

Maharashtra Public Service Commission

Civil Services Exam – Mains Optional

Horticulture

(Code No : 104)

Paper - I

Standard : Degree in Horticulture.

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 the 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)

1) Basic Horticulture:

- .01) **Horticulture :** Definition, branches, importance and scope. Nutritive values of fruits and vegetables.
- .02) Classification of horticultural crops.
- .03) Climatic parameters affecting the growth and development of horticultural crops. Horticultural zones of Maharashtra and India.
- .04) Site selection for establishment of orchards.
- .05) Soil considerations. Formation of soil. Classification of soils on the basis of texture. Physical and chemical properties of soil in relation to horticultural crops.
- .06) Systems of planting and layout of orchard.
- .07) Nutrition, manuring and foliar feeding of plant nutrients. Symptoms of nutrient deficiencies and excesses.
- .08) Water management of horticultural crops. Determination of water requirement of horticultural crops.
- .09) Weed management by mechanical, cultural, biological, chemical methods. Use of herbicides in the control of seasonal and perennial weeds.
- .10) Orchard soil management practices. Inter cropping, sod culture, clean culture, cover cropping and green manuring.
- .11) Control of important diseases and pests of horticultural crops. Integrated pest management in horticultural crops and its importance. Formulations of fungicides and pesticides solutions.
- .12) Training and pruning of fruit trees, their principles, objectives and methods.
- .13) Flower bud formation, fruit bud differentiation, fruit set, fruit development and fruit drop, causes and control measures for fruit drops.
- .14) Unfruitfulness factors responsible and measures to overcome the same.
- .15) Parthenocarpy and seedless ness in fruits.

- .16) Special horticultural practices like pinching, girdling, notching, ringing, bending, smudging, bahar treatment.
- .17) Classes of growth regulators and uses of plant growth regulators in Horticulture.
- .18) Mendal's work and its impact on plant breeding. Mendal's laws of inheritance. Methods of breeding of horticultural crops. Achievements of breeding.
- .19) Photoperiodism, photosynthesis, C₃ and C₄ plants. Mechanism of uptake of nutrients by plants. Short day, long day and day neutral plants.
- .20) Farming system - definition, objectives, types - mono, multiple, mixed (apiculture, sericulture, dairy, sheep and goat, poultry, fish culture)
- .21) Use of Windbreaks and Shelter Belts.
- .22) Organic farming concept.

Section - B (Marks : 50)

2) Plant Propagation and Nursery Management :

- .01) **Plant propagation:** definition, basic concepts, sexual and asexual propagation, their advantages and disadvantages.
- .02) Viability and vitality of seed. Types of dormancy and measures to overcome the same.
- .03) Apomixis, Polyembryony and use of Polyembryonic root stocks.
- .04) Methods of asexual propagation-cuttage, layering, budding and grafting Rootstocks. Factors affecting rooting in cutting and layering. Factors affecting union of grafts.
- .05) Stock-Scion relationship. Graft incompatibility and its causes and remedies to overcome the same.
- .06) Establishment of commercial nurseries. Nursery Act.
- .07) Propagation by specialised structures like suckers, rhizomes, corm, bulb, runner, stolon.
- .08) Mist propagation, micropropagation, Role of Biotechnology. Tissue culture.
- .09) Rejuvenation of fruit crops.
- .10) Use of growth regulators in plant propagation.
- .11) Propagation media and containers.

Section - C (Marks : 50)

3) Fruit Production:

- .01) Importance, scope and present status of fruit production in Maharashtra and India.
- .02) **Fruit Crops:** Present status, area and production, geographical distribution, important varieties, propagation methods, soil and climatic requirements. Use of wind breaks and shelter belts, Layout & planting, manuring, irrigation, training and pruning, intercropping, weed control. Harvesting, grading, packaging, marketing and storage of mango, banana, citrus, guava, pineapple, grape, papaya, sapota, fig, pomegranate, *aonla* tamarind, *ber*, litchi, *kokum*, jackfruit, *karonda*, apple, pear, peach, cherries, almond, walnut, plum, apricot.
- .03) Control of important pests and diseases of above fruit crops.
- .04) Methods of breeding in fruit crops & significant achievements made through various breeding methods.
- .05) **Flowering and fruiting :** problems and measures to overcome the same.
- .06) Role of plant growth regulators in maximization of fruit production.

