

AGRICULTURE (CODE NO. 01)

PAPER - I

There will be two parts

PART I , Compulsory for all the candidates.

PART II, There will be two optional sections (A & B)

Candidate will have to answer all the questions from the opted - one section.

PART - I

1. Elementary Agronomy

Classification of weeds and herbicides. Associated losses due to infestation of weeds. Weed management through cultural, chemical, biological and integrated approach. Tillage and crop production. Water use efficiency in relation to crop production. Criteria for scheduling irrigation. Concepts of multiple cropping, multi-storey, relay and intercropping and their importance.

2. General Horticulture

Orchard planning (Soils, Climate, Nutrition, Training, Pruning, Flowering and fruiting problems and bearing habits), Bonsai. Nursery management and propagation methods. Types of vegetable gardening; Physiological disorders in vegetables and fruits. Principles and methods of preservation of important fruits and vegetables and processing techniques. Landscape, Floriculture including raising of ornamental plants. Design and layout of gardens.

3. Basic genetics

Chromosome organization and functions - Mitotic and meiotic cell division. Reproduction and fertilization - Mendel's experiments and laws of inheritance. Gene interaction, Linkage and crossing over, Chromosomal aberration. Cytoplasmic inheritance. Qualitative and quantitative traits. Nilsson-Ehle's experiment. Structure and replication of genetic material. Gene expression. Central dogma. gene transcription and translation. Genetic code. Operon model. Gene mutation.

4. Crop improvement

Center of Crop diversity, mode of reproduction, variability in plants, Germplasm Male sterility and self incompatibility. Heterosis and inbreeding depression, Breeding methods for crop improvement

5. Plant protection

Classification and symptoms of plant diseases, Principles of plant disease control including (exclusion, eradication, immunization and protection) Classification of pesticides and formulations. Agents and basic steps of biological control. Integrated diseases and insect pest management. Principle methods of control of stored grain pest and storage pests. Methods of rodent control. Spray equipments, their selection and maintenance. Safety precautionary measures during pesticide usage. Bee keeping (apiculture) and mushroom cultivation. Legal control - plant quarantine and insecticidal act.

6. Basic agro-forestry

Silvi-culture and agro-forestry, Classification of agro-forestry system; Waste land and watershed development through agro-forestry

7. Elements of crop physiology

Absorption and translocation of water and nutrients. Transpiration and water economy. Photosynthesis and respiration. Growth analysis and its importance. Photo-periodism and vernalisation. Growth hormones, senescence and post-harvest physiology (seed dormancy, storage physiology and fruit ripening)

8. Organic farming

Defination of organic Farming, Components and its role in sustainable Agriculture Bio-fertilizers, production and use; Role of *neem* Products in crop protection. Role of microorganisms in agriculture

9. Dry land farming

Dry land agriculture for sustaining agricultural production. Soil and Water management with special reference to dry land agriculture.

PART - II

There will be two optional sections (A & B) Candidate will have to answer all the questions from the opted section.

SECTION - A

Will be based on production & protection of the following main crops:

Field crop groups	
Cereals	: Wheat, rice, maize and sorghum
Pulses Crops	: Pigeon pea ,chick pea, Urid and Mung
Oilseeds Crops	: Soybean, groundnut, and rapeseed/mustard

Cash crops : Cotton and sugarcane

SECTION - B

Will be based on production & protection of the following horticultural crops :

Horticultural crop groups	
Fruits	: Mango, citrus , banana and papaya
Vegetable crops	: Potato, onion, cucurbits, tomato, okra and peas
Cole crops	: Cauliflower and cabbage
Leafy vegetables	: Spinach,
Flowers	: Roses, merry gold, chrysanthemum, aster, gaillardia and gladiolus
Spices	: garlic, chillis, fenugreek, coriander

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PAPER - II

1. Seed technology

Seed technology : definition and importance. Varieties, Seed germination and dormancy. Planting value. Seed and variety deterioration. DUS and VCU test. Physical and genetic purity. Seed health. Seed legislation and certification; Classes of seeds; basic principles of Seed production and processing

2. Agricultural biotechnology

Methods and application of plant tissue culture; D.N.A. based marker gene cloning and tools for recombinant DNA technology

3. Agricultural economics and farm management

Agriculture marketing and its problems; Marketing costs, Profit margins and efficiencies. Cooperative marketing in India. EXIM policies and farm commodities for export. Barriers of export in context to WTO. Farm management, types and systems of farming and factors affecting them.

4. Agricultural extension education

Rural society and institutions. Definitions, characteristics and importance of social stratification and culture. Agricultural extension-its importance; Importance and methods of extension training and evaluation. Importance of rural development programmes in India in post-independence period. Communication and diffusion of agricultural innovations. Role of KVKs in dissemination of agricultural technologies. Role and functions of ATMA

5. Agricultural statistics

Measures of central tendency and dispersion. Correlation and regression. Graphs and diagrams

6. Computer application in agriculture

Types and classification of computers. Data operating systems. Library function. Data management.

7. Soil Science and Microbiology

Processes and factors of soil formation. Soil Taxonomic classification. Physico-chemical properties of soils. Soil fertility and fertilizers. Integrated nutrient management. Problem soils and their management. Essential plant nutrients, their distribution, functions and cycling in soils. Microbial processes involved in recycling of plant nutrients. Symbiotic and non-symbiotic nitrogen fixation. Soil organic matter and nutrient cycling. Soil survey, conservation and land use planning. Processes and factors of erosion and runoff and their management.

8. Biodiversity and natural resource conservation

Natural resources (Forest and water), their management and conservation. Environmental pollution (air, water, soil and nuclear) and associated hazards to crops. Solid waste management. Utility of plant genetic resources in crop improvement. Germplasm collection and conservation.

9. Food science and food biochemistry

Biochemistry of carbohydrates and proteins. Types and properties of amino acids. Types of vitamins and their sources. Classification and nature of enzymes. Factors affecting activities of enzymes. Metabolism. Chemistry of natural products (natural antibiotics and plant hormones)

10. Farm management

Farm management planning and budgeting. Role of farming systems in sustainable agriculture. Significance of farm mechanization in agricultural production