प्रदेश लोक सेवा आयोग, बागमती प्रदेश

नेपाल कृषि सेवाका एगृ एक्सटेन्सन, हर्टिकल्चर, एग्रोनोमी, प्लान्ट प्रोटेक्सन, एगृ. इको. एण्ड मार्केटिङ्ग र स्वायल साइन्स समूहका अधिकृत सातौं तहका पदहरूको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :–	लिखित परीक्षा (Written Examination)	पूर्णाङ्ग :– २००
द्वितीय चरण :-	(क)सामूहिक परीक्षण (Group Test)	पूर्णाङ्ग :– १०
	(ख) अन्तर्वार्ता(Interview)	पूर्णाङ्ग :– ३०

परीक्षा योजना (Examination Scheme)

प्रथम चरण : लिखित परीक्षा(Written Examination) **पूर्णाङ्ग :– २००**

पत्र	विषय	खण्ड	पूर्णाङ्ग	उर्तीर्णाङ्ग	परीक्षा प्रणाली		प्रश्नसंख्या ×अङ्ग	समय
प्रथम	General Subject	Part I: General Awareness & General Ability Test	१००	४०	वस्तुगत (Objective)	बहुवैकल्पिक प्रश्न (MCQs)	५० प्रश्न × १ अङ्ग	१घण्टा ३० मिनेट
		Part II: General Technical Subject					५० प्रश्न × १ अङ्ग	
द्वितीय	Technical Subject		१००	४०	विषयगत (Subjective)	छोटो उत्तर लामो उत्तर	४ प्रश्न × ५ अङ्ग ८ प्रश्न × १०अङ्ग	३ घण्टा

द्वितीय चरण : सामूहिक परीक्षण (Group Test) र अन्तर्वार्ता (Interview) **पूर्णाङ्ग :– ४०**

पत्र /विषय	पूर्णाङ्ग	उर्तीर्णाङ्ग	परीक्षा प्रणाली	समय
सामूहिक परीक्षण (Group Test)	१०		सामूहिक छलफल (Group Discussion)	३० मिनेट
अन्तर्वार्ता (Interview)	३०		बोर्ड अन्तर्वार्ता (Board Interview)	-

द्रष्टव्य :

1. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।
2. प्रथमपत्र र द्वितीयपत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
3. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्ग कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्ग दिइने छैन र अङ्ग कट्टा पनि गरिने छैन ।
4. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
5. विषयगत प्रश्नहरुको हकमा तोकिएको अंकको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।
6. द्वितीय पत्रमा(विषयगत प्रश्न हुनेका हकमा) प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोहीखण्डको उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
7. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।
8. **यथासम्भव प्रश्नहरू नेपाल र बागमती प्रदेशको सन्दर्भमा सोधिने छन् ।**
9. प्रथमचरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीयचरणको परीक्षामा सम्मिलित गराइनेछ ।
10. यस भन्दा अगाडि लागु भएका माथि उल्लेखित सेवा, समूहको पाठ्यक्रम खारेज गरिएको छ ।
11. पाठ्यक्रम लागू मिति : - **२०७९/०८/११**

प्रथम पत्र (Paper I): General Subject

Part (I) : - General Awareness & General Ability Test (50 Marks)

1. नेपालको संविधान तथा सान्दर्भिक कानूनहरू: [10 ×1 Mark = 10 Marks]

1.1 नेपालको संविधान
1.2 कर्मचारी समायोजन ऐन, २०७५
1.3 सार्वजनिक खरिद ऐन, २०६३
1.4 सार्वजनिक खरिद नियमावली, २०६४
1.5 प्रदेश सार्वजनिक खरिद नियमावली, २०७६
1.6 भ्रष्टाचार निवारण ऐन, २०६४
1.7 सम्पत्ती शूद्धिकरण ऐन, २०६४
1.8 प्रदेश सूचनाको हक सम्बन्धी ऐन, २०७६
1.9 प्रदेश सुशासन ऐन, २०७७
1.10 संघ, प्रदेश तथा स्थानीय तहका निजामती सेवा सम्बन्धी कानूनहरू
1.11 प्रदेश सहकारी ऐन, २०७६