- .07) Special problems in fruit culture like alternate bearing, malformation, spongy tissue, black tip of mango, bitter pit in apple, granulation in citrus, bronzing in guava, shot berries, water berries and mummification in grape, fruit cracking in fig, pomegranate, etc.
- .08) High density planting in fruit crops.
- .09) Suitability of fruit crops for soil salinity and alkalinity.

Section - D (Marks : 50)

4) Vegetable Production :

- .01) Definition of Olericulture. Importance of vegetables from nutritional and economic security. Present status of vegetables in India and Maharashtra. Export of vegetables.
- .02) Classification of vegetable crops. Types of vegetable farming. Kitchen and nutrition garden.
- .03) Climatic factors affecting vegetable and tuber crops production.
- .04) Climate, soil, improved varieties, nursery raising, planting, manuring, irrigation, weed control, intercultural operations, use of growth regulators, special intercultural practices in vegetables and tuber crops production like tomato, brinjal, chillies, bell pepper, okra, cucurbits, cluster bean, sweet potato, cole crops, root crops, garden peas, fenugreek, lettuce, beet-root, potato, tapioca, colocasia, yam and perennial vegetable crops.
- .05) Harvesting, yield, grading, packing, storage and marketing of vegetable and tuber crops.
- .06) INM (Integrated Nutrient Management) and use of starter solutions in vegetable production.
- .07) Rotation, inter, relay, mixed and companion cropping in vegetable cropping system.
- .08) Importance of mushrooms in nutritional and economic security, types of mushrooms, culture of mushrooms. Materials and equipments required for mushroom cultivation. Problems in mushroom cultivation.
- .09) Standards for export of vegetable crops, organic vegetables production and certification agencies.
- .10) Poly house cultivation of bell pepper, cucumber and tomato.

Paper - II

Standard : Degree in Horticulture.

Total Marks : 200

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Section - A (Marks : 50)**1) Ornamental Horticulture, Aromatic and medicinal crops :**

- .01) Importance and scope of ornamental gardening and floriculture.
- .02) Principles of garden designing, types of garden, garden features and adornments.
- .03) Types of lawn grasses, annual flowers, shrubs, trees, climbers and creepers, herbaceous plants, palms and their use in gardening.
- .04) Lawn making, rockery, flower arrangement, bonsai, ikebana, topiary work.
- .05) Open cultivation of rose, chrysanthemum, gladiolus, jasmine, tuberose, aster, marigold, gaillardia, crossandra, daisy. Use of growth regulators and special horticultural practices in cultivation of flower crops.
- .06) Protected cultivation and its scope and problems in India.
- .07) Types of greenhouses.
- .08) Greenhouse ventilation, cooling system, green house heating system, CO₂ enrichment, light control.
- .09) Irrigation, nutrient management and fertigation system in greenhouses.
- .10) Protected cultivation of rose, gerbera, carnation anthurium, orchid, chrysanthemum.
- .11) Harvesting, grading, precooling, storage and transport and export of cut flowers.
- .12) Use of computers in green house production of cut flowers.
- .13) Cultivation of lemon grass, shatavari, mehendi, rose, geranium, mentha, eucalyptus, kewada, davana, vetivera, citronella, sandalwood, jasmines, opium, vinca, Solanum khasianum, isabgol, cinchona, belladonna, rauwolfia, dioscorea, ashwagandha and patchouli on following aspects - importance, scope, species, varieties, propagation and cultural practices, nutrition and water requirements, harvesting, yield, processing and marketing.
- .14) Chemical constituents of important medicinal and aromatic crops.
- .15) Therapeutic and pharmaceutical uses of important species of medicinal and aromatic crops.
- .16) Methods of extraction of essential oils from aromatic crops.

