

AGRICULTURE

A) AGRONOMY –

- 1) Evaluation of agriculture-from tools through ages.
- 2) Classification of crops, their geographical distribution & factors responsible.
- 3) Impact of agriculture trade & industrial development.
- 4) Crop production & field in the state as compared to that of other states.

Agronomy as a science & its relationship with other sciences, Germination, maturity harvesting & storage of Crop Plants, tillage principles, requirement for minimum tillage, seed bed preparation characteristics of good beds, Methods of sowing & their suitability under different Conditions. weed characteristics, dissemination, competition for growth factors & losses caused by them, Common methods of weed control.

Maintenance of soil fertility & soil productivity green manuring.

Crops rotation, mixed cropping, relay cropping & dry-farming. Kharif crops, Rabi crops.

B) Agro-Climatology- 1) Agro-climatology, definition & scope, the role of climate in soil & natural vegetation & live stock distribution, the earth and its atmosphere, Environmental factors in agriculture, elements & factors of climate, weather forecasting, basic parameters. Impact of climatology factors in crop & livestock distribution in India. Effects of weather on sowing, growth, maturity & harvesting of crops.

Cropping pattern. Climate classification in India's Punjab.

Biochemistry :- Importance of plant cell, Biomolecules, structure, function and properties amino Acids, Proteins & their quality.

Enzymes- classification, factors affecting activity.

Lipids-their industrial applications.

Biodiesel-Carbohydrates & nucleic acids, citric acid cycle pentose phosphate pathway & oxidative phosphorylation & fatty acid oxidation, Biosynthesis.

Soil-Science- Concept of land, soil & soil science, composition of earth crust & its relationship with soil, Rocks & minerals weathering, soil forming factors & processes, soil profile, soil colour, soils of Punjab & India, soil physical properties soil texture, textural classes, soil structure, classification, soil aggregation & significance, soil crusting, bulk density & particle density of soils & porosity, their significances manipulation.

Soil Water- Retention & potentials, soil moisture constants, movement of soil water-infiltration, percolation, permeability drainage & methods of determination of soil moisture, thermal properties of soil, soil temp, soil air composition, influence of soil temperature & air on plant growth. salinity & alkalinity, ion

exchange, soil organic matter decomposition, mineralization, humus, carbon cycle, soil organism & their beneficial & harmful roles, methods of soil testing. Factors influencing nutrient use efficiency (NUE) in respect of N,P,K,S,Fe. & zn fertilizers.

Horticulture :- Definition importance & divisions of horticultural climatic zones, area & production of different fruit crops. Selection of site, fencing & wind break, Planting system, Propagation methods, methods of training & pruning, use of growth regulators in fruit production.

Package of Particles for cultivation of major fruits. Mango, Citrus, grapes, guava, apple, Litchi & Papaya.

Package of practices for cultivation of Minor fruits, pineapple, Pomegranate, ber, fig, loquat, Banana, Phalsa, Pear, Plum, Peaches.

Mathematics :- Menstruation of rectangles, easy examples of garden paths cost of planting trees & fencing gardens. Area of right angled triangle area & height of isosceles & equilateral triangles, area of triangles in terms of sides, rent of field, Area of parallelograms, rhombus, equalilateral & trapezoid. Circumference & area of circles, circular rings. Cast of fencing circular fields & paths.

Algebra - Solution of quadratic equations & of these reducible to quadratic equation. Theory of quadratic equations. Relation between roots & co-efficient. Bionominal theorem. expansion particular term coefficient of n, summation of simple infinite series evaluation cube root etc.

$$x/a + y/b = 1, y - y_1 = m(x - x_1), y - y_1 = y_2 - y_1 / x_2 - x_1 (x - x_1)$$

Co-ordinate Geomaty the point-distance & section formulae area of a triangle. the straight line equation in the following standard forms, $x=a$, $Y=b$, $Y=mx$, $Y=mx+C$.

