

23. SYLLABUS FOR COMPETITIVE EXAMINATION FOR THE POST OF TEACHING ASSOCIATE IN HORTICULTURE

1. Fruit Production-

Importance, scope and constraints of horticulture with especial reference to Rajasthan. Climate change and fruit production, biodiversity and conservation of fruits, export-oriented fruit production and cropping system of fruit production. Overview of commercial varieties of regional, national and international importance, soil & climate, recent trends in propagation, rootstock influence, planting systems, root zone and canopy management, High Density and Meadow orcharding, Training & pruning, nutrient and water management, fertigation, role of bio-regulators, abiotic factors limiting, physiological disorders- causes and their remedies, plant protection measures, maturity indices, harvesting, grading, packing, storage and ripening techniques of:-

A. Mango, banana, papaya, sapota, jackfruit, aonla, pomegranate, phalsa, ber, date palm and other minor fruits viz. lasoda, mulberry, fig, tamarind and karonda.

B. Apple, plum, litchi, strawberry, grapes, guava, citrus, custard apple and other minor fruits viz. bael, jamun, ker, Pilu and khejri.

2. Propagation and Nursery Management-

Importance and scope of plant propagation and nursery management. Sexual propagation, cellular basis for propagation, apomixes, polyembryony, chimeras, principal factors influencing seed germination of horticultural crops, dormancy, hormonal regulation of germination and plant growth, seed quality, treatment, packing, storage, certification. Asexual propagation- rooting of cuttings, physiological, anatomical and bio chemical aspects of root induction in cuttings, layering-its principles and methods. Budding and grafting-selection of elite mother plants, methods, establishment of bud wood bank, stock, scion and inter stock relationship. Role of PGRs in propagation. Rejuvenation of old orchards through topworking, progeny orchard and scion bank. Micro propagation-principles and concepts. Techniques-in vitro clonal propagation, direct organogenesis, embryogenesis, micro grafting, meristem culture, shoot tip grafting/micro grafting. Nursery-types, structures, components, planning and layout. Nursery management and practices for healthy propagule production and recent trends in propagation.

3. Breeding and Physiology of Fruit Crops-

History, development and importance of fruit breeding. Genetics of diversity, distribution and domestication of fruit species. Problems in fruit breeding Polyploidy, heterozygosity, polyembryony, parthenocarpy and seedlessness etc. Incompatibility and sterility system, Apomixis, Variability, germplasm and its selection. Breeding strategies- clonal selection, bud mutation and chimeras, mutagenesis and its application. Hybridization, resistance breeding for biotic and abiotic stresses. Role of genetic engineering and biotechnology in important fruit crops. Parameters of growth and development, morphogenesis, effect of light, temperature, photosynthesis & photoperiodism, vernalisation. Physiology of flowering, pollination, fruit set and development.

4. Post-Harvest Technology of Horticultural Crops –

Importance and scope of PHT & preservation. Maturity indices, harvesting, minimal processing, practices for specific market requirements, influence of post-harvest practices, enzymatic and non-enzymatic changes, respiration, transpiration of fruits & vegetables, physiology and biochemistry of fruit ripening factors leading to post harvest losses, pre-cooling, methods of storage-ventilated, refrigerated, MA & CA storage, physical injuries and disorders, packaging methods and transportation, principles and methods of preservation, food processing,

canning, fruit juice beverages, pickles, jam, jellies, sauces and ketchup, candies, preserves, dried and dehydrated products. Nutritionally rich products, fermented fruits and beverages and processing of waste management. Recent trends in food preservation and value addition, food additives, ripening of fruits and vegetables. Food safety standards and food laws.

5. Vegetable Production-

Importance and scope of Vegetables. Classification of vegetables, Types of vegetable gardening, hydroponic, roof top vegetable gardening and protected cultivation of vegetable crops (Hi-tech horticulture), Introduction of organic vegetable farming, Brief about underutilized vegetable crops. General constraints in vegetable production, climatic and soil requirements, commercial varieties/hybrids, sowing/planting time and methods, seed rate and seed treatment, Plant Growth regulators, nutritional and irrigational requirements, inter cultural operations, weed control, mulching, physiological disorders, harvesting, post-harvest management, plant protection measures and economics of crop production. A. Tomato, brinjal, hot and sweet peppers, potato, okra, vegetable cowpea, vegetable cluster bean, cucurbitaceous crops, colocasia, sweet potato and green leafy vegetables. B. Cabbage, cauliflower, knol-khol, sprouting broccoli, exotic vegetables, carrot, radish, onion, garlic and peas.

6. Floriculture and Ornamental Gardening-

Importance and scope of floriculture in India. Varietal wealth and diversity, propagation, nursery management, pro-tray nursery under shade nets, transplanting techniques, soil and climatic requirements, precision farming techniques, water and nutrient management, weed management, training and pruning, pinching and disbudding, special horticultural practices, use of growth regulators, physiological disorders and remedies, IPM and IDM, flower forcing and year round flowering, harvesting techniques, post harvest handling and grading, packing and storage, value addition, concrete and essential oil extraction of cut/scented roses, chrysanthemum, gerbera, gladioli, tuberose, carnation, dahlia, Jasmine, marigold, gaillardia, ixora, lilies, aster and cut foliage. Landscape gardening, styles of gardening, different features of garden, arboretum, shrubbery, fernery, palmatum, arches and pergolas, edges and hedges, climbers and creepers, cacti and succulents, herbs, annuals and flower borders and beds, ground covers, carpet beds, establishment and maintenance of lawn. Bio-aesthetic planning. Eco-tourism and its relationship with landscaping, theme parks, indoor gardening, xeriscaping, hardscaping, waterscaping and non-plant components.

7. Breeding and Seed Production of Vegetable Crops-

Origin, botany, taxonomy, cytogenetics, breeding objectives, breeding methods (introduction, selection, hybridization, mutation), varieties and varietal characterization, resistance breeding for biotic and abiotic stress, quality improvement, biotechnology and their use in breeding in Solanaceous, cucurbitaceous, cole crops, legume, bulb and root crops etc. Scope of vegetable seed industry in India. Use of growth regulators and chemicals in vegetable seed production, methods of hybrid seed production, categories of seed, seed certification, seed standards, physiological maturity, seed harvesting and extracting, curing, drying, grading, seed processing, seed coating & pelleting, packaging and storage of seeds.

8. Spice, Plantation, Medicinal and Aromatic Crops-

National and international importance of spice, medicinal and aromatic crops. Climatic and soil requirement, commercial varieties, hybrids, sowing, planting time and methods, seed rate and seed treatment, nutritional and irrigation requirements, intercultural operations, weed control, mulching, physiological disorders, harvesting and post harvest management, plant protection measures, organic resource management, organic certification, quality control and cultivation of:

Spices: Clove, black pepper, cardamom, cinnamon, turmeric, ginger, coriander, fenugreek, cumin, fennel, ajowain, dill, celery, vanilla.

Medicinal crops: Isabgol, aloe, ashwagandha, gugal, senna, safed musli and opium poppy.

Aromatic crops: lemon grass, vetivar, basil, citronella, mint etc. Salient production techniques of coconut, cashew nut, tea, coffee, areca nut and rubber.