सत्यमेव जयते

The Mizoram Gazette

EXTRAORDINARY

Published by Authority

RNI No. 27009/1973

VOL - LIII Aizawl, Friday 25.10.2024 , Kartika 3, S.E. 1946, Issue No. 710

NOTIFICATION

No. A.32013/4/2021 - HORT, the 23rd October, 2024: The competent authority is pleased to notify the syllabus for direct recruitment of Junior Grade of Mizoram Horticulture Service (appended herewith) with immediate effect and until further orders.

This syllabus is vetted by DP&AR(GSW) vide ID No.A.32013/2/2023-P&AR(GSW) dated 23.09.2024.

Ramdinliani
Secretary to the Govt. of Mizoram
Horticulture Department

APPROVED SYLLABUS FOR JUNIOR GRADE OF MIZORAM HORTICULTURE SERVICE FOR COMBINED TECHNICAL EXAMINATIONS OF AGRICULTURE & ALLIED SERVICES

1. General English (Matriculation or equivalent standard) :100 Marks (3 hours)

(a) Précis Writing..... 14 Marks
(b) Letter Writing..... 10 Marks
(c) Comprehension of given passages..... 10 Marks
(d) Grammar: Parts of Speech..... 30 Marks
(e) Correct usage and Vocabularies..... 16 Marks
(f) Formation of Sentence..... 20 Marks

(i) Verbs
Tenses : Present/Past forms, Simple/continuous forms, Perfect forms, Future time reference

(ii) Sentence Structure
Connectors
Types of sentences: Affirmative/interrogative sentences, Negation, Exclamations.
Types of Phrases and Clauses: finite and non-finite subordinate clauses, noun clauses and phrases, adjective clauses and phrases, adverb clauses and phrases Narration (Direct and Indirect speech)

2. General Studies : 100 Marks (3 hours)

(a) Current events of state, national and international Importance..... 12Marks
(b) History of India and Indian National Movement..... 12Marks
(c) Indian and world Geography - Physical, Social, Economic Geography of India and the world..... 12Marks
(d) Indian Polity and Governance -Constitution, Political System, Public Policy, Duties & Rights Issues ..... 12 Marks
(e) Economic and Social Development Sustainable Development, Poverty, Inclusion, Demographies, 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

The topics listed above shall cover the State of Mizoram wherever applicable.

General awareness on Mizo culture, its heritage and Society :16 Marks

TECHNICAL PAPERS

HORTICULTURE SCIENCE PAPER-I		-	**200 marks**
I.	Basic horticulture	-	60 marks
II.	Organic farming	-	40 marks
III.	Plant propagation and nursery management	-	20 marks
IV.	Water management	-	20 marks
V.	Soil fertility and nutrient management	-	40 marks
VI.	Weed management in horticulture crops	-	20 marks
HORTICULTURE SCIENCE PAPER-II		-	**200 marks**
I.	Fruit crops	-	40 marks
II.	Vegetable crops	-	40 marks
III.	Floriculture and landscaping	-	40 marks
IV.	Plantation crops	-	10 marks
V.	Spices and condiments	-	20 marks
VI.	Medicinal and aromatic plants	-	10 marks
VII.	Protected cultivation of horticulture crops	-	20 marks
VIII.	Mushroom	-	10 marks
IX.	Bee keeping	-	10 marks
HORTICULTURE SCIENCE PAPER-III		-	**200 marks**
I.	Post-harvest technology	-	50 marks
II.	Plant breeding and genetics	-	40 marks
III.	Plant biotechnology	-	40 marks
IV.	Crop physiology	-	30 marks
V.	Extension education	-	20 marks
VI.	Farm power & machineries	-	10 marks
VII.	Horti-business management and entrepreneurship development	-	10 marks

HORTICULTURE SCIENCE PAPER -1

I. Basic Horticulture - 60 Marks

Economic importance and scope, classification of horticultural crops and their culture, nutritive value, Horticulture zones of India, soils and climate, planning and layout, management of orchards, importance, objectives, merits and demerits, clean cultivation, 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.

Growth and development-definitions, components, photosynthesis productivity, leaf area index (LAI) - optimum LAI in horticultural crops, canopy development; different stages of growth, growth curves, growth analysis in horticulture crops. Plant bio-regulators-auxin, gibberellins, cytokinin, ethylene inhibitors and retardants, basic functions, biosynthesis, role in crop growth and development, propagation, flowering, fruit setting, fruit development, fruit drop and fruit ripening. Flowering-factors affecting flowering, physiology of flowering, photoperiodism-long day, short day and day neural 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 - 20 Marks

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.

III. Plant Propagation and Nursery Management - 20 Marks

Plant propagation - sexual and asexual methods of propagation, advantages and disadvantages. Propagation methods and various techniques. Techniques of propagation through specialized organs (corm, runners, suckers, etc.). Apomixes - monoembrony, polyembrony, chimera & bud sport. Seed dormancy (scarification & stratification) internal and external factors, nursery techniques, Propagation structures: Mist chamber, humidifiers, greenhouses, poly-houses, nursery (tools and implements), use of growth regulators in seed and vegetative propagation, Physiological & biochemical basis of rooting, factors influencing rooting of cutting and layering, graft incompatibility. Selection and maintenance of mother trees, collection of scion wood, scion-stock relationship, and their influences, bud wood certification, Hardening of plants in nurseries. Nursery Registration Act. Pest and disease management.

