

Maharashtra Public Service Commission

Civil Services Exam – Mains Optional

Agriculture

(Code No : 101)

Paper – I

Standard : Degree in Agriculture

Total Marks : 200

Nature of Paper : Conventional Type

Duration : 3 Hours

- Note :**
- 1) Answers to this paper must be written in English only.
 - 2) This paper will test the candidate's ability to comprehend, to analyse, to interpret, to criticise and to appraise subject matter related to the topics/sub topics mentioned below.
 - 3) It is expected from candidates to study the latest and recent developments and happenings pertaining to the topics/sub topics mentioned below.

Section - A (Marks : 50)

Agronomy

1) Ecology :

- .01) Ecology and its relevance to natural resources in India in general and Maharashtra in particular, with special reference to agriculture.
- .02) Agro meteorology – types of climate and their methods of classification
- .03) Effect of climatic factors on crop growth.
- .04) Drought – classification and factors of drought tolerance in plants.
- .05) Eco-system, Environmental pollution and associated hazards to crop plants.

2) Cropping Patterns :

- .01) Cropping patterns in relation to Agro-climatic zones of Maharashtra
- .02) Concept of multiple cropping, multistory, relay, inter cropping and mixed cropping and their importance in crop production and resource management.
- .03) Organic Farming – Concept, Permaculture, Regenerative agriculture, Prospects and Limitations.
- .04) Package of practices of important cereals, pulses, oilseeds, fibers, sugarcane, and fodder crops grown during kharif and rabi seasons in Maharashtra.
- .05) Weeds associated with various crops and their integrated management.

3) Tillage :

- .01) Tillage and its objective and factors affecting it.
- .02) Tillage implements and its relevance for good tillage and plant growth.
- .03) Modern concept of tillage.

Section – B (Marks : 50)

Agricultural Chemistry and Soil Science

4) Soil :

- .01) Processes and factors of soil formation.

- .02) Classification of soil including modern concepts.
- .03) Physical, chemical and biological properties of soil (texture, structure, soil reaction and pH, soil air and soil temperature etc.).
- .04) Soil Survey and Land capability classification.
- .05) Soils of Maharashtra.
- .06) Soil fertility management in relation to sustainability of productivity.

5) Soil and Water Conservation :

- .01) Soil conservation, planning on watershed basis.
- .02) Erosion and run-off management in hilly, foothills and valley lands.
- .03) Dry land agriculture and its problem, stabilization of productivity in dry land agriculture.
- .04) Problem soils and their reclamation methods.

6) Essential Nutrients in Plants :

- .01) Essential plant nutrients criteria, classification, functions, deficiency symptoms and corrective measures.
- .02) Organic manures, inorganic fertilizers, bio-fertilizers and methods of application.
- .03) Fertigation, slow release fertilizers and fertilizer use efficiency.
- .04) Integrated plant nutrient management (IPNM) in relation to sustainable agriculture.

Section – C (Marks : 50)

Agricultural Engineering

7) Water Management :

- .01) Soil water constant and water requirement.
- .02) Water use efficiency in crop production.
- .03) Criteria for scheduling irrigation.
- .04) Drip and sprinkler irrigation.
- .05) Quality of irrigation water.
- .06) Type of drainage for water logged soil, effect of drainage on soil improvement and crop growth.
- .07) Effect of industrial effluents on soil and water pollution.

8) Farm Machinery and Power :

Conventional and Non-conventional sources of farm power, farm machinery and farm implements.

9) Agricultural Process Engineering :

- .01) Concept of value addition and scope, utilisation of byproduct.
- .02) Post-harvest processing techniques and equipments, status of Agro-industries in Maharashtra.

Section – D (Marks : 50)

Horticulture

10) Horticulture :

- .01) Climatic requirements and cultivation of major fruit crops, vegetable crops and flower plants, package of practices.
- .02) Scope of fruits, vegetables and flowers for domestic and export market.
- .03) Important Milestones and present status in fruits, vegetables and floriculture in Maharashtra.
- .04) Principle methods of preservation of important fruits and vegetable products.
- .05) Role of fruits and vegetables in human nutrition.

- .06) Production of mushroom.
- .07) Design, layout of gardens and land scaping.
- .08) Hi-tech floriculture (Green House and Poly House technology).
- .09) Importance and scope of dry land horticulture and crops suitable for dry land and rain fed conditions.

11) Medicinal and Aromatic plants :

Importance and scope of medicinal and aromatic plants, its cultivation, processing and present status in Maharashtra.

12) Forestry :

Types of Forestry, Social and Agro- forestry, their importance, scope and relevance to the need of rural community, multipurpose tree species, Apiculture and Sericulture.

Paper - II

Standard : Degree in Agriculture

Total Marks : 200

Nature of Paper : Conventional Type

Duration : 3 Hours

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Section - A (Marks : 50)

Agricultural Botany

1) Cell Biology :

- .01) Cell Structures and organelles.
- .02) Cell division – Mitosis and Meiosis.
- .03) Nucleic acids.

- a) Structure and functions.
- b) Gene structure and functions.

