

**APPROVED SYLLABUS FOR DIRECT RECRUITMENT TO THE POST OF SENIOR
HORTICULTURE DEMONSTRATOR (LEVEL-07 IN THE PAY MATRIX) UNDER
HORTICULTURE DEPARTMENT**

The examination shall comprise of the following papers:

1. Paper - I	: General English (Conventional Type & MCQ with negative marking)	: 100 Marks (3 hours)
2. Paper - II:	: General Knowledge (MCQ with negative marking)	: 100 Marks (2 hours)
3. Paper - III:	: Technical Subject (Horticulture Science -I) (MCQ with negative marking)	: 200 Marks (2 hours)
4. Paper - IV:	: Technical Subject (Horticulture Science -II) (MCQ with negative marking)	: 200 Marks (2 hours)
Total of Written Examination		: 600
5. Personal Interview		: 75
TOTAL		: 675

DETAILED SYLLABUS

1) General English : 100 Marks (3 hours)

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| a) Précis Writing | : 10 Marks |
| b) Letter Writing | : 10 Marks |
| c) Comprehension of given passages | : 10 Marks |
| d) Essay | : 10 Marks |
| e) Grammar: Parts of Speech (MCQ with negative marking) | : 20 Marks |
| f) Correct usage and Vocabularies (MCQ with negative marking) | : 20 Marks |
| g) Formation of Sentence (MCQ with negative marking) | : 20 Marks |

2) General Knowledge (MCQ) : 100 Marks (2 hours)

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| a) Current events of state, national and international importance | : 12 Marks |
| b) History of India and Indian National Movement | : 12 Marks |
| c) Indian and World Geography - Physical, Social, Economic | : 12 Marks |
| d) Indian Polity and Governance - Constitution, Political System, Public Policy, Duties & Rights Issues | : 12 Marks |
| e) Economic and Social Development, Sustainable Development, Poverty, Inclusive Economy, Demographics, Social Sector initiatives, and other related issues | : 12 Marks |
| f) General issues on Environmental Ecology, Bio-diversity and Climate | : 12 Marks |
| g) General Science | : 12 Marks |
| <i>The topics listed above shall also cover the State of Mizoram wherever applicable</i> | |
| h) General awareness on Mizo Culture, its heritage and society | : 16 Marks |

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3) PAPER-III : Technical Subject (MCQ) – 200 Marks (2 hours)

Horticulture Science - I

I. Major Fruit crops - 40 Marks

Important varieties, climate and soil requirements, propagation techniques, planting density and systems, after care, training and pruning, self-incompatibility and pollinisers. Water and nutrient management and special horticulture techniques (plant growth regulators, canopy management etc.) Harvest indices, Post harvest technology, harvesting methods, Physiological disorders. Disease and pest management.

II. Major Vegetable Crops - 40 Marks

Varieties and hybrid, climate and soil requirements, seed rate, preparation of field, nursery practices and transplanting of vegetable crops, planting system, water and weed management, nutrient management. Pest and disease management. Physiological disorder. Cropping system, harvest, yield and seed production, post-harvest handling and storage of major vegetable crops.

III. Floriculture and Landscaping - 40 Marks

Types of gardens, landscaping – basic principles and components. Principles of gardening, garden components, Flower arrangement: importance, Bonsai.

Varieties, production techniques of commercial flowers, growing of flowers under protected environments (glass house, polyhouse, etc.). Disease and pest management. Harvesting, post-harvest technology of commercial cut flowers, dehydration techniques for drying of flowers.

IV. Plantation Crops - 10 Marks

Soil and climate, planting systems and method, gap filling, mulching, shade regulation, weed and water management, nutrient management, soil management, canopy management, physiological disorders, insect pest management, harvesting, post-harvest handling and processing, packaging, marketing and yield.

V. Major Spices and Condiments - 20 Marks

Soil and climate, propagation, methods of planting. Nutrient and water management, mulching and cover cropping. Training and pruning practices, role of growth regulators, shade crops and shade regulation. Disease and pest management. Harvesting, post-harvest management, storage, value added products, methods of extraction of essential oil and oleoresins.

VI. Medicinal and Aromatic Plants - 10 Marks

Importance and uses, climatic and soil requirements, propagation and nursery techniques, cultural practices, training and pruning, nutrient and water management. Disease and pest management, harvesting, post harvest management and processing (methods of extraction of essential oil and oleoresins) of major Medicinal & Aromatic plants.

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VII. Protected cultivation of horticulture crops - 20 Marks

Protected and growing structures – green house, polyhouse, net house etc., basic considerations in establishment and operation of Protected and growing structures, maintenance, advantages of growing plants in a Protected and growing structures, functioning and maintenance, water and nutrient management.

VIII. Mushroom - 10 Marks

Species of Mushroom, Importance and uses, Precautionary measures, Production Practices, Pest and diseases of mushroom and their management, Spawn production.

IX Bee Keeping - 10 Marks

- i. Different species of bees, bee keeping equipment, reproduction, queen rearing, seasonal management, bee pasturage, economics of bee-keeping, Bee-enemies, disease of bee, bee products and their uses.

4) PAPER-IV : Technical Subject (MCQ) – 200 Marks (2 hours)

Horticulture Science - II

I Basic Horticulture - 50 Mark

Classification of horticultural crops, Horticulture zones of India, planting systems and planting densities, Canopy management of fruit crops, types and use of growth regulators in horticulture, cropping systems, inter cropping, multi-tier cropping, mulching, bearing habits, factors influencing fruitfulness and unfruitfulness, rejuvenation of senile orchards.