2. General Awareness and Contemporary Issues [20 ×1 Mark = 20 Marks]

1.1 Physical, socio-cultural and economic geography and demography of Nepal
1.2 Major natural resources of Nepal
1.3 Geographical diversity, climatic conditions, and livelihood & lifestyle of people
1.4 Notable events and personalities, social, cultural and economic conditions in modern history of Nepal
1.5 Current periodical plan of Nepal and Bagamati Province
1.6 Information on sustainable development, environment, pollution, climate change, biodiversity, science and technology
1.7 Nepal's international affairs and general information on the UNO, SAARC & BIMSTEC
1.8 Governance system and Government (Federal, Provincial and Local)
1.9 Functional scope of public services
1.10 Public Service Charter
1.11 Concept, objective and importance of public policy
1.12 Fundamentals of management: planning, organizing, directing, controlling, coordinating, decision making, motivation and leadership
1.13 Government planning, budgeting and accounting system

3. Major events and current affairs of national and international Importance [4 X 1 Mark = 4 Marks]

4. General Ability Test [10×1 Mark = 10 Marks]

4.1 **Verbal Ability Test**
Jumble words, Series, Analogy, Classification, Coding-Decoding, Matrix, Ranking Order Test, Direction and Distance Sense Test, Common Sense Test, Logical Reasoning, Assertion and Reason, Statement and Conclusions

4.2 **Numerical Ability Test**
Series, Analogy, Classification, Coding, Arithmetical reasoning/ operation, Percentage, Ratio, Average, Loss & Profit, Time & Work, Data interpretation & Data verification

4.3 **Non-verbal/Abstract Ability Test**
Figure Series, Figure Analogy, Figure Classification, Figure Matrix, Pattern Completion/Finding, Analytical Reasoning Test, Figure Formation and Analysis, Rule Detection, Water images, Mirror images, Cubes and Dice &Venn-diagram

5. नेपाली र अङ्ग्रेजी भाषाः [6 X 1 Mark = 6 Marks]

5.1 English: Knowledge on writing correct English sentences, letters, and reports according to English grammar based on the following syntactic functions: [3 X 1 Mark = 3 Marks]

a. Parts of Speech:
b. Noun
c. Pronoun
d. Adjective
e. Determiner
f. Verb
g. Adverb
h. Preposition
i. Conjunction and
j. Interjection
k. Infinitives and gerunds, reported speech and tenses

5.2 नेपालीः नेपाली भाषामा स्तरीय शुद्ध शब्द, वाक्यांश र वाक्य लेखनको लागि आवश्यक पर्ने ह्रस्व दीर्घ, ब र व, तथा श, ष, स लगायतका व्याकरणगत शुद्ध लेखनशैलीमा केन्द्रित शुद्ध शब्द, वाक्यांश र वाक्य लेखनसहितको नेपाली भाषाको शुद्धाशुद्धिको ज्ञान [3 X 1 Mark = 3 Marks]

Part (B) : - General Technical Subject (50 Marks)

1. **History and Current Status of Agriculture Sector in Nepal (5 marks)**
   - 1.1 History of agricultural research and development in Nepal
   - 1.2 Overview of Nepalese agriculture: Current status and scope
   - 1.3 Institutional arrangement of agricultural research, extension and education in Nepal
   - 1.4 Agriculture Perspective Plan (APP) and its impact in Nepalese agriculture
   - 1.5 Devolution of agriculture extension system and its impact in agricultural development