IV. Water Management - 20 marks

Importance of water, and water resources in India. Water requirement of horticulture crops - factor for crop growth stages - critical stages of crop growth for irrigation. Irrigation scheduling-different approaches - methods of irrigation, their suitability, merits and limitations, economic use of irrigation water. Water management problem, quality of irrigation water, irrigation management practices for different soils and crops. Layout of different irrigation system - surface and sub-surface systems.

V. Soil fertility and nutrient management - 40 Marks

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.

VI. Weed Management in Horticulture crops - 20 Marks

Introduction, harmful and beneficial effects, classification, reproduction and dissemination; Crop-weed association, crop-weed competition and allelopathy. Concepts of weed prevention, control and eradication; Losses caused by weeds, herbicide classification, formulations, weed management, common herbicides used in horticultural crops, time and rate of applications, types of herbicide, Integrated Weed Management, advantages, limitations, resistance of herbicides, herbicide persistence in soil and plants. Compatibility of herbicides with other agro chemicals.

HORTICULTURE SCIENCE PAPER - II

I. Fruit crops - 40 Marks

Classification of economic importance, export potential, 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 of tropical, sub-tropical, temperate, dry land and minor fruits.

II. Vegetable Crops - 40 Marks

Economic importance, export potential, 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 vegetables (including roots and tubers) - tropical, sub-tropical and temperate regions.

III. Floriculture and Landscaping - 40 Marks

Scope of gardening, aesthetic values, types of gardens, landscaping, Importance of floriculture industry. Landscaping - basic principles and components. Principles of gardening, garden components, adornments, lawn making, methods of designing rockery, water garden etc. Types of Trees, their design values in landscaping, propagation, planting shrubs and herbaceous perennials, propagation, planting, climbers and creepers, palms, ferns, grasses and cacti, succulents. Flower arrangement: importance, Bonsai. Parks and public gardens.

Scope and importance of commercial floriculture, varieties, production techniques of ornamental plants, bulbous flowers and commercial flowers for domestic and export market, 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

Scope and importance, export and important potential, role in national and state; economy, uses, industrial importance, by-products utilization, soil and climate, varieties, propagation techniques, 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. Spices and Condiments - 20 Marks

Scope and importance, uses, export potential and role in national economy. Classification of spices, 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

Scope, opportunities and constraints in the cultivation and maintenance of medicinal and

aromatic plants in India. 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).

VII. Protected cultivation of horticulture crops - 20 Marks

Scope and importance, problems and prospects of protected cultivation in India, 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

Importance and scope of apiculture, different species of bees, life cycle, bee keeping equipment, reproduction, queen rearing, seasonal management, bee pasturage, economics of bee-keeping. Bee-enemies, disease of bee, role of bees in increasing the productivity of horticulture crops in India economy, bee products and their uses.

HORTICULTURE SCIENCE PAPER-III

I. Post-harvest technology - 50 Marks

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, cushioningmaterials, modes of transportation etc.

Importance and scope of fruits and vegetable preservation industry in India. Processing of plantation crops. Food pipe line, losses in post-harvest operations, unit operations in food processing, principles and methods of preservation (heat pasteurization, canning, bottling, sugar and chemicals, candies, crystaljized 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, Govt, policy on import and export of processed products. Food Law.

II. Plant Breeding and genetics - 40 Marks

Plant breeding as a dynamic science, genetic basis of Plant Breeding, quantitative and molecular, Plant breeding in India - limitations, major achievements. 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.

III. Plant Biotechnology - 40 Marks

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.

IV. Crop Physiology - 30 Marks

Role of water in plant metabolism, osmosis inhibition, diffusion water potential and its components, measurement of water potential in plants, absorbtion of water, mechanism of absorbtion 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 absorbtion and its role in plant metabolism, nutritional disorders.

V. Extension Education - 20 Marks

Meaning, definition, nature, scope, objectives, principles, approaches and history. 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 Participatoiy Rural Appraisal (PRA) and Rapid Rural Appraisal (RRA). Concepts of human resource development (HRD), rural leadership.

Communication - Key elements and models of Communication, Communication through written forms, different kinds of communication methods, media and Audio Visual aids/materials. Capacity building of extension personnel and farmers - training to farmers, women and rural youth.

VI. Farm Power and Machineries - 10 Marks

Basic concepts of various forms of energy, unit and dimensions of force, energy and power. 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, 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.

VII. Horti- Business Management and Entrepreneurship Development - 10 Marks

Definition, nature, characteristics and scope of farm management. Farm management principles, production function, technical relationships, cost concepts, factors relationship, product relationship. Cost of cultivation and production, break even analysis, decision making under risk and uncertainty, Farm planning, budgeting, organizations and management. Financial management and project management.

Globalisation and emerging business/ entrepreneurial environment. Concept of entrepreneurship; entrepreneurial and managerial characteristics; managing an enterprise; motivation and entrepreneurship development; SWOT analysis; Govt, schemes and incentives for promotion of entrepreneurship. Export and import policies relevant to horticulture sector. Venture capital; Contract farming and joint ventures, public- private partnership. Overview of Horticulture inputs industry.

Published and Issued by Controller, Printing & Stationery Department, Government of Mizoram
Printed at the Mizoram Government Press, Aizawl. C/30