बरिष्ठ वैज्ञानिक, एस-३ (Senior Scientist, S-3) पद/तहको खुलासात्त्वा आन्तरिक प्रतियोगितात्युत
लिखितपरीक्षाको पाद्यक्रम एवं परीक्षा योजना

यस पाद्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ।

प्रथम चरण: लिखित परीक्षा (Written Examination)
हिस्तीय चरण: अन्तरवार्ता (Interview)

पूर्णाङ्क: २००  
पूर्णाङ्क: ३०

१. प्रथम चरण (First Phase): लिखित परीक्षा (Written Examination)

<table>
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<tr>
<th>Paper</th>
<th>Subject</th>
<th>Mark</th>
<th>Full Mark</th>
<th>Pass Mark</th>
<th>No. Questions (Q) x Mark (M) = Total Marks</th>
<th>Time Allowed</th>
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<tr>
<td>I</td>
<td>Part-I: Management</td>
<td>15</td>
<td>75</td>
<td>40</td>
<td>5 Q x 3 M = 15 (Short Answer)</td>
<td>2.00 Hours</td>
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<tr>
<td></td>
<td>Part-II: Agriculture Research and development Issues</td>
<td>60</td>
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<td>4 Q x 6 M = 24 (Short Answer)</td>
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<td>3 Q x 12 M = 36 (Long Answer)</td>
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<tr>
<td>II</td>
<td>Technical Subject</td>
<td>125</td>
<td>40</td>
<td></td>
<td>5Q x 15 M=75 (Critical Analysis)</td>
<td>3.30 Hours</td>
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<td></td>
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<td>2Q x 25M = 50 (Problem Solving)</td>
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२. द्वितीय चरण (Second Phase): Interview

<table>
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<tr>
<th>Subject</th>
<th>Full Marks</th>
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<tbody>
<tr>
<td>Interview</td>
<td>30</td>
<td>Oral</td>
</tr>
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</table>

प्रश्नसँगकार:

१. यो पाद्यक्रम योजनालाई प्रथम चरणमा लिखित परीक्षा र द्वितीय चरणमा अन्तरवार्ता परीक्षा गरी दुई चरणमा विभाजन गरिएको छ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली भने अंग्रेजी अथवा नेपाली र अंग्रेजी दुबै हुन सक्छ।

३. समावेश पत्र/पत्रकारिता प्रथम वर्षबाट उपसमयहरूको लागि पाद्यक्रम एउटै भएको कारण एककृत परीक्षा सम्पन्न गर्नुहुने। तर द्वितीय पत्र तहको पाद्यक्रम उपसम्म अनुसार प्रक्रिया पनि गर्नुहुने।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा हुँदै नेपाली भन्नुहुने।

५. प्रथम पत्रको Part-I को पाठ्यक्रम एक बटा र Part-II को पाठ्यक्रम दुबै हुनु भएको एक बटा उत्तर पुस्तिका हुनेछ।

६. यस पाद्यक्रम योजना निर्देशनका पत्र/सूचनाका प्रविधिकामा अनुसारको लेखिकाले प्राशंसक र राष्ट्रिय प्रतियोगिताका विवरण उपलब्ध भएका पाद्यक्रमको तत्वावधान, प्रक्रिया, नियम, विद्यालय र नीतिहरू परीक्षाको मिति भन्ना ३ महिना अघिधि (संशोधन भएको वा संशोधन भएको हटाउका निर्देशक र वा जो गरी संशोधन भएको) कायरहेकोलाई पदी पाद्यक्रमको प्रक्रिया मात्र भएको संभाल नेदै।

७. परीक्षाको तौन सालको विद्युत उपकरण तथा कॉल्कुलेटर (Calculator) प्रयोग गरेको छैन।

८. पाद्यक्रमको भएको यसासाम्य सँग पाद्यक्रमको प्रथम मात्र सम्भव भएको छ। प्रथम चरणको लिखित परीक्षाको छनितलेनुभएको उपमेदिकालाई निर्देश द्वितीय चरणको प्राधिकारिता अन्तर्वार्ता सम्बन्धमा सम्मिलित गरेको छ।

९. प्रथम चरणको लिखित परीक्षा छनितलेनुभएका उपमेदिका प्राधिकारको प्राधिकारको द्वितीय चरणको अन्तरवार्तामा गरेको अंक जोडी योग्यता क्रमानुसार सिफारिष गरिनेछ।

१०. पाद्यक्रमको लागू मिति: २०७८ ४३ २५

११. यस भन्दा अन्याय लागू भएको पाद्यक्रम छापेपन गरिएको छ।
Management and Agricultural Research and Development
(Common For all Sub-groups)