2. **Agriculture Research, Extension and Education (5 marks)**
   - 2.1 Role of agriculture research in contemporary agriculture
   - 2.2 Nepal Agricultural Research Council (NARC) and its vision
   - 2.3 Agricultural education systems in Nepal
   - 2.4 Academic institutions such as AFU, PU, TU
   - 2.5 Non-academic institutions (CTEVT and its allied institutions)
   - 2.6 Major functions of agriculture research, extension and education in Nepal
   - 2.7 Linkage and coordination among research, extension and teaching in Nepal
   - 2.8 Public, private, NGOs, CBOs, agricultural co-operatives and farmer groups involvement in research, extension and education
   - 2.9 Participatory technology development, participatory planning, monitoring, evaluation and feedback

3. **Natural Resource, Environment Conservation, Climate Change and Disaster-Risk Management (10 marks)**
   - 3.1 Importance of natural resources conservation, utilization and management w. r. t. food security, employment generation and livelihoodimprovement in Nepal
   - 3.2 Bio-diversity and agro-biodiversity: Conservation and utilization for sustainable agriculture development
   - 3.3 Use of fertilizers and pesticides in agriculture and their implications to environment
   - 3.4 Integrated pest, crop, and plant nutrient management systems (IPM, ICM, IPNM) and Good Agricultural Practices (GAP)
   - 3.5 Environmental issues and sustainability of Nepalese agriculture
   - 3.6 Organic agriculture, and organic products for export promotion and food safety
   - 3.7 General climatic conditions of Nepal
   - 3.8 Weather observation and instruments use in Nepal
   - 3.9 Climate change and its impact in agriculture sector
   - 3.10 Climate change adaptation and mitigation strategies of Nepal
   - 3.11 Disaster (landslide, drought, flood, cold spell, earthquake, pest outbreak) management in agriculture

3.12 Rapid urbanization and change in land use pattern and their consequences in food security, environment conservation, employment generation and youth migration
3.13 Crop insurance in Nepal: Current policies and status

4. **Legislations, Plan, Policies, Strategies, and Global Trade in Agriculture (10 marks)**
4.1 Agriculture sector in current constitution
4.2 Concept, goals, target and strategies of current periodic plan
4.3 Planning , implementation, monitoring and evaluation of agricultural projects
4.4 Local governance and its role in agricultural development
4.5 National Agriculture Policy, 2061 (2004)
4.6 Agro-biodiversity Promotion Policy, 2063 (2007) (first amendment, 2071)
4.7 Agri-business Promotion Policy, 2063 (2006)
4.8 Agriculture Development Strategy (ADS), 2015-2035 AD: vision, mission, target, components and its salient features, implementation status of ADS, supporting projects and institutional arrangement
4.9 National Seed Vision, 2013-2025 and its implementation status
4.10 Nepal Trade Integration Strategy (NTIS), 2016 - Agricultural commodities
4.11 Agricultural Extension Strategy, 2061 (2003)
4.12 Seeds Act, 2045 (1988) and Seeds Rules, 2069 (2013)
4.13 Plant Protection Act, 2064 (2007) and Plant Protection Rules, 2066 (2010)
4.14 Pesticides Management Act, 2076 (2019) and Regulation
4.15 Fertilizer Control Order, 2055
4.16 Food Right and Food Sovereignty Act, 2076 (2019)
4.17 Food Safety Policy, 2076 (2019)
4.18 Agro Forestry Policy, 2076 (2019)
4.19 World Trade Organization (WTO), Agreement on South Asian Free Trade Area (SAFTA): their implication and impact in Nepalese agriculture
4.20 Comparative advantage, agriculture commercialization and trading of Nepalese agricultural products.
4.21 Implication of Sanitaryand Phyto-sanitary(SPS) measures in Nepalese agricultural trade