2) Genetics :

- .01) Laws of heredity, their significance in plant breeding.
- .02) Linkage and crossing over and its significance in recombination breeding.
- .03) Variations – Component of variation, polyploidy, euploid and aneuploids, Mutations and mutgens.

3) Plant breeding :

- .01) Mode of reproduction – Selfing and crossing techniques.
- .02) Sterility and incompatibility and its role in crop improvement.
- .03) Crop genetic resources, conservation and utilization.
- .04) Breeding Methods.
 - a) Selection (mass selection, pure line selection, pedigree selection and recurrent selection).

b) Hybridization.

- (1) Combining ability and its significance in plant breeding.
- (2) Hybrid vigour and its exploitation.
- (3) Back cross method of breeding.
- (4) Breeding for disease and pest resistance.
- (5) Role of inter-specific and inter generic hybridization.

.05) Improved varieties, hybrids composites of various crop plants.

4) Seed Technology :

- .01) Seed technology and its importance.
- .02) Different types of seeds and their production and processing techniques.
- .03) Role of public and private sector in seed industry.
- .04) Seed Acts, seed testing and seed certification.

5) Physiology :

- .01) Photosynthesis and its Mechanism.
- .02) C3, C4 and Crasulacean Acid Metabolism (CAM) plants.
- .03) Aerobic and anaerobic respiration.

6) Growth and Development of Plants :

- .01) Plant growth regulators – Phytohormones, their mechanism of action and importance in agriculture.
- .02) Seed germination and dormancy.

Section - B (Marks : 50)

Plant Pathology, Entomology and Nematology

7) Plant Pathology :

- .01) Plant diseases and their Classification.
- .02) Plant diseases of major crops of Maharashtra.
- .03) Epidemiology and forecasting of diseases.
- .04) Principles of Plant disease management.
- .05) Plant protection equipments and maintenance.
- .06) Integrated disease management (IDM).
- .07) Biological control of diseases.

8) Entomology :

- .01) Classification of insect and pests of agriculture importance.
- .02) Major insect pests of major crops of Maharashtra and losses cause of by them.
- .03) Biological control of insect pests, scope and limitation.
- .04) Storage insect pests of cereals and pulses and their management.
- .05) Integrated pests management (IPM).

9) Nematology :

Plant parasitic nematods of major crops of Maharashtra infestation and their management.

10) Pesticides :

Pesticides and bio-pesticides, their formulations, compatibility and mode of action, microbial toxins.

Section - C (Marks : 50)

11) Food Policy and Standards :

- .01) Food production and consumption trends in Maharashtra.
- .02) National and International food policies.
- .03) Production, procurement, distribution, storage and processing of farm products.
- .04) Relation of food production and national dietary pattern.
- .05) Major deficiencies of calorie and protein – malnutrition problems in Maharashtra.

12) Livestock production and management :

- .01) Live stock production of cattle, goat, sheep, poultry and pig in Maharashtra.
- .02) Live stock breeds and their characteristics, Breeding and management of dairy animals.
- .03) Animal nutrition – Chemical compositions of animal feed, digestion, absorption and metabolization of food, nutritive evaluation of feed.

13) Biotechnology :

- a) Tissue culture and its application in agriculture.
- b) Recombinant DNA technology.
- c) Transgenic plants for biotic and abiotic stress tolerance.
- d) Biotechnology and its application in food processing, alcoholic beverages, biogas, bio-fertilizers, Animal and human health.

14) Remote sensing and its application in agriculture and natural resource management.

Section - D (Marks : 50)

Agricultural Economics and Extension

15) Agricultural Economics :

- .01) Farm management, and importance.
- .02) Farm planning and budgeting.
- .03) Types and systems of farming and factors affecting them.
- .04) Agricultural marketing and its institutes, pricing of agricultural inputs and outputs.
- .05) Problems in the marketing and measures to overcome.
- .06) Agricultural price policy, objectives of price policy, price stabilization and price support policy of government to agricultural produce.
- .07) Agricultural finance institutes and role in agricultural economy.
- .08) Government agricultural credit policy, credit institutes, problems thereof.
- .09) Government economic policy, World Trade Organization (WTO)- present provisions and its impact on agricultural production, growth and trade. Intellectual Property Rights (IPR) and Patents.
- .10) Agricultural business management.
- .11) Cooperation : Meaning, Principles and importance of cooperation, Types of cooperative institutes and their role in agriculture development, cooperative movement in Maharashtra.

16) Extension :

- .01) Agricultural extension, its importance and role.
- .02) Methods of evaluation of extension programme.
- .03) Socioeconomic survey and status of big, small and marginal farmers and landless agricultural labours.
- .04) Communication

- a) Importance of audiovisual aids in extension education.
 - b) Mass media and their importance in extension education.
 - c) KVK and its role in agricultural promotion and development.
 - d) Single window system organization.
- .05) Lab to land programme, TAR, IVLP, ATMA & Kisan Call Centre.
 - .06) Integrated rural development programme.
 - .07) Role of public and private agencies in agricultural extension.
 - .08) Information Technology, its utility and role in agricultural extension and development.
 - .09) **Agri – Clinics:** concept, need and prospects.