Part-I: Management

A. Management:
1. Concept, principles, functions, scope, type, role, level and skills of managers
2. Time management: concept, advantages and disadvantages
3. Conflict management: concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
4. Stress management: Concept, causes and sources of stress, techniques of stress management

B. Finance and Human Resource:
1. Financial management: concept, approaches, budget formulation, and implantation, auditing and topics related to financial management
2. Human resources management: concepts, functions, and different aspects
3. Leadership: concept, functions, leadership styles, leadership and management effectiveness
4. Coordination: concept, need, types, techniques and approaches for effective coordination
5. Motivation: Concept, theories of motivation, reasons for low productivity, techniques of employ motivation

C. Agricultural Related Issues:
1. Use of Information and Communication Technologies (ICTs): concept, types, advantages & disadvantages, impact, status in Nepal
2. Agricultural research project planning and management: concepts, principles, nature, instruments and steps
3. Decision making: importance, types, rational process of decision process
4. Agriculture research farm management
Part-II: Agricultural Research and Development

1. Constitution of Nepal: Food, agriculture and natural resources related issues

2. Current national agricultural policies, strategies and plans: National Agriculture Policy, Agricultural Biodiversity Policy, National Climate Change Policy, Agriculture Development Strategy (ADS), Seed Vision, Fertilizer Policy, National Land Use Policy and agriculture related issues in development plans

3. Nepal Agricultural Research Council (NARC) as a National Agricultural Research System (NARS) in the context of national and global perspectives

4. International Agricultural Research Organizations: CGIARs and IARCs - CIAT, CIMMYT, CIP, ICRISAT, ICARDA, World Fish, ICAR, IIPRI, IITA, ILRI, Bioversity International, IRRI, IWMI, AVRDC, ICIMOD, ICRAF, IFDC, IFAD and FAO

5. Agricultural Innovation System: concept, accountability, relationship with actors and stakeholders

6. Agricultural research project management: Problem & objective tree analysis, logframe development, effect and impact assessment and its linkage with technology users.

7. Coordination and partnership of Nepal Agricultural Research Council with national organizations, international organizations, civil societies, entrepreneurs and agri-business

8. Implementation and impact of Agricultural Research in Nepal

9. Agricultural research and its contribution in GDP

10. Agricultural statistics: Production, productivity, import/export trend of major agricultural commodities

11. Agricultural marketing and networking

12. Agricultural research system tools (ICTs, GIS, GPS, Remote Sensing, Satellite, Drone and Models) and their integrated use in agriculture research, technology transfer and development
1. Crop Production
Rice, wheat, maize, finger millet, barley, buckwheat, amaranths, lentil, soybean, chickpea, pigeon pea, mungbean, rapeseed, mustard, groundnut, sugarcane, jute, tobacco, cotton, potato, with respect to:
1.1 Introduction, origin and distribution
1.2 Botany, morphology and growth stages
1.3 Climate and soil
1.4 Recommended and pipe-line cultivars and their characters
1.5 Cultural practices:- land preparation, seed treatment, planting methods (spacing), planting time, seed rate, , inter-culture operations, harvesting, drying, cleaning, transportation and storage
1.6 Weed and weed control: Importance of weed, recommended herbicides and their use, method and time of application
1.7 Manures and fertilizers: recommended doses, method of application, time of application
1.8 Water management: time and frequency of water application, irrigation methods, water requirement, drainage
1.9 Typical cropping calendars and cropping patterns in hills, mid-hills, Terai and inner-Terai
1.10 Economics of crop production of major crops (rice, maize, wheat, sugarcane, tobacco, cotton, jute, potato, lentil)
1.11 Plant protection measures: causal agent, symptoms and control measures, IPM, use of plant pesticides

2. Climate, Weather and Crop
2.1 Climate: temperature, humidity, wind pressure, rainfall, effective rainfall, sunshine hours, soil temperature and their effect in crop production
2.2 Climate of Nepal : climatic zones, moisture classes their features and vegetation
2.3 Effects of adverse climate and weather in different crops
2.4 Climate change, global warming and greenhouse gases: Definition and impact in different crops
2.5 Agro-climatic normals for different crops
2.6 Weather forecasting and its implication in crop production

3. Tillage
3.1 Tillage: objective, significance, limitations and importance in crop production
3.2 Zero tillage, minimum tillage and optimum tillage
3.3 Condition of soil suitable for cultivation
3.4 Tillage and crop establishment methods
4. Land Resources
   4.1 Physiographic land distribution system of Nepal
   4.2 Land capability classification and utilization and irrigation suitability
   4.3 Soil of Nepal and their classifications