5. **Agricultural Technology and Management (20 marks)**
5.1 Importance of technology generation, verification and dissemination in crop production and management
5.2 Seed quality assurance: Seed production, laboratory testing, processing, handling, marketing and storage
5.3 Variety release and registration system in Nepal
5.4 Food and nutrition security: Concepts, status and dimensions
5.5 Importance of pests and pesticides management
5.6 Integrated Pest Management (IPM) concepts and strategies/practices
5.7 Roles of pollinators in crop production
5.8 Importance of microbial agents (fungus, bacteria, nematodes and virus) in plant

protection

5.9 Importance of crop diversification and commercialization in Nepal.
5.10 Precision and protected agriculture: Concepts and technologies
5.11 Agricultural crops for agro-forestry and environmental protection
5.12 Strategies for commercialization of high value low volume commodities
5.13 Concept of soil fertility and productivity
5.14 Essential plant nutrients and their sources (manures and fertilizers)
5.15 Soil reaction (pH) and soil reaction improvement
5.16 Concept of Integrated Plant Nutrient Systems (IPNS) and its significance
5.17 Contemporary agricultural extension practices in Nepal (plant clinic, mobile service, training and demonstration farm, farmer to farmer extension and pluralistic extension)
5.18 Role of information and communication technology(ICT) in agriculture development
5.19 Agricultural markets and marketing in Nepal
5.20 Agricultural Management Information System (AMIS) in Nepal
5.21 Agriculture Census, 2068
5.22 Linkage of agro-industries with agriculture production and marketing
5.23 Role of cooperatives in agriculture development in Nepal
5.24 Research methodology in agriculture (basic concepts, common designs and their application)
5.25 Trade liberalization and its implication in Nepalese agricultural product
5.26 Value chain development: concepts and practices in agriculture
5.27 Postharvest management of agricultural commodities
5.28 Farming system and sustainable agriculture development
5.29 Gender Equity and Social Inclusion(GESI) and women's role in Nepalese agriculture
5.30 Conservation agriculture: concept, principles and practices

---

द्वितीय पत्र (Paper II) : Technical Subject

Section (A) - 25 Marks

1. **Agricultural Extension**
   - **Extension Education, Training and Leadership Development**
     - Concepts, definition, principles, philosophy and objectives of extension education
     - Role and scope of extension education in Nepalese agricultural development
     - History of agricultural extension in Nepal
     - New direction of agricultural extension (subject matter specialist, privatization, pluralistic, collaborative, gender mainstreaming in agriculture, pocket package strategy, public private partnership)
     - Extension teaching methods and factors to be considered for selection of methods
     - Training need assessment, designing training module and training management
     - Leadership development and role of local leaders in Agricultural Extension
   - **Communication, Innovation, Diffusion and Technology Transfer**
     - Role of communication in agricultural extension
     - Communication models and Communication channels (mass media, inter personal, indigenous)
     - Information and Communication technologies (ICTs) and Agricultural Extension
     - Designing effective communication process
     - Barriers of effective communication
     - Innovation diffusion process
     - Adopter's categories and factors affecting rate of adoption
     - Development and transfer of technology and selection of appropriate technology
     - Models of transfer of technology (e.g. Conventional, Feedback Model, Farming System Research and Extension, Farmers' Field School)
   - **Agricultural Extension System & Extension Program Planning**
     - Agriculture extension Systems of Nepal in changing context
     - Role, responsibility and coordination among stakeholders involved in agricultural extension in Nepal
     - Effective extension program planning: Principles, importance and process in Nepalese context
     - Factors to be considered in executing extension program
2. **Agricultural Economics**
   - **Principles of Economics**
   - Basic concepts on demand and supply
   - Price and income elasticity of demand, cross elasticity of demand
   - Consumer's preference and indifference curve
   - Market classification and price determination under different market condition
   - Principles of production (production function, the law of diminishing return, isoquant, product curves, production possibility curves)
   - Cost of production (explicit and implicit costs, total, average, marginal, variable and fixed costs, economies and diseconomies of size and scale)

