SUBJECT PAPER : HORTICULTURE (DEGREE STANDARD) SUBJECT CODE: 278

UNIT- I: FUNDAMENTALS OF HORTICULTURE

Scope and importance – State, National and Global scenario of horticultural crops – Area and production – Import and export – Nutritive value of horticultural crops – Horticultural zones of Tamil Nadu and India – National and regional agencies involved in promotion of horticultural Industry in India (NHB, APEDA and Commodity Boards) – Classification of horticultural crops – Factors limiting horticultural crop production – Role of season – Soil and climate requirements - Physical and chemical properties of soil - Climatic factors – Light, temperature, photoperiod, relative humidity, rainfall, altitude, microclimate - Kitchen gardening -Nutrition gardening – Truck gardening – Market gardening - Vegetable forcing - Protected and precision horticulture – Hydroponics, Aeroponics – Nutrient Film Technique - Horticulture therapy.

UNIT - II: GROWTH AND DEVELOPMENT OF HORTICULTURAL CROPS

Important phases of growth and development - Bearing habits – Classification of horticultural crops based on life cycle – Annual, biennial perennial (woody and herbaceous perennials) – Fruitfulness and unfruitfulness - External and internal factors associated with unfruitfulness – Physiology of flowering, fruit set, ripening and senescence – Fruitdrop - Causes and control measures - Plant growth regulators – Functions and role in horticultural crops - Bud dormancy – Dormancy breaking – Parthenocarpy – Parthenogenesis – Polyembryony – Stenospermocarpy – Vivipary - Apomixis.

UNIT - III: PROPAGATION OF HORTICULTURAL CROPS

Propagation – Definition – Establishment of nursery – Site selection - Tools and implements propagation structures - Mist chamber, phytotron - Humidifiers – Greenhouse – Glasshouse – Polyhouse - Shade net, glass house, poly tunnels, cold frames and hotbeds, pit nursery - Media and containers – Soil sterilization - Sexual propagation – Merits and demerits – Crops propagated through seeds - Seed viability, longevity, dormancy, germination – Pre-sowing treatment – stratification, scarification, seed priming, seedling vigour – Raised seed bed and pro-tray nursery – Asexual propagation – Merits and demerits – Methods of vegetative propagation – Identification of plus trees – Mother block, scion bank – Clonal nursery – Cutting – Layering – Grafting, budding types – Anatomical and physiological basis of grafting

Stock scion relationship, graft compatibility -Budwood selection and certification –
Propagation through specialized plant parts (bulbs, tubers, offsets, runners, suckers, slip, crown, rhizomes, corms) – Quality management and nursery certification – Micro propagation
Application – infrastructure requirements – Types of media – Stages of micro propagation –
Micro grafting – *in vitro* propagation of important horticultural crops.

UNIT - IV: MANAGEMENT TECHNIQUES FOR HORTICULTURAL CROPS

Planning – Layout and management of orchards – Fencing – Wind breaks and shelter beds – Spacing – Planting system – Physical and chemical properties – Soil reaction – acid, saline and alkaline soils – Soil fertility - Essential elements –Functions - Organic manures and inorganic fertilizers, bio-fertilizers, vermi-composting - Applications and management – Nutrient deficiencies and corrective measures - Physiological disorders and remedies -Irrigation – Critical stages of water requirement – Effect of water stress on crop yield – Antitranspirants – management of irrigation water quality - Conventional and micro irrigation – Fertigation - Mulching – Sod culture – Weed management – Application growth regulators – Training and pruning principles and methods - Rejuvenation of senile and old orchards – Cropping systems - Cover cropping - Multitier cropping –Intercropping – Special horticultural techniques (pinching, thinning, disbudding, blanching, smudging, notching, ringing) -Principles of organic horticulture – GAP and GMP.