5. Weed and Weed Control
   5.1 Classification of weeds, its importance in crop production, pattern of weed distribution
   5.2 Common weeds found in major field crops
   5.3 Herbicides: types of herbicides, herbicide formulation, mode of action, physiology of herbicides, application method and type of nozzle for herbicides, herbicides use in Nepal
   5.4 Integrated weed management practices in major crops
   5.5 Economic use of herbicides
   5.6 Crop-weed completion

6. Soil and Fertilizer
   6.1 Soil: definition, soil and sub-soil, importance of top soil and sub-soils
   6.2 Soil texture, soil structure, soil bulk density, soil consistency and their importance in agriculture
   6.3 Classification of essential elements on the basis of their functions
   6.4 Functions and deficiency symptoms of essential elements
   6.5 Determination of nutrient requirement of major crops
   6.6 Soil pH, its measurement, liming material for correcting soil pH, liming materials and their reactions in soil
   6.7 Soil organic matter, nutrient content of different manures and importance of organic matter
   6.8 Recommended dose of nutrients, method of application and time of application
   6.9 Recommendation of nitrogen, phosphorous and potassium on the basis of soil analysis
   6.10 Green manure: benefit of green manure, green manuring and green leaf manuring, influence of leguminous green, manure, desirable characteristics of green manure, plant suitable for green manure, aerobic and anaerobic decomposition and its effect on soil, constrains of green manuring
   6.11 Soil fertility and productivity and their indicators

7. Farming System and Outreach Research
   7.1 Introduction to farming system, system approach in agriculture, and component/ determinants of farming system
   7.2 Social, economic and institutional aspects of farming system
   7.3 Intensive cropping, sequential cropping systems, management of different cropping systems and evaluation of cropping systems
   7.4 On-farm farming system research: methodology, characteristics of FSR, frame work of FSR methodology, diagnostic phases (RRA, Agro ecosystem, analysis, conventional survey)
   7.5 Gender perspective of technology generation and adoption

8. Sustainable Agriculture
   8.6 Definitions
   8.7 Differences between modern and sustainable agriculture
   8.8 Problem of modern agriculture and management practices
8.9 Positive and negative implication of sustainable and modern agriculture
8.10 Impact of green revolution in food and nutritional security
8.11 Role of agro-forestry and its management for sustainable crop production

9. Principles of Plant Breeding
   9.1 Definition, importance, history and achievement of plant breeding
   9.2 Heredity, growth and assimilation
   9.3 Genotypes and phenotypes
   9.4 Mode of reproduction in crop plant
   9.5 Methods of breeding in field crops
   9.6 Classification of crops according to pollination
   9.7 Germplasm collection, evaluation, utilization and conservation
   9.8 Vareital improvement work procedure in Nepal
   9.9 Method of hybridization to improve major field crops

10. Seed Technology
    10.1 Seed formation, development and composition
    10.2 Physiology of seed
    10.3 Seed quality and seed classes and their purity maintenance
    10.4 Principles and practices of seed production and seed testing
    10.5 Seed certification procedures and seed certification standards in major crop in Nepal

11. Crop Physiology: Photosynthesis, respiration, photo-periodism, transpiration, physiological stress in crops, crop water stress indices and crop stress detection

12. Statistics
    12.1 Probability and simple statistics
    12.2 Estimate of error: replication and randomization
    12.3 Control error: blocking, field plot technique, data analysis
    12.4 Complete randomized design (CRD): randomization, layout, analysis of variance, interpretation of results.
    12.5 Randomized complete block design (RCBD): layout, randomization, analysis of variance and interpretation of results
    12.6 Latin square design: randomization, layout, analysis of variance, efficiency of row and column, blocking and interpretation of results
    12.7 Lattice design: balanced lattice design, partially balance lattice - layout, randomization, analysis of variance and interpretation of results
    12.8 Two factorial experiments: randomization, layout, analysis of variance, interactions and interpretation of results
    12.9 Split plot design - randomization, layout, analysis of variance, interaction of factors and interpretation of result
    12.10 Strip-plot design: randomization, layout, analysis of variance, interaction of factors and interpretation of result
    12.11 Comparison: least significant difference (LSD) and Duncan's Multiple Range Test (DMRT), group comparison-between-group, within group, trend, and factorial and interpretation of results
12.12 Regression and correlation and their use in agronomic research
12.13 Importance and validity of statistics in agriculture
12.14 Methods of statistical analysis for cropping systems
12.15 Data transformation and missing plot techniques
12.16 Test of significance: t, F and Chi-square

13. Others
13.1 Importance of agronomical research in relation to WTO
13.2 Agricultural marketing and agri-bussiness of field crops
13.3 Importance of commercial field and industrial crops for commercialization
13.4 Major constrains and opportunities of crops production in Nepal
13.5 Climate smart agronomical research