, country plough improved ploughs, harrows and cultivators, threshers, winnowers and seed drills, tractor driven implements.
4. Manures and Fertilizer : (i) Essential elements for plant growth (ii) Description and uses of organic manures F.Y.M. Compost green manures (iii) Different Nitrogenous, phosphate and potash fertilizers, properties and uses.
5. Production of crops : (i) Classification of crops according to seasons and economic classification ii) Cultivation of Kharif crops-jowar, Maize, Groundnut, Cotton, Paddy, Soyabean, Arhar, Urad, Moong (iii) Rabi crops- Wheat, Linseed, Mustard, Sugarcane, Gram, Barely under following heads 1. Preparation of land 2. Sowing operation 3. Seed rate per hectare 4. Manures and fertilizer 5. Irrigation6. Intercultural and weeding 7. Improved varieties 8. Yield per Hectare 9. Disease : pests and their control.
6. Irrigation land Drainage : (i) Object of irrigation and drainage (ii) Sources of irrigation and drainage (iii) Method of irrigation and drainage (iv) Water requirements of crops (v)Duty and discharges of water, (vi) Common water lifts. Diesel and electric pumps.
7. Weed and weed control.
8. Cropping scheme, importance of principles of: (i) Crop rotation (ii) Principle cropping. (iii) Mixed-and inter cropping (vi) Dry farming (v) Cooperative farming.
9. Elementary Surveying-importance of surveying. Elementary survey with the help of chains, instruments used in survey as optical square, cross staff offset rod, dumpy level, recording of field book.
10. Introduction (i) Importance and scope of Horticulture (ii) Pomology-location and layout, (iii) Planting system Trimming, pruning, inter-Cropping, winds, breaks, protectionfromfrostandsunburn (vi) Care maintenance and rejuvenation of fruit, orchards.
11. Vegetable Gardening (i) Kitchen gardening (ii) Cultivation of Radish, Carrot, cole crops, onion, Brinjal, Chilies, Tomato, potatoes.
12. Fruit cultivation (i) Vegetative propagation-Budding, inarching and Goottee cutting, Grafting and Layering (ii) Cultivation of papaya, Banana, Grapes, Mango, Guava and Citrus fruits.
13. Ornamental Gardening (i) General Cultivation of Winter and Summer season annuals (ii) Ornamental and flowering plants, Trees, Shrubs, Climbers, hedges and Hedge plants, (iii) Common ornamental and flowering plants e.g. Rose, Carina and Chrysanthemum (iv) Preparation and maintenance of Lawns.
14. Fruit and Vegetable preservation- Canning and bottling Technique (i) Simple canning and bottling techniques, use of suitable containers like aluminized plastic and paper (ii) Washing, Blanching and peeling of fruits and Vegetables, trading of fruits for canning.
15. Preservation of Fruits and vegetables (i) General principles and methods of fruit and vegetable preservation (ii) processing by heat, preservation by antiseptic drying, pre servation by fermentation. dehydration and packing (iii) preparation of Jelly, lime squash and Tomato sauce.

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16. Rural Finance (i) Cultivator's Finance needs for farmers (ii) Sources of credit (iii) Organisation of Rural Cooperative credit and marketing societies.
17. Agriculture Business planning and Management (i) Inventory of farm resources (ii) Identifying family assets and liabilities (iii) Maintenance of farm Records and Accounts.

पशुपालन एवं कुक्कुट पालन के तत्व
Elements of Animal Husbandry and poultry Farming (Ag-3) (50 Marks)

(A) 1. Introduction - (i) Importance of Live stock in Indian Economy (ii) Body Parts of cow and buffalo and description of important systems; respiratory digestive, reproductive, secretion of milk.
2. Improved Cattle Breeds - (i) Cow (ii) Buffalo (iii) Goat and (iv) Sheep.
3. Care and management of Cattle - (i) Animal Hygiene (ii) Cattle housing - sheds for bullocks, bull milch cattle etc. (iii) Special attention for rearing of calves, pregnant and milch cattle, working bullocks and bull.
4. Breeding of cattle - (i) Breeding : Line breeding and cross breeding, Mendel's laws of breeding.(ii) Artificial insemination in cattle with examples.

(B) 5. Dairy Farming - (i) General idea regarding dairy farming as a business in village and town conditions, requirement of land, labour, capital, management techniques (ii) Scope of dairy farming - white revolution in India.
6. Milk production- (i) Different methods of milking, (ii) Principles of clean milk production, (iii) Factors affecting quality of milk.
7. Composition of milk- (i) Definition of Milk (ii) Milk constituents, (iii) composition of Milk Factors affecting composition of milk.
8. Physical properties of milk - (i) Temperature (ii) Boiling Freezing point (iii) pH (iv) Density (v) Sp. Gravity, Use of lactometer (vi) Gerber's method for fat test.

(C) 9. Feed and Feeding (i) principles of Feeding of dairy cattle, (ii) Different types of feeds and fodders and their nutritive values-kharif and Rabi fodders; Hay and Silage crops (iii) Preservation of , fodders : making of silage, hay silopits. (iv) Computation of balanced ration of cows, buffaloes, bullocks, bulls goats and sheep.
10. Judging of Cattle (i) Importance of Judging, (ii) Judging method. Score card method and on the basis of body parts, (iii) Judging the age of cattle by rings on the horn and by the teeth development.
11. Dairy appliances - (i) Construction of appliances and their cleanliness (ii) working of cream separator and its parts. Butter churner, Butter worker.
12. Milk products - (i) Preparations of Cheese, Gream, Ravri, Dahi, flutter, Ghee, Condensed milk, Milk powder and their composition.
13. Common diseases of Cattle- (i) Symptoms of sick Animals, (ii) Symptoms of different diseases.Rinderpest. Foot and Mouth disease, Blackquarter, Haemorrhagic Septicaemia, Anthrax and piroplasmosis; (iii) Their prevention and control measures.
14. Poultry Farming- (i) Introductory, (ii) Scope and limitation of Poultry Farming (iii) Important breeds of poultry for eggs, meat, (iv) Hatching of eggs and uses of incubator.
15. Housing and ration for poultry birds- (i) Poultry sheds, layout model sheds, (ii) Ration of poultry bird Chicken, Grower, Layers arid Broilers.
16. Diseases of Poultry - (i) Preventive control measures, (ii) Bacillary. White diarrhoea, Ranikhet, Coccidiosis, Fowl Pox, Fowl, cholera, Ecto and endoparasites.

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