- Comparative and competitive advantage

- **Agricultural Economics**
  - **Farm Management**
    - Scope and importance of farm management
    - Farm budgets (total and partial budgeting).
    - Cost and return analysis (Major food grains, cash crops and horticultural crops)
    - Farm plan (Resources, constraints and optimization).
    - Efficiency measure; farm inventory management and valuation
    - Time value of money, compounding and discounting techniques
    - Income and net-worth statement
  - **Agricultural Marketing and Agri-business**
    - Concept, scope and role
    - Characteristics of agricultural market and problems of marketing in Nepal
    - Grading, standardization, quality control and related problems of agricultural commodities
    - Value chain development in agriculture
    - Business plan preparation
    - Marketing of agricultural inputs (fertilizer, seeds, saplings, chemicals) and outputs (cereals, cash crops, fruits and vegetables)
    - Global and regional context of agricultural marketing and trade (WTO, SAFTA, Indo-Nepal trade)
    - Commodity markets in agriculture
- **Agricultural Program Planning, Monitoring, Evaluation and Data Management**
  - Concepts of agricultural planning, preparation of programs/projects, budgeting and project cycle
  - Feasibility studies of agricultural projects and use of B/C Ratio, IRR, Economic and Financial Rate of Return, Net Present Value
  - Risk and uncertainty
  - Monitoring and evaluation of agricultural programs/ projects
  - Logical framework in project planning and monitoring
  - **Statistics and Survey Techniques**
    - Frequency distribution and measures of central tendency, bar and pie charts
    - Computation of mean and standard deviation from grouped and ungrouped sets of data
    - Hypothesis testing and confidence interval
    - Regression and correlation analysis
    - Estimate of errors, control of error
    - Agriculture Census: Sample survey and its advantage over census survey
    - Source of sampling and non-sampling error and measures to minimize such errors. Sample design for collecting current agricultural statistics in Nepal
    - Rapid and Participatory Rural Appraisal (RRA and PRA) and crop cutting surveys

Section (B) - 25 Marks

3. **Soil Science**
   - **General Introduction**
     - Definition of soil
     - Soil forming process
     - Physical properties of soils (texture, structure, density, porosity, consistency)
     - Chemical properties of soils (soil reaction, electric conductivity, cation exchange capacity, percentage base saturation, fertilizers and reclamation of problematic soil: Acidic & alkaline)
     - Biological properties of soils (algae, fungi, actinomycetes, soil bacteria)
     - Role of soil microorganisms in ammonification, nitrification, denitrification, biological nitrogen fixation (symbiotic and non-symbiotic)
     - Soil organic matter and carbon nitrogen ratio
   - **Soil Fertility and Plant Nutrition**
     - **Plant Nutrition**
       - Essential plant nutrients and their functions
       - Visual symptoms of nutrient deficiencies and nutrient disorders
       - Nutrient cycle (C, N, P, and S) and its component
       - Nutrient requirements, uptake mechanism
       - General soil fertility status of Nepal and major causes of declining soil fertility
       - Soil testing, plant analysis and diagnostic techniques for improved soil fertility management
       - Integrated Plant Nutrient Systems and its significance in sustainable soil management in the Nepalese context
       - **Manures and Fertilizers**
         - Different types of chemical fertilizers and their application
         - Sources and types of organic manures
         - Bio-fertilizers, inoculants and their use in Nepalese agriculture
         - Fertilizers available in Nepalese market and their use
         - Fertilizerregulation, marketingandqualitycontrolmechanismin Nepal
   - **Soil survey and Water conservation**
     - **Soil Survey**
       - Importance of soil survey and types
       - General soil classification
       - Major soils of Nepal and their characteristics (suborder/great group levels of USDA taxonomy).
       - Soil fertility mapping and tools used
     - **Soil , Water and Plant Relationship**
       - Hydrological cycle
       - Water infiltration and percolation
       - Soil permeability and Hydraulic conductivity
       - Saturation percentage, permanent wilting point, field capacity and plant available soil water
       - Soil moisture retention curve
       - Crop water requirements, evapo-transpiration and irrigation requirements, water balance
       - Soil water management, water stress (drought, water logging)

