

द्वितीय पत्र :- प्राविधिक बिषय

अङ्क:- १००

1. Fruit orchard establishment and management

- 1.1 Climatic requirements
- 1.2 Site selection, land preparation, lay-out, planting methods
- 1.3 Water management
- 1.4 Training and pruning
- 1.5 Top working
- 1.6 Weed management
- 1.7 Soils, manure and fertilizer management
- 1.8 Meadow orchard system
- 1.9 High density planting

2. Production packages of major fruits, vegetables, spices, plantation crops and ornamentals

relating to classification, location, altitude, aspect, soil, climate, seed, open pollinated and hybrid cultivar, sowing/transplanting time, grafting, spacing, irrigation, drainage, manure, fertilizer micro-nutrients, mulching, major varieties, insect pests, diseases, harvesting time, mix-cropping on production and productivity.

- 2.1. **Major fruit crops** (mandarin, sweet orange, lime, lemon, aonla, apple, pear, walnut, mango, litchi, banana, pine apple, grape, papaya, strawberry, olive, almond, coconut, and arecanut),
- 2.2. **Major vegetables** (potato, sweet potato, tomato, brinjal, chilly pepper, sweet pepper, cauliflower, cabbage, broccoli, pea, radish, carrot, onion, garlic, cucumber, broad-leaf mustard, lettuce and guards)
- 2.3. **Major spices** (ginger, large cardamom, turmeric and cumin)
- 2.4. **Major ornamental plants** (orchid, rose, marigold, petunia, bougainvillea, dahlia, chrysanthemum and gladiolus)
- 2.5. **Major plantation crops** (tea and coffee)

3. Crop physiology

- 3.1 Photosynthesis and respiration
- 3.2 Transpiration and translocation
- 3.3 Photoperiodism
- 3.4 Stress physiology
- 3.5 Plant growth regulators and retardant
- 3.6 Vernalization
- 3.7 Growth and development
- 3.8 Diffusion and osmosis
- 3.9 Flowering and fruiting phenomenon

4. Special topics in horticulture

- 4.1 Self unfruitfulness
- 4.2 Fruit drop
- 4.3 Citrus decline
- 4.4 Alternate bearing
- 4.5 Heterosis and development of hybrid variety
- 4.6 Genetic erosion and transformation
- 4.7 Parthenogenesis
- 4.8 High density plantation
- 4.9 Tree structure and canopy

- 4.10 Landscaping
- 4.11 Urban and peri-urban horticulture
- 4.12 Role and importance of medicinal plants in Nepal
- 4.13 Controlled cultivation
- 4.14 Integrated crop management (ICM) – IPM, IDM, IPNS
- 4.15 Organic farming
- 4.16 Hydroponics/aeroponics

5 Off-season Production

- 6.1 Present status, constraints and potentiality
- 6.2 Utilization of diverse agro-climatic zones for off-season production
- 6.3 Suitable crops, varieties and time for off-season production.
- 6.4 Protected cultivation: Green house, lath house, plastic culture, hot beds and cold frame.
- 6.5 Improved cultural and management technologies for off-season production.
- 6.6 Cost and benefits of off-season production.
- 6.7 Marketing strategies for off-season production.

6 Seed and planting materials production

- 6.1 Nursery management of fruits, vegetables, spices and ornamental plants
- 6.2 Plant propagation methods
- 6.3 Root stocks and their use in fruit cultivation with their compatibility & effect
- 6.4 Nursery media
- 6.5 Scion use, compatibility and effects on rootstock
- 6.6 Rootstock and its compatibility
- 6.7 Influence of location, aspects, altitude, temperature, light, day-length, spacing, irrigation, manure, fertilizers, micro nutrients, hormone, direct seedling, stickling-transplanting, seedling and planting time on seed yield and seed/sapling quality.
- 6.8 Nucleus, breeder, foundation and improved seed production.
- 6.9 Pollination, fertilization, seed development, dormancy and germination.
- 6.10 Variety maintenance methods.
- 6.11 Seed testing, certification and field inspection.
- 6.12 Seed production methods for open pollinated and hybrid cultivars.
- 6.13 Effects of harvesting time, threshing, drying, grading, packing, packaging and storage of horticultural commodities.
- 6.14 Major problems and weaknesses in seed/saplings production.

