

Paper II**Horticulture (Diploma Standard)****Code: 432****Unit I: Basic Horticulture and Plant Propagation (30 Questions)**

Horticulture – Definition, scope and importance, Division and classification of horticultural crops – Horticultural zones in India and Tamil Nadu – Cropping systems - Precision farming- Planting systems – HDP and UHDP- Irrigation systems – Nutrient application methods in horticultural crops – Weed management – Training and Pruning system– Special horticultural practices – Maturity indices – Harvesting methods, pre-cooling – Packaging - Storage of horticultural crops - Protected cultivation. Propagation - Tools and implements - Media and Containers - Types of nursery beds - Seed treatment - Sowing – Protray nursery-seedling production - Potting, depotting and repotting of plants - Methods of asexual propagation through cuttings, layering, grafting and budding - Plant propagation structures - Mist chamber and shade net – Hardening and maintenance – Polyhouse-Application Growth regulators in propagation – Nutrient management and plant protection measures – Record keeping and maintenance nursery act and certification.

Unit II: Soil and Fertility, Irrigation and Weed Management (20 Questions)

Soil types- Physical and chemical properties- Soil organic matter and its importance- Essential nutrients for crop plants - Major, secondary and micro nutrients – Manures and fertilizers – Types of fertilizers – Straight, Complex, Compound, Mixed, Fortified, chelated and water soluble fertilizers and their reactions in soil. Soil fertility – INM practices– soil health card- Problem soils – Acid, saline and alkaline soils - Reclamation and management- Rootstocks for problem soils. Irrigation – Sources of water for irrigation –Critical stages of water requirement – Irrigation scheduling and fertigation – Irrigation methods- Water conservation methods. Study of weeds -methods of weed control–Herbicides for weed management in horticultural crops– Integrated weed management practices.

Unit III: Production Technology of Fruits and Vegetables (30 Questions)

Area, production and importance of fruit crops in Tamil Nadu – Major fruit producing districts in Tamil Nadu. Layout of orchard - Physical features in orchard - Study of cultural practices of Tropical fruits – Mango, Banana, Grapes, Papaya, Sapota, Guava, Acidlime, Jackfruit, Dragon fruit. Sub-tropical and temperate fruits – Pineapple, Avocado, Mandarin orange, Apple, Pear, Plum, Strawberry with reference to soil, climate, varieties/hybrids methods of propagation (rootstocks), nutrient, irrigation and weed management practices – Training and pruning – Growth regulators – Maturity standards for harvesting – Post-harvest handling of fruit crops – Yield – Grading – packing – Storage and value added products – HDP/UHDP Top working, double working and rejuvenation of old orchard- Organic fruit production and certification Good Agricultural Practices (GAP).

Dry land horticulture – Arid and semi-arid zones in Tamil Nadu and India. Crops suitable for dry land production – Important varieties, climate and soil requirements, commercial propagation methods - Spacing and planting systems - Cropping systems and intercropping – Mulching – Management of nutrients, water, weeds and problem soils – Training and pruning - Use of plant growth regulators – Post-harvest handling of Aonla, custard apple, pomegranate, ber, jamun, manila tamarind and wood apple - Soil and moisture conservation methods – Anti-transpirants.

Area, Production and importance of vegetable cultivation in Tamil Nadu – Kitchen garden-roof garden-vertical garden– Truck garden and market garden –soil and climate requirement – varieties/hybrids – Seed rate – Sowing -nursery practices – Protray nursery – Transplanting – Manuring – Irrigation – Fertigation - Nutrient deficiency and their corrective measures - Use of growth regulators - Special horticultural practices (training, staking, pruning) – Physiological disorders and corrective measures – Maturity indices - Harvesting – Grading, sorting – Packing and storage and yield for important vegetable crop; Tomato, Brinjal, Chillies, Bhendi, Onion, Bittergourd, Ridgegourd, Snake gourd, Pumpkin, Water melon, Musk melon, Ash gourd, Tapioca, Yams, Colocasia, Cabbage, Cauliflower, Radish, Carrot, Beet root, Amaranthus, Moringa, Potato, Cluster beans, Lab lab, Peas and Beans.

Unit IV: Production Technology of Flower Crops and Landscaping (30 Questions)

Importance of commercial flower crops – Area and production - Study of cultural practices of commercial loose flowers – Rose, Jasmine, Tuberose, Chrysanthemum, Marigold, Crossandra, Celosia, Nerium and Gomphrena. Floral concrete and pigment extraction from loose flowers - Protected structures for cut flower production – Study of cut flower production techniques of Rose, Carnation, Gerbera, Chrysanthemum, Orchids, Anthurium, Liliun, Alstroemeria, Lisianthus, Heliconia, fillers (Asparagus, limonium, gypsophylla) and foliage (dracaena and xinadu). Post-harvest management of cut flowers – Floral decorations, bouquets and dry flowers – Grading, packing and marketing of flowers-Flower Auction centres in Tamil Nadu. Importance of ornamental gardening, landscaping and nursery business– Principles and styles and types of garden - Features of garden - Garden components and adornments – operations in planting and maintenance of trees, annuals, shrubs, climbers, creepers, herbaceous perennials, ferns, cacti and succulents, palm and cycads – Sunken garden, roof garden, rockeries, vertical garden and plant choices Bonsai making- Lawn and lawn making – sports turf- Flower arrangements and dry flower making

Unit V: Production Technology of Spices, Plantation Crops, Medicinal and Aromatic Crops (30 Questions)