Biology-

Morphology- seed structure of seeds of Gram, castor, maize & process of germination.

Roots :- External character & functions, type of root systems & their bearing on agriculture practices.

Stem :- External Characters and functions, buds & their types, spines & ordinary branches, modification of stem and leaf. Parts of a typical leaf & their functions, simple & compound leaves & their functions, venation & modification of leaves, uses of leaves.

Inflorescence:- Simple & special type of inflorescence.

Flower:- Structure & functions of Floral parts, nectaries, floral formulae & vertical section of a flower.

Pollination:- mechanism, agencies responsible for pollination contrivances for cross pollination.

Fertilization & seed formation, structure of orthotropus & Anatropous ovule.

Reproduction in Plants:-vegetative & sexual reproduction their merits & demerits, natural & artificial methods.

Fruits:-Elementary knowledge of fruits, dispersal of seeds & fruits with examples from Punjab.

Anatomy-In elementary account of the various tissues & their functions, internal structure of a stem (Dicot & monocot) root & Leaf.

Punjabi-1. ਗਿਆਨ ਮਾਲਾ- (ਵਿਗਿਆਨਕ ਤੇ ਸਮਾਜ-ਵਿਗਿਆਨਕ ਲੇਖਾਂ ਦਾ ਸੰਗ੍ਰਹਿ) (ਸੰਪਾ ਡਾ. ਸਤਿੰਦਰ ਸਿੰਘ, ਪ੍ਰੋ ਮਹਿੰਦਰ ਸਿੰਘ ਬਨਵੈਤ) ਲੇਖਪਹੀਆ ਪ੍ਰਦੂਸ਼ਣ, ਭਰੂਣ ਹੱਤਿਆ ਦੇ ਦੇਸ਼ ਵਿਚ ਨਾਰੀ ਸ਼ਕਤੀ ਵਾਤਾਵਰਣੀ ਪ੍ਰਦੂਸ਼ਣ ਅਤੇ ਮਨੁੱਖ, ਏਡਜ਼: ਇੱਕ ਗੰਭੀਰ ਸੰਕਟ, ਪੰਜਾਬ ਤੇ ਮਹਾਨ ਕਲਾਕਾਰ (ਬਲਵੰਤ ਗਾਰਗੀ) ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ, ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ।

Water management & Micro Irrigation-Definitions & Objectives, water resources and irrigation development in India and Punjab. Plant water relationship, crop water requirement and methods irrigation efficiency. Water management in rice, wheat, maize, cotton, groundnut, sugarcane, mango, banana and tomato.

Computer application- Input and output devices units of memory, Hardware and software, types of processors, booting of computer , viruses, worms and vaccines and security system., Disk Operating System, Windows and Linux, window explorer, anatomy of a window, www. Concepts, email etc.

Agri Extension- Education meaning and types, extension education & agricultural extension meaning objectives, principles and philosophy importance and problems of rural development. Agricultural and rural development programmes of pre & post independence era. New trends in extension education and privatizations of extension. Emergence of broad based extension.

Genetics- Mendal's laws of inheritance- Types of gene action, multiple factor hypothesis, cytoplasmic inheritance, mutations, study of chromosome structure, morphology number & types of Karyotype & Ideogram. Mitosis & meiosis, DNA, RNA, structure, function, types, modes of replication & repair.

Crop Physiology- Introduction & Importance of crop physiology in agriculture seed structures morpho physiological & Biochemical Changes during seed development, seed germination and seed dormancy, photosynthesis & crop productivity, respiration its types & significance, mineral nutrition, physiology of nutrient uptake, fruit ripening and its hormonal regulation.

Fundamentals of Insect Morphology & Systematics- Entomology definition & its history, factors for insect abundance. modification & functions of mouth parts, antennae, legs and wings, sense organs, types of reproduction .

Taxonomy- Its importance, history, development & binomial nomenclature, definitions of bio type, sub species, species, genus, family and order. Classification of class inscta upto orders suborders and important families with special emphasis on distinguishing morphological characters.