- Soil Erosion, Slopping Agriculture Land Technology (SALT) and terracing

4. **Agronomy**

1.1 **Basics of crop production**

- **Farming system**
  - Introduction, system approach in agriculture, component /determinants of farming system
  - Farming System Research Methodology (FSR)
  - Framework of FSR methodology
- **Resource conservation technologies (RCT) in crop production**
- **Tillage**
  - Objective, significance and importance of tillage in crop production
  - Zero tillage, minimum tillage and optimum tillage
  - Condition of soil suitable for cultivation
- **Seed Technology**
  - Seed formation, development and physiology of seed
  - Seed quality and seed classes
  - Principles and practices of seed production
  - Seed processing, handling and storage
  - Seed testing principles
  - Seed certification procedures and seed standards of major crops in Nepal
  - Importance of Varietal Replacement and Seed Replacement Rate
  - Seed self-sufficiency and seed production programs in Nepal

1.2 **Crop production technology**

- Production practices of rice, maize, wheat, finger millet, lentil, soybean, chickpea, mungbean, rapeseed, sunflower, groundnut, sugarcane with respect to:
  - Importance , distribution, origin and classification
  - Morphology and growth stages
  - Recommended varieties
  - Climate and soil
  - Cultural practices and post-harvest technology
- Underutilized crops and their importance in food and nutritional security

1.3 **Plant breeding and research design**

- Definition, importance, history and achievement of plant breeding
- Methods of crop improvement and breeding methods in field crops
- Classification of crops according to mode of pollination
- Germplasm collection, characterization, evaluation and utilization
- Variety development procedure in Nepal
- Maintenance breeding of varieties/germplasms.
- Hybrid variety development and hybrid seed production.
- Use of biotechnology in plant breeding
- Research design and application

Section (C) - 25 Marks

5. **Horticulture**

- **Cultivation practices of major horticultural crops**
  - Fruits: Citrus (*Citrus spp.*), Mango (*Mangifera indica*), Litchi (*Litchi chinensis*), Banana (*Musa acuminate*), Apple (*Malus pumila*), Pear (*Pyrus communis*) and Kiwi (*Actinida deliciosa*)

- Vegetables: Potato (*Solanum tuberosum*), tomato (*Solanum lycopersicum*), chili (*Capsicum frutescens*), cucumber (*Cucumis sativus*), cauliflower (*Brassica oleracea var botrytis*), radish (*Raphanus sativus*), beans (*Phaseolus vulgaris*), onion (*Allium cepa*), Pea (*Pisum sativum*) and broad leaf mustard (*Brassica juncea var rugosa*)
- Spice crops: Ginger (*Zingiber officinale*), Turmeric (*Curcuma longa*) and Cardamom (*Ammomum subulatum*)
- Flower: Rose (*Rosa spp.*), carnation (*Dianthus caryophyllus*), gladiolus (*Gladiolus spp*.) and Gerbera (*Gerbera jamesonii*)
- Plantation crops: Tea (*Camellia sinensis*) and Arabica coffee (*Coffea arabica*)