Area, production and Importance of spice crops in Tamil Nadu – Study of production techniques of important spice crops Pepper, Cardamom, Turmeric, Ginger, Clove, Nutmeg, Cinnamon, Tamarind, Curry leaf and Coriander. Harvesting and processing – grading and packing – Organic farming and GAP in spice production. Area, production and Importance of

plantation crops in Tamil Nadu - Study of cultural operations for Tea, Coffee, Rubber, Cocoa, Cashew, Coconut, Arecanut, Oil palm and Palmyrah – Harvesting and Processing – Grading and packing - Organic farming and GAP in plantation crops. Area, production and Importance of medicinal and aromatic plants in Tamil Nadu - Contract farming - production technologies – Medicinal crops : Glory lily, Medicinal Coleus, Senna, Periwinkle, Gymnema, Ashwagandha, Phyllanthus, Kalmegh and Aloe vera. Aromatic plants: Japanese mint, Rosemary, Lemon grass, Citronella, Palmarosa, Vettiver, Geranium, Patchouli and basil.

Unit VI: Insect Pest and Diseases of Horticultural Crops and Their Management (20 Questions)

Pest - Categories – Pest management - Principles and components. Natural enemies. IPM – different types of traps - Management strategies for important insect pests groups – Chewing insects - Stem borers – Fruit borer – Sap feeders of important fruit, vegetable, spices, medicinal and plantation crops - Special pest management strategies in storage pests and poly house. Management techniques for plant parasitic nematodes –Etiology, symptoms and integrated management of important diseases.

Important pest and diseases of Fruits: Mango, Banana, Citrus, Grapes, Guava, Sapota, Pomegranate, Papaya, Jack, Pineapple, Ber, Apple, Pear, Plum Vegetables: Brinjal, Tomato, Bhendi, chillies, Cucurbits, Moringa, Crucifers, Beans, Peas, Potato and Cassava. Spices and condiments: Onion, Garlic, Chillies, Cardamom, Pepper, Turmeric, Ginger, Coriander, Clove and Nutmeg. Plantation crops: Tea, Coffee, Cocoa, Rubber, Ccoconut, Arecanut and Cashew. Flowers: Jasmine, Rose, Crossandra, Chrysanthemum, Tube rose, Medicinal plants: Gloriosa, Senna, Coleus, Aloe vera, Solanum nigrum and Aswagandha.

Unit VII: Post-Harvest Handling and Value Addition of Horticultural Crops (20 Questions)

Scope and importance of post harvest technology in horticultural crops - Washing, grading, sorting - pre cooling and pre treatments - Blanching and peeling methods – Post- harvest handling methods: Dehydration, Canning of fruits and vegetables – Thermal processing - Low temperature processing - Cold storage - Controlled and atmospheric storage - Refrigeration truck, ripening chamber, packaging for horticultural crops - Value addition in horticultural crops. Fruits: Jam, Jelly, Squash, RTS and Candy. Vegetables: Pickle, chutney, sauce and ketchup. Spices – Oleoresins, masala powders and mix - Food safety standards, National: Agmark, BIS, FSSAI and HACCP, International – Codex and ISO.

Unit VIII: Livestock Management and Poultry Production (5 Questions)

Significance of Livestock and Poultry - Various systems of livestock production – Important cattle Breeds - Artificial Insemination - Housing management - Feeds and fodder – Major cattle diseases and management. Sheep and Goat farming - Important breeds - Economic traits - Systems of rearing - Housing management - Nutrition - Common diseases, Ecto and endo parasites - Prevention and Control. Poultry farming - Commercial strains of layer and broiler -

backyard poultry - country birds - Housing management - Brooding management - Deep litter - Cage system - Nutrition of Chick - Grower and Layer and Broiler – Diseases - Causative organisms – Symptoms – Vaccination - Disease control and Prevention.

Unit IX: Commercial Agriculture (7 Questions)

Seed Production - varieties –Hybrids- emasculation and Pollination –isolation distance- rogueing-planting ratio-seed production techniques of Tomato, Brinjal, chilli, bhendi, onion, gourds, cluster bean, moringa, Amaranthus– Extraction techniques – Seed processing – Seed treatment – Seed packaging – Seed storage –Seed act-Seed inspection and Certification

Bio-Control Agents - Importance – Examples of bio-control agents – Role in pest and disease management – Categories of bio-control agents- Spawn and Mushroom Production - Oyster and button - Organic Composting – Enriched FYM-Vermi compost-preparation of vermi beds-coir compost-quality standards.

Unit X: Farm Management, Marketing and Extension Education (8 Questions)

Farm Management – types and systems of farming, collective farming - farm planning and budgeting- risk and uncertainty- Horticultural Marketing-demand and supply- Marketing costs and marketing margins - Warehousing – Processing - Cold storage - Marketing agencies and institutions - Cooperative marketing societies - Role of regulated markets – NAFED – TANFED – NHB - Commodity boards - Marketing of agricultural inputs - Market information and intelligence - AGMARKNET, DEMIC, DMI, Uzhavar Sandhai - Farmers Producers Organisation. Agricultural Extension – methods of Communication, mass contact methods. Participatory Rural Appraisal techniques. Audio-visual aids –Farm Journalism –writing for media. Information and Communication Technology (ICT) – Computer networks, internet, video conferencing, agriportals, Kisan Call Centre, mobile apps. Geo tagging, Photography – Basic concepts, advancements. New governmental schemes, flagship programmes, policy notes, Duties and responsibilities of AHOs, Calamity mitigation and enumeration- crop compensation - Crop Cutting Experiment and Crop Insurance - Revenue records of Farmers, Drones in Horticulture crop production-AI based weather forecasting and farm advisory- GIS mapping-Major Research Institutes in Horticulture.