Section – B (Marks : 50)**2) Post harvest technology of Horticultural Produce :**

- .01) Maturity indices and harvesting of fruits and vegetables.
- .02) Ripening of fruit and changes associated with fruit ripening, methods of hastening and delaying the ripening.
- .03) Post harvest losses, their causes and prevention.
- .04) Precooling, grading, packing, storage and transport, storage structures, types of storage. Controlled atmosphere storage, modified storage, freezing preservation.
- .05) Importance and scope of fruit and vegetables preservation.
- .06) Principles and methods of fruit and vegetable preservation.
- .07) Preparation and preservation of fruit juices, squash, syrup, cordial, jam, jelly marmalade, fruit preserve, candy, pickle and ketchup.
- .08) Canning of fruits, fruit juices and vegetables.
- .09) Causes of spoilage of fruits and preserved products.
- .10) Dehydration and drying of fruits and vegetables.
- .11) Waste and by- product utilization of major fruits and vegetables.

- .12) Scope and development of processing as cottage industries in rural areas.
- .13) Food Products Order (F.P.O.) regulations.

Section – C (Marks : 50)

3) Agricultural Business Management and Agricultural Extension :

- .01) Importance of Horticulture in national economy.
- .02) Concept of national income.
- .03) Horticulture development strategies. Role of Horticulture in five year plan.
- .04) Horticultural marketing, marketing channels and price spread, market functions, functionaries, market cost, margining. Role of STC, NAFED, APEDA, National Horticulture Board, Maharashtra Agricultural Produce and Marketing Board in financing and marketing of horticultural produce.
- .05) Present status and future scope for export of horticultural produce. Role of ATMA, APEDA, Spice Board, Coffee Board and other agencies in Horticulture development.
- .06) **Horticultural Finance :**

Definition of credit, type of credits, role of village agricultural co-operative societies, District Central Co-operative Banks, Apex Banks, NABARD, Rural Banks, Commercial Banks in Development of Horticulture. Role of Horticultural Development Scheme under EGS and its impact on economy of farmers and the State.

- .07) Extension agencies - Agencies responsible for dissemination of Horticultural technology.
- .08) Role of rural social institutions in Horticultural Development Programme, Transfer of Technology programme. Impact of GATT and WTO in horticultural sector, Export and import potential for horticultural sector. Role of information technology in Horticulture development.

Section - D (Marks : 50)

4) Plantation Crops, Spices and Condiments :

- .01) Definition- Importance, present status and future scope of plantation/ spices and condiment crops in India and Maharashtra.
- .02) Problems in growing of plantation crops and spices.
- .03) Complete cultivation aspect of various plantation crops and spices on the points -Soil and climatic requirements, varieties, propagation, planting, after cares including shade regulation, training and pruning, pest and disease control, harvesting, processing and yield of

(i) Plantation crops: coconut, arecanut, tea, coffee, cocoa, cashewnut, oil palm and rubber.

(ii) Spices and Condiments: black pepper, clove, cinnamon, ginger, curry leaf, turmeric, betelvine, cardamom, chilli, nutmeg, vanilla, cumin and coriander.

5) Forestry and Agroforestry:

- .01) Importance of forests, causes and effects of deforestation. Afforestation. Branches of forestry.
- .02) **Agroforestry-** definition, scope, benefits and limitations. Interactions of trees with crops.

- .03) Agroforestry Systems-** Agri-silviculture, Silvi-pasture, Horti-pasture, Horti-silvi pasture.
- .04) Horti-Silvi pastoral system-** Introduction, land use planning with special reference to Indian Agriculture and Forestry, Trees with plantation crops, Trees with fodder grasses and legumes.
- .05)** Compatibility of grazing-free V/S controlled grazing combination based on systems of grazing.
- .06)** Regeneration methods of forest tree species.
- .07)** Site preparation, management of Horti-pastoral systems and its economics.