UNIT - V: PRODUCTION TECHNOLOGY OF FRUIT CROPS

Scope and importance of fruit crops - Composition and uses - Origin and distribution – Species – Season - Climate and soil requirement – Varieties and hybrids – Propagation techniques - Planting systems and planting density -Including High density planting (HDP) and ultra high-density planting (UHDP) –spacing – Water and nutrient management – Fertigation - Weed management - Canopy management - Training and pruning – Intercultural practices - Off season production - Special horticultural techniques – Use of plant growth regulators – Maturity indices - Harvest and yield – Nutrient deficiencies and physiological disorders and its corrective measures and management of important pest and diseases of important fruit crops :- Mango, Banana, Acidlime, Sweet orange, Mandarin, Grapes, Papaya, Guava, Sapota, Pineapple, Jackfruit, Pomegranate, Aonla, Annona, Ber, Apple, Pear, Plum, Peach, Strawberry, Litchi, Avocado, Walnut and Almond and minor tropical, arid and temperate fruit crops.

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UNIT- VI: PRODUCTION TECHNOLOGY OF VEGETABLE CROPS

Scope and importance of vegetable crops - Composition and uses - Origin and distribution - Area and production - Soil and climatic requirements - Varieties and hybrids -Propagation methods - Seed rate – Sowing and nursery practises – Containerized seedling production - Season - Planting methods - Water, nutrient and weed management -Fertigation – Training for vegetables – Intercultural practices - Maturity indices – Harvest and yield – Nutrient deficiencies and physiological disorder and its corrective measures of important vegetable crops: Tomato, Brinjal, Chilli and Capsicum (Sweet Pepper), Bhendi, Leguminous vegetables (Beans, Peas, Cluster beans, Cowpea, Dolichos bean); Bulbous vegetables (Onion, Garlic); Tuber crops - (Potato, Tapioca, Sweet potato, Elephant footyam, Colacassia); Cucurbitaceous vegetables (Cucumber, Bittergourd, Snakegourd, Ridgegourd, Ashgourd, Muskmelon, Watermelon. Pumpkin) Cruciferous vegetables (Cabbage, Cauliflower and Knolkhol); Root vegetables (Carrot, Radish, Beetroot, Turnip) - Leafy vegetables (Spinach, Lettuce, Palak, Amaranthus) -Perennial vegetables (Drumstick, Coccinea) - Protected cultivation of vegetable crops -Precision farming of important vegetable crops and seed production.

UNIT – VII: FLORICULTURE & LANDSCAPE GARDENING

Scope and importance of flower crops production - Uses - Origin and distribution - Area and production - Climate and soil requirement - Species and varieties - Propagation, season - Spacing and planting methods - Irrigation, nutrient management - Fertigation -Weed management - Training and pruning – Intercultural operations – Special horticultural techniques – Growth regulators – Off season production - Maturity indices – Harvest and yield and management of important pest and diseases for important loose flower crops: Jasmine, Rose, Tuberose, Chrysanthemum, Marigold, Nerium and Crossandra - Cut flowers - Rose, Carnation, Anthurium, Orchid and Gerbera - Cutfoliage and fillers. Principles of Landscape designing – Styles of gardening - Types of gardening viz., Hindu, English, Mughal, Japanese, Persian, Italian, French gardening -Garden components -Trees foliage flowering and avenue trees – Burlapping – Shrubs – Flowering annuals creepers and Climbers - Cacti and succulents -Lawn - Astroturf - Types of grasses -Layout, planting and maintenance of lawn – Hedge and edge plants - Indoor plants and interior scaping - Garden adornments - Principles and styles of flower arrangements -Bonsai styles and culture – Industrial, Institutional, Public and Private landscaping - Special types of gardening – Bog garden, dish, terrarium, bottle, roof, vertical gardening and green wall.

UNIT – VIII: PRODUCTION TECHNOLOGY OF SPICES AND PLANTATION CROPS

Scope and Importance of spices and plantation crops - Composition and uses - Origin and distribution – Area and production – Climate and soil requirements - Species and varieties - Season, seed rate / propagation methods –Spacing - Planting system – High density planting – Irrigation and nutrient management – Fertigation and weed management – Training and pruning – Cropping systems – Multitier cropping – Cover cropping – Inter cropping - Growth regulators – Mulching - Shade and canopy regulation – Maturity indices, harvest, yield and management of important pest and diseases and processing m e t h o d s of important plantation and spice crops: Major, seed, tree, herbal spices and minor spices - Black Pepper, Cardamom, Turmeric, Ginger, Curry leaf, Clove, Nutmeg, Cinnamon, Coriander, Fenugreek, Cumin, Tamarind, all spice and vanilla – Plantation crops - Tea, Coffee, Rubber, Cocoa, Coconut, Oilpalm, Cashew, Palmyrah, Arecanut.