- **Vegetable Seed production technology**
  - Vegetable seed production zones of Nepal
  - Classification and types of seeds (breeder, foundation, certified and improved; Open pollinated, hybrids, True Potato Seed and Pre-basic Seed)
  - Hybrid seed production of tomato in Nepal and seed production of open pollinated crops (cauliflower, radish, cucumber, and onion)
- **Postharvest management of horticultural crops**
  - Post harvest physiology: transpiration, respiration and ripening of fruit and vegetables
  - Causes of postharvest loss and their management
  - Storage of potato and fruits : principles, importance and different storage structures
  - Preservation of fruits and vegetables
- **Nursery management in fruits and vegetables**
  - Sexual and asexual propagation techniques of horticultural crops
  - Nursery types and its use in horticultural crop production including hi-tech nurseries
  - Use of rootstocks in horticulture
  - Care and management of plants in nursery
- **Modern technologies in horticulture**
  - Organic farming, soilless farming, tissue culture technology for tuber and sapling production, high density planting, modern irrigation technologies, use of machineries in horticulture
  - Precision and protected horticultural technology
  - Urban farming technologies (roof top, vertical farming and home garden)
  - Use of plant growth regulators and hormones in horticulture
- **Plant growth and development**
  - Seed germination: mechanism and controlling factors
  - Flowering, pollination, fruit set, fruit drop and fruit maturity
  - Fruit ripening and senescence: mechanism and controlling factors
  - Tuber and bulb formation: mechanism and controlling factors

Section (D) - 25 Marks

6. **Plant Protection**
   - **General Plant Protection**
   - Importance of crop pests & disease
   - Climate change and implication on crop pest & disease
   - Plant protection principle and approaches
   - Importance, issues, challenges and role of plant quarantine in Nepalese agriculture

- Importance of pest survey and surveillance in disease/pest forecasting and early warning
- Types of sprayers, duster and seed treatment Equipments
- Use of equipment, calibration, dose calculation
- Biological control of pests and diseases
- Tools used for pest monitoring
- Insect predators, pathogens and parasitoids
- Biopesticides & Biofungicides in pest & disease control
- Type of Pesticide formulation
- WHO classification of pesticide by hazard
- Banned pesticides in Nepal
- Safe use of pesticides
- Status of pesticide use in Nepal
- Symptoms and treatment of pesticide poisoning
- Different methods of pesticide residue monitoring
- Weed management
- Rodents and their management

- **Entomology**
  - **Industrial Entomology**
    - Importance of industrial entomology
    - Biology of silkworm and honey bee
  - **Agricultural Insect Pests of National Importance and their Management**
    - **Cereals:** Stem borers (*Chilo partellus; Chilo suppressalis; Sesamia inferens; Scirpophaga incertulas*); Green leaf hopper (*Nephottetix nigropictus*); Brown plant hopper (*Nilaparvata lugens*); Gundhi bug (*Leptocorisa chinensis*); White grubs (*Melolontha spp.; Phyllophaga spp.; Holotrichia spp.*); white fly in rice, Fall Armyworm (*Spodoptera frugiperda*)
    - **Vegetables:** Cutworm (*Agrotis ipsilon; A. segetum*); Pumpkin fruit fly (*Bactrocera cucurbitae*); Aphids (*Myzus persicae; Aphis fabae; A. gossypii; A. craccivora; Brevicoryne brassicae*); Red ants (*Dorylus orientalis*); Shoot and fruit borer (*Leucinodes orbonalis*); Large white butterfly (*Pieris brassicae nepalensis*); Fruit borer (*Helicoverpa armigera*); Tobacco caterpillar (*Spodoptera litura*); Potato tuber moth (*Phthorimaea operculella*); Diamondback moth (*Plutella xylostella*); White fly (*Bemisia tabaci*); South american leaf miner (*Tuta absoluta*)
    - **Cash Crops**
      - White stem borer of coffee (*Xylotrechus quadripes*)
      - Sugarcane plassey borer (*Chilo tumidicostalis*)
      - Pink bollworms (*Pectinophora gossypiella*)
    - **Fruits**
      - **Sub- tropical fruits:** Citrus fruit fly (*Bactrocera spp.*); Scale insects (*Aspidiotus destructor, Aonidiella aurantii*); Citrus green stinkbug (*Rhynchocoris poseidon*)
      - **Tropical fruits :** Mango hoppers (*Idioscopus clypealis, I. nitidulus and Amritiodus atkinson*); Banana stem weevil (*Odoiporus longicollis*); Banana rhizome weevil (*Cosmopolites sordidus*); Litchi leaf curl mite (*Aceria litchii*)