7 Post-harvest technology

- 7.1 Post harvest technology; respiration and transpiration.
- 7.2 Maturity indices
- 7.3 Method of harvesting, cleaning, grading, and packaging.
- 7.4 Post harvest handling and transportation.
- 7.5 Harvesting for local and distant markets.
- 7.6 Markets and marketing
- 7.7 Storage (cellar store, rustic store, controlled atmospheric storage, diffused light storage, zero energy and cold storage)
- 7.8 Causes of deterioration of horticultural products.
- 7.9 Quality standardizations.
- 7.10 Processing and preservation.

8 Indigenous Technology

- 8.1 Local and wild edible fruits and vegetable species, cultivars and their usefulness.
- 8.2 Indigenous practices of vegetable cultivation.
- 8.3 Indigenous methods of disease and pest control and preventive measure.
- 8.4 Indigenous methods of soil fertility improvement and management.
- 8.5 Indigenous methods and management of water conservation and utilization.

9 Plant genetics and crop improvement

- 9.1 Tissue culture technology and bio-technology
- 9.2 Superior hybrid and superior open pollinated cultivars
- 9.3 Use of transgenic plants in horticulture
- 9.4 GMOs
- 9.5 Genes and their action
- 9.6 Breeding methods: self-pollinated species, cross-pollinated species,
- 9.7 Concept of heterosis and development of hybrid variety.
- 9.8 Mutation breeding.
- 9.9 Genetic erosion and transformation.
- 9.10 Temperature stress, moisture stress and nutrient stress

10. Statistics

- 10.1.1 Basic statistics: Standard deviation, standard error, normal distribution, sampling theory, test of hypothesis, and confidence interval, T-test, F-test and Chi-square tests
- 10.2 Research problem identification and project prioritization
- 10.3 Research and development project proposal preparation
- 10.4 Designs of experiment (single factor and factorial)
- 10.5 General methodologies to carry out RRA, PRA, Action research, Adoptive research, Exploratory, Academic research, Multi-disciplinary research, Multi-location research, Outreach research, Farmers' participatory research, Socioeconomic and market research, Collaborative research and Multi-partnership research.
- 10.6 Sampling methods, sampling size, data analysis, technical report writing and presentation
- 10.7 Estimate of experimental error and Control of error
- 10.8 Comparison: Pair comparison by Least Significant Different (LSD) and Duncan's Multiple Range Test (DMRT) group comparison - between - group comparison. Within group comparison, trends comparison and factorial comparison.
- 10.9 Regression and correlation: (Simple linear regression and correlation, multiple-linear regression and correction, simple non-linear regression and correlation, multiple nonlinear regression)

लोक सेवा आयोग
नेपाल कृषि सेवा, हर्टिकल्चर समूह, राजपत्रांकित द्वितीय श्रेणी, खुला र आन्तरिक प्रतियोगितात्मक लिखित
परीक्षाको पाठ्यक्रम

नमूना प्रश्नहरू (Model Questions)

विश्लेषणात्मक समिक्षा (Analytical Review)	४ प्रश्न × १५ अंक = ६० अंक
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1. High density planting, training and pruning of apple tree are the important operations to be carried out for high productive trees. Discuss relationship between these activities and also the benefits of individual operation on productivity of trees. 15
2. Shape, size, shining colour and firmness are the important parameters for assessing the fruit quality. What latest technologies do you advice to farmer to obtain these quality? 15
3. Stress in plants are caused by high moisture or drought or high wind or hail stone, etc. are the common problem of the plants. These conditions resulted into poor production, poor productivity and poor quality of produces. What organic inputs will you suggest to farmer to apply to overcome these problems? 15
4. How the F₁ hybrid cultivars are developed and also provided the methods of hybrid seed production in tomato. 15

विश्लेषणात्मक र समाधान मुलक उत्तर (Analytical and problem solving)	२ प्रश्न × २० अंक = ४० अंक
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5. Chhirke phurke and rhizome rot are the major constraints faced by cardamom farmers. Critically analyse the cause of the problems and provide measures to solve the problems so that productivity of cardamom and cash income of the farmers are enhanced. 20
6. Low productivity of off-season vegetable is due to mainly diseases and pests. Investigate the causes of the problems and suggest practical and affordable preventive measures to protect the crops from these problems. 20