UNIT – IX: PRODUCTION TECHNOLOGY OF MEDICINAL AND AROMATIC CROPS

Scope and importance of medicinal and aromatic crops - Composition and uses - Origin and distribution – Area and production - *Ex situ* and *insitu* conservation – Classification of medicinal and aromatic crops – Constraints in medicinal plant cultivation - Climate and soil – Varieties – Propagation - Nursery practices - Planting methods - Cropping systems – Manures & fertilizers – Irrigation – Intercultural operations – Harvest indices – Harvest & yield and management of important pest and diseases - Production systems - Contract farming – GAP – GCP – GMP - Organic production and certification – Classification and distillation methods of essential oils – Secondary metabolite production - Value addition - Organisational support for promotion of medicinal and aromatic crops - Medicinal crops: Senna, Periwinkle, Glory Iily, Aswagandha, Medicinal coleus and Solanum, Sweet flag, Aloe, Isabgol, *Phyllanthus*, *Stevia*, Opium poppy. Aromatic crops: Lemon grass, Citronella, Vetiver, Ocimum, Davana, Mint, Geranium, Patchouli and Eucalyptus.

UNIT - X: POST- HARVEST TECHNOLOGY OF HORTICULTURAL CROPS

Importance of post-harvest handling in horticultural crops – Maturity indices – Post-harvest handling methods – Washing – Grading - Waxing – Grades and standards – Methods of packing - Types of containers and their advantages and disadvantages – Storage - Principles and methods of refrigerated and gas storage - Storage methods - Pre-cooling - Controlled atmospheric storage, Modified atmospheric storage – Low pressure storage and

cold chain concept - Importance and scope of processing industry in India, general principles of fruit and vegetable preservation like canning, dehydration, freezing, fermentation - Use of chemicals(preservatives) and irradiation – GMP – Food safety and quality control.

PAPER-II

GENERAL STUDIES (DEGREE STANDARD/OBJECTIVE TYPE)

(Code No: 003)

UNIT-I: GENERAL SCIENCE

Physics Universe-General Scientific laws-Scientific instruments-Inventions and discoveries-National scientific laboratories-Science glossary-Mechanics and properties of matter-Physical quantities, standards and units-Force, motion and energy-Electricity and Magnetism, Electronics and Communication -Heat, light and sound-Atomic and nuclear physics-Solid State Physics – Spectroscopy- Geophysics - Astronomy and space science.

<u>Chemistry</u> Elements and Compounds-Acids, bases and salts-Oxidation and reduction-Chemistry of ores and metals-Carbon, nitrogen and their compounds-Fertilizers, pesticides, insecticides-Biochemistry and biotechnology-Electrochemistry-Polymers and plastics.

Botany Main Concepts of life science-The cell-basic unit of life-Classification of living organism-Nutrition and dietetics-Respiration-Excretion of metabolic waste-Bio-communication.

Zoology Blood and blood circulation-Endocrine system-Reproductive system-Genetics the science of heredity-Environment, ecology, health and hygiene, Bio- diversity and its conservation-Human diseases-Communicable diseases and non- communicable diseases-prevention and remedies- Alcoholism and drug abuse-Animals, plants and human life

UNIT- II: CURRENT EVENTS

<u>History</u> Latest diary of events – National--National symbols-Profile of States-Defence, national security and terrorism-World organizations-pacts and summits-Eminent persons & places in news-Sports & games-Books & authors -Awards & honours-Cultural panorama-Latest historical events - India and its neighbours - Latest terminology- Appointments-who is who?

Political Science 1. India's foreign policy 2. Latest court verdicts – public opinion 3. Problems in conduct of public elections 4. Political parties and political system in India 5. Public awareness & General administration 6. Role of Voluntary organizations & Govt., 7. Welfare oriented govt. schemes, their utility

Geography Geographical landmarks-Policy on environment and ecology.

Economics Current socio-economic problems-New economic policy & govt. sector

<u>Science</u> Latest inventions on science & technology-Latest discoveries in Health Science-Mass media & communication.