Farm power & machinery- Farm power in india- sources, working principles of two stroke & four stroke engines, different types of tractors, types of primary & secondary tillage implements, seed drills, paddy transplanters etc. Harvesting & threshing equipments cost of operation of machinery.

Manures & Fertilizers- classification, manufacturing process and properties of major nitrogenous, Phosphatic, potassic & complex fertilizers. Fertilizer control order, storage, Biofertilizers and their advantages. Manures, FYM, composting vermi composting, green manuring oil cakes, sewage & sludge, biogas Plant slurry, plant & animal refuges.

Soil Physics & Erosion Management- Soil a water reservoir, forces of water retention, soil water potential, Rain erosivity, soil erodibility. Run off methods of measurement, factors and management, run off farming.

Plant pathogens & principles of plant pathology- Introduction, importance & general characters of fungi , bacteria, fastidious, bacteria & nematodes, phytoplasmas, stryloplasmas, viruses, viroids, algae, protozoa & Phanerogamic Parasites. Study of defence mechanisms in plants, plant disease epidemiology & forecasting, plant disease management. Plant quarantine & inspection.

Environmental Studies- Definitions, scope and its importance, need for public awareness, natural resources & associated problems, forest, water, mineral , food, energy resources, biodiversity & its conservation

Principles of seed technology:- Importance of seed production, certified , foundation and breeder seed production, maintenance of genetic purity, seed quality and classes of seed, seed production in Maize, Bajra and Sorghum, Rice, castor, tomato, brinjal, chillies, Bhindi, onion, bottle gourd & ridge gourd. Seed testing procedures for quality assessment, seed treatment & its importance, seed packing & storage.

Diseases of Field crop and their Management- Economic importance symptoms, casual organisms, epidemiology disease cycle and integrated management of diseases of rice, sorghum, Bajra, Maize, Wheat, Barley, Sugarcane, turmeric , tobacco, ground nut, sesamum, castor, sun flower, rapeseed & mustard, cotton, pulses mentha & berseem.

Organic Farming- Introduction concept, relevance in the present context recycling of organic residue, soil improvement and amendments, integrated diseases and pest management, use of bio control agents, trap crops and bird perches, quality consideration, certifications, labeling, marketing and export

Agricultural Marketing, Trade and Prices- Concept, definition, scope, components, classification, market structure, market functionaries, producers surplus-meaning type, marketed surplus, marketing costs, margins and price spreads, free trade, world trade organization implications of agreement on agriculture export-import polity, cooperative marketing state trading, quality control, risk in marketing, contract farming etc.

Introduction to food science and post harvest value addition-

Food production & consumption trends in India. Major deficiencies of calories and proteins, food groups & concept of balanced diet. Causes of food spoilage, principles of processing and preservation of food by heat, low temperature, chemicals and fermentation. Preservation, food safety, adulteration & food laws, status of food industry in India.

Forestry- Definition scope and importance, status of forest in India forest & their classification, agro forestry, farm forestry, planting methods forest policy & laws.

Plant breeding: Classification of Plants, botanical description, Floral Biology emasculation & pollination techniques in cereals, millets, pulses oil seeds fibers, plantation crops etc. Methods of Breeding, single cross, double cross hybrids.

Flower cultivation & landscape gardening- Introduction to floriculture and landscaping. Package of practices for rose, jasmine, chrysanthemum, gladiolus, marigold, tuberose, planning of gardens landscape art & Principles, use of trees, shrubs, climbers in the gardens.

G M crops-Genetically modified crops in cotton.

B.T Cotton- *Bacillus thuriengensis*.

Ist Grown in 2006.

Precision farming, green house cultivation

Role of plant clinics in agri definitions, history and scope of plant clinics.

Role of National seeds corporation (NSC), Indian Council of Agricultural Research (ICAR), NABARD, FCI, FAO. Protection of Plant variety and farmers Right (PPV & FR) act 2001.

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