- **Temperate fruits :** Apple wooly aphid (*Eriosoma lanigerum*); San Jose scale (*Quadraspidiotus perniciosus*)
- **Ornamental and Flowers:** Red Spider Mite (*Tetranychus spp.)*

- **Plant Pathology:**
  - Introduction and importance of plant diseases
  - Mechanism of infection by plant pathogen, Host Plant Resistance
  - Defense mechanisms of host plants
  - Genetics and disease resistance in plants
  - Plant disease epidemiology and forecasting
  - Agricultural Crop Diseases of National Importance and Their Management
    - **Cereals :** Rice blast (*Pyricularia oryzae*); Bacterial blight (*Xanthomonas campestris pv oryzae*); Stalk rot (*Erwinia carotovora*); Leaf blight (*Helminthosporium turcicum*); Rusts (*Puccinia graminis tritici, P. recondita, P. striiformis*); Loose smut (*Ustilago tritici*)
    - **Vegetables and spices:** Late blight (*Phytophora infestans*); Bacterial wilt (*Ralstonia solanaceanum*); Alternaria leaf spots (*Alternaria brassicicola, A. brassicae*); Damping off of seedlings (*Pythium spp., Fusarium spp.*); Club root (*Plasmodiophora brassicae*); Root knot (*Meloidogyne spp.*); Anthracnose (*Colletotrichum spp.*); Tomato yellow leaf curl virus; Rhizomes rot of ginger and cardamom (*Pythium spp., Fusarium spp.*)
    - **Fruits and others:** Foot and root rot (*Phytophthora citrophthora, P. nicotianae*); Citrus greening (*Huanglungbin*) – (*Liberibacter asiaticum*); Pink disease (*Pellicularia samoniclor*); Scab (*Venturia inaequalis*); Powdery mildew (*Levullela taurica*); Panama wilt of banana (*Fusarium oxysporum*); Coffee rust (*Hemalia vestatrix*); Septoria blight of marigold (*Septoria apicola*)
- **Mushroom cultivation**
  - Cultivated species of mushroom in Nepal

  6.4.2 Cultivation techniques of *Pluerotus spp.* and *Agaricus spp.*
- **Laboratory Techniques & production**
  - Isolation
  - Culture and preservation
  - Mounting & culturing
  - Sterilization
  - Different media used
  - Production technique of *Metarhizium anisopliae, Beauveria bassiana & Trichoderma harzianum T. viridae*

सामूहिक छलफल (Group Discussion)

यस प्रयोजनको लागि गरिने परीक्षण १० पूर्णाङ्क र ३० मिनेट अवधिको हुनेछ जुन नेता विहिन सामूहिक छलफल (Leaderless Group Discussion) को रुपमा अवलम्वन गरिने छ । दिइएको प्रश्न वा Topic का विषयमा पालैपालोसँग निर्दिष्ट समय भित्र समूह वीच छलफल गर्दै प्रत्येक उम्मेदवारले व्यक्तिगत प्रस्तुति (Individual Presentation) गर्नु पर्नेछ । यस परीक्षणमा मूल्याङ्कनको लागि देहाय अनुसारको ३ जना भन्दा बढीको समिति रहनेछ ।

आयोगका सदस्य	-	अध्यक्ष
आयोगका सदस्य	-	सदस्य
मनोविज्ञ	-	सदस्य दक्ष/विज्ञ (१ जना)-सदस्य

सामूहिक छलफलमा दिइने नमुना प्रश्न वा Topic

उदाहरणको लागि - उर्जा संकट, गरीवी निवारण, स्वास्थ्य बीमा, खाद्य सुरक्षा, प्रतिभा पलायन जस्ता Topics मध्ये कुनै एक त्यउष्ठ मात्र दिइनेछ ।