UNIT-III : GEOGRAPHY

Earth and Universe - Solar system-Atmosphere hydrosphere, lithosphere - Monsoon, rainfall, weather and climate - Water resources - rivers in India-Soil, minerals & natural resources - Natural vegetation - Forest & wildlife-Agricultural pattern, livestock & fisheries -Transport including Surface transport & communication - Social geography – population -density and distribution-Natural calamities – disaster management-Climate change - impact and consequences - mitigation measures - Pollution Control.

UNIT-IV: HISTORY AND CULTURE OF INDIA

Pre-historic events -Indus valley civilization-Vedic, Aryan and Sangam age-Maurya dynasty-Buddhism and Jainism-Guptas, Delhi Sultans, Mughals and Marathas-Age of Vijayanagaram and the bahmanis-South Indian history - Culture and Heritage of Tamil people-Advent of European invasion-Expansion and consolidation of British rule - Effect of British rule on socioeconomic factors-Social reforms and religious movements - India since independence-Characteristics of Indian culture-Unity in diversity – race, colour, language, custom-India-as secular state-Organizations for fine arts, dance, drama, music-Growth of rationalist, Dravidian movement in TN-Political parties and populist schemes- Prominent personalities in the various spheres – Arts, Science, literature and Philosophy – Mother Teresa, Swami Vivekananda, Pandit Ravishankar , M.S.Subbulakshmi, Rukmani Arundel and J.Krishnamoorthy etc.

UNIT-V: INDIAN POLITY

Constitution of India - Preamble to the constitution- Salient features of constitution- Union, State and territory- Citizenship-rights amend duties- Fundamental rights- Fundamental duties- Human rights charter- Union legislature – Parliament- State executive- State Legislature – assembly- Status of Jammu & Kashmir- Local government – panchayat raj – Tamil Nadu- Judiciary in India – Rule of law/Due process of law- Indian federalism – center – state relations -. Emergency provisions - Civil services in India - Administrative challenges in a welfare state - Complexities of district administration - Elections - Election Commission Union and State. Official language and Schedule-VIII- Amendments to constitution-Schedules to constitution-. Administrative reforms & tribunals- Corruption in public life- Anticorruption measures – Central Vigilance Commission, lok-adalats, Ombudsman, - Comptroller and Auditor General of India- Right to information - Central and State Commission- Empowerment of women- Voluntary organizations and public grievances Redressal- Consumer protection forms

UNIT- VI: INDIAN ECONOMY

Nature of Indian economy-Need for economic planning-Five-year plan models-an assessment-Land reforms & agriculture-Application of science in agriculture Industrial growth-Capital formation and investment-Role of public sector & disinvestment-Development of infrastructure- National income- Public finance & fiscal policy- Price policy & public distribution- Banking, money & monetary policy- Role of Foreign Direct Investment (FDI)-WTO-globalization & privatization- Rural welfare oriented programmes- Social sector problems – population, education, health, employment, poverty-HRD – sustainable economic

growth- Economic trends in Tamil Nadu -Energy Different sources and development- Finance Commission -Planning Commission- National Development Council

UNIT-VII: INDIAN NATIONAL MOVEMENT

National renaissance-Early uprising against British rule-1857 Revolt- Indian National Congress-Emergence of national leaders-Gandhi, Nehru, Tagore, Nethaji -Growth of militant movements -Different modes of agitations-Era of different Acts & Pacts-World war & final phase struggle-Communalism led to partition-Role of Tamil Nadu in freedom struggle - Rajaji, VOC, Periyar, Bharathiar & Others-Birth of political parties /political system in India since independence.

UNIT-VIII: APTITUDE AND MENTAL ABILITY TESTS

Conversion of information to data-Collection, compilation and presentation of data - Tables, graphs, diagrams-Parametric representation of data-Analytical interpretation of data - Simplification-Percentage-Highest Common Factor (HCF)-Lowest Common Multiple (LCM)-Ratio and Proportion-Simple interest-Compound interest-Area-Volume-Time and Work-Behavioural ability -Basic terms, Communications in information technology-Application of Information and Communication Technology (ICT)- Decision making and problem solving-Logical Reasoning-Puzzles-Dice-Visual Reasoning-Alpha numeric Reasoning-Number Series-Logical Number/Alphabetical/Diagrammatic Sequences.