Leaf area index (LAI) – optimum LAI in horticultural crops, canopy development; different stages of growth, Plant bio-regulators-auxin, gibberellins, cytokinin, ethylene inhibitors and retardants. Flowering-factors affecting flowering, physiology of flowering, photoperiodism-long day, short day and day neutral plants, vernalisation and its application in horticulture, pruning and training physiological basis of training and pruning-source and sink relationship, translocation assimilates. Physiology of seed development and maturation, seed dormancy and bud dormancy, fruit setting, factors affecting fruit set and development, physiology of ripening of fruits-climateric and non-climateric fruits.

II. Organic farming - 30 Mark

Introduction, concept, relevance in present context; Organic production requirements; Biological intensive nutrient management-organic manures, vermicomposting, green manuring, recycling of organic residues; Soil improvements and amendments; Integrated disease and pest management – use of biological agents, bio-pesticides, pheromones, trap crops, bird perches; Weed management; Quality considerations, certification, labeling and accreditation process, marketing, exports, organic farming for Sustainable horticulture.

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III. Soil fertility and nutrient management - 30 Mark

Essential plant nutrients and their deficiency symptoms, Criteria of essentiality of plant nutrients, indicators of soil fertility and productivity. Soil classifications – major soils of India, soil micro-organisms, classification and their roles. Manures and Fertilizer – classifications and their roles, green manuring, recycling of organic waste, composting. Characteristic features of Biofertilizers. Role of microorganisms in organic matter decomposition-humus formation, minerals and their availability to plants, principles and methods of fertilizer application, Integrated Nutrient Management, methods of soil sample collection, soil testing and fertilizer recommendations. Organic matter decomposition, C:N ratios, mineralization and immobilization process, humus. Soil erosion, types and control measures.

IV. Post harvest technology - 30 Mark

Importance of post-harvest technology in horticultural crops. Maturity indices, harvesting, handling, grading, packaging and storage. Physiological changes in horticulture crops after harvest. Pre-harvest treatment and post-harvest treatments of horticultural crops. Types of containers, cushioning materials, modes of transportation etc.

Methods of preservation (heat pasteurization, canning, bottling, sugar and chemicals, candies, crystallized fruits, chemical preservatives, preservation with salt and vinegar, pickling, chutneys, sauces, freezing etc.) . Methods of preparation of juices, squashes, syrups, cordials and fermented beverages, jam, jelly and marmalade. Spoilage in processed food, quality control of processed products.

V Plant Breeding and genetics - 10 Mark

Sexual reproduction (cross and self pollination), asexual reproduction, pollination control mechanism (incompatibility and sterility and implications of reproductive systems on population structure). Genetic components of polygenic variation and breeding strategies, selection as a basis of crop breeding. Hybridization and selection - goals of hybridization, selection of plants; population developed by hybridization – simple crosses, bulk crosses and complex crosses. Breeding techniques. Heterosis – concepts, estimation and its genetic basis.

VI. Plant Biotechnology - 10 Mark

Concepts, scope and importance; Plant tissue culture and plant genetic engineering, Totipotency and morphogenesis, Techniques of *in vitro* culture, micro-propagation. Anther culture, Pollen culture, Ovule culture, Embryo culture, Test tube fertilization, Endosperm culture, Applications and achievements; Somaclonal variation; Protoplast isolation; Somatic hybrids and cybrids- application in crop improvement. Genetic engineering; Restriction enzymes; Gene cloning and gene transfer methods; Cryopreservation; Biosafety Rules and Intellectual Property Rights.

VII. Crop Physiology - 10 Mark

Role of water in plant metabolism, osmosis inhibition, diffusion water potential and its components, measurement of water potential in plants,

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absorbption of water, mechanism of absorbption and ascent of sap. Stomata: Structure, distribution, classification, mechanism of opening and closing of stomata. Photosynthesis; Photorespiration; Phytohormones, physiological role in controlling plant processes. Osmotic pressure, guttation, stem bleeding, transpiration methods and mechanism and factors affecting transpiration. Different types of stresses - water, heat and cold tolerance; mechanism of tolerance. Plant nutrition - Essentiality, mechanism of absorbption and its role in plant metabolism, nutritional disorders.

VIII. Extension Education - 20 Mark

Rural Development: meaning, definition, objectives and genesis. Transfer of technology programmes like Lab to Land Programme (LLP), national demonstration (ND), Front line demonstration (FLD), Training and visit (T&V) system, KrishiVigyan Kendras (KVK), Technology Assessment and Refinement Programme (TARP) etc. of ICAR. Scope and importance of Participatory Rural Appraisal (PRA) and Rapid Rural Appraisal (RRA). Concepts of human resource development (HRD), rural leadership.

Capacity building of extension personnel and farmers - training to farmers, women and rural youth.

IX Farm Power and Machineries - 10 Mark

Internal combustion (IC) engines: Basic principles of operation of compression, ignition and spark ignition engines, two stroke and four stroke engines, cooling and lubrication system, power transmission system, broad understanding of performance and efficiency of tractors, power tillers and their types and uses. Tillage: objectives, methods of ploughing. Primary tillage implements, secondary tillage implements. Sowing and transplanting equipment. Grafting, pruning and training tools and equipments. Inter-culture equipment, crop harvesting equipments.

Notes :

- 1) There will be penalty (negative marking) for every wrong answer given by a candidate in the MCQ type questions.
- 2) For each question for which a wrong answer has been given by the candidate, one third of the marks assigned to that question will be deducted as penalty.
- 3) If a candidate gives more than one answer to one question, it will be treated as wrong answer even if one of the given answers happens to be correct and there will be same penalty as above for that question.
- 4) If any questions is left blank i.e. no answer is given by the candidate, there will be no penalty for that question.

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