

प्रदेश लोक सेवा आयोग
सुदूरपश्चिम प्रदेश
प्रदेश निजामती सेवा वन सेवा, बोटानी समूह, सातौं तह वा सो सरह पदको खुला, अन्तर तह र आन्तरिक प्रतियोगितात्मक
परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई निम्न अनुसार दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण : लिखित परीक्षा (Written Examination)	पूर्णांक : २००
द्वितीय चरण : (क) सामूहिक परीक्षण (Group Test)	पूर्णांक : १०
(ख) अन्तरवार्ता (Interview)	पूर्णांक : २५

परीक्षा योजना (Examination Scheme)

प्रथम चरण : लिखित परीक्षा (Written Examination) पूर्णांक : २००

पत्र	विषय	खण्ड	पूर्णांक	उत्तीर्णांक	परीक्षा प्रणाली	प्रश्न × अंक	समय
प्रथम	General Subject	खण्ड (क) General Awareness & General Reasoning Test	100	40	वस्तुगत (Objective) (MCQs)	50 × 1	1:30 Hrs
		खण्ड (ख) General Technical Subject				50 × 1	
द्वितीय	Technical Subject		100	40	विषयगत (Subjective)	छोटो उत्तर 4 × 5 लामो उत्तर 8 × 10	3 Hrs

द्वितीय चरण : सामूहिक परीक्षण (Group Test) र अन्तरवार्ता (Interview) पूर्णांक : ३५

पत्र/विषय	पूर्णांक	उत्तीर्णांक	परीक्षा प्रणाली	समय
सामूहिक परीक्षण (Group Test)	१०	-	सामूहिक छलफल (Group Discussion)	३० मिनेट
अन्तरवार्ता (Interview)	२५	-	मौखिक (Oral)	-

द्रष्टव्य :

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।
- प्रथम पत्र र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- वस्तुगत बहुवैकल्पिक प्रश्नहरू (Multiple Choice Questions) को गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अंक कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अंक दिइने छैन र अंक कट्टा पनि गरिने छैन ।
- बहुवैकल्पिक प्रश्नहरू हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
- विषयगत प्रश्नका लागि तोकिएका १० अंकका प्रश्नहरूको हकमा १० 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 टिप्पणीहरू (Short notes) सोध्न सकिने छ ।
- द्वितीय पत्रमा प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तर पुस्तिकाहरू हुनेछन । परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरूको उत्तर सोही खण्डको उत्तर पुस्तिकामा लेख्नु पर्नेछ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका ऐन, नियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधन भई कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको सामूहिक परीक्षण र अन्तरवार्तामा सम्मिलित गराइनेछ ।
- पाठ्यक्रम लागु मिति : २०८१।११।११ गते देखि

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परीक्षाको पाठ्यक्रम
प्रथम चरण : लिखित परीक्षा (Written Examination)

प्रथम पत्र : खण्ड (क) - (५०अंक)

General Awareness & General Reasoning Test

1. General Awareness and Contemporary Issues

(30 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, livelihood & lifestyle of people
- 1.4. Notable events and personalities, social, cultural and economic conditions in modern history of Nepal
- 1.5. National and Sudurpashchim Province current periodic plan
- 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. The Constitution of Nepal (From Part 1 to 5 and Schedules)
- 1.9. Governance system and Government (Federal, Provincial and Local)
- 1.10. Sudurpashchim Province Civil Service Act, 2079 and Regulation, 2081
- 1.11. Functional scope of public services, Public Service charter
- 1.12. Sudurpashchim Province Good Governance Act, 2075
- 1.13. Concept, objective and importance of public policy
- 1.14. Fundamentals of management: planning, organizing, directing, controlling, coordinating, decision making, motivation and leadership
- 1.15. Government planning, budgeting and accounting system
- 1.16. Major events and current affairs of national and international importance

2. General Reasoning Test

(20 Marks)

2.1. Logical Reasoning (7 Marks)

Verbal Ability, Alphanumeric Series, Reasoning Analogies, Classification, Coding-Decoding, Order & Ranking, Distance & Directions, Analytical and Logical Reasoning, Assertion and Reason, Statement and Conclusion, Input/output, Venn- diagram

2.2. Numerical Reasoning (7 Marks)

Arithmetic Series, Analogy, Classification, Arithmetical Reasoning, Fraction, Percentage, Ratio, Average, Profit & Loss, Time & Work, Date & Calendar, Data Sufficiency, Data Interpretation & Data Verification

2.3. Spatial Reasoning (6 Marks)

Figure Series, Figure Analogy, Figure Classification, Figure Matrix, Pattern Completion, Embedded Images, Image Formation & Analysis, Mirror and Water Images, Cubes and Dices, Paper Folding & Cutting

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प्रथम पत्र : खण्ड (ख) - (५० अंक)
General Technical Subject

1. Algae and Lichens

(5 Marks)

1.1. Algae

- 1.1.1. General account, classification and economic importance of algae with reference to Nepal.
- 1.1.2. Structure and life cycle of the following genera:
 - 1.1.2.1. Oscillatoria
 - 1.1.2.2. Anabaena
 - 1.1.2.3. Chlamydomonas
 - 1.1.2.4. Ulothrix
 - 1.1.2.5. Spirogyra
 - 1.1.2.6. Volvox
 - 1.1.2.7. Oedogonium
 - 1.1.2.8. Vaucheria
 - 1.1.2.9. Chara
 - 1.1.2.10. Batrachospermum

1.2. Lichens

- 1.2.1. Structure and different forms.
- 1.2.2. Economic importance of lichens with reference to Nepal.
- 1.2.3. Lichens as a bio-indicator of the air pollution and a pioneer in the plant succession.

2. Fungi, Bacteria, Virus and Plant Pathology

(5 Marks)

2.1. Fungi

- 2.1.1. General account, classification and economic importance of fungi with reference to Nepal.
- 2.1.2. Structure and life cycle of the following taxa:
 - 2.1.2.1. Plasmodiophora
 - 2.1.2.2. Saprolegnia
 - 2.1.2.3. Albugo
 - 2.1.2.4. Rhizopus
 - 2.1.2.5. Yeast
 - 2.1.2.6. Eurotium
 - 2.1.2.7. Puccinia
 - 2.1.2.8. Agaricus
 - 2.1.2.9. Alternaria

2.2. Bacteria: Structure, nutrition, reproduction and economic importance

2.3. Virus: General concept of virus.

2.4. Plant pathology

- 2.4.1. Introduction and scope of plant pathology.
- 2.4.2. Symptoms and plant diseases caused by fungi, bacteria and virus.
- 2.4.3. Study of causal organism, symptom, etiology and control measure of the following diseases in plants:
 - 2.4.3.1. Damping off disease
 - 2.4.3.2. Late blight disease on potato

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- 2.4.3.3. Downy mildew disease on spinach
- 2.4.3.4. Rust disease on wheat
- 2.4.3.5. Fusarium wilt disease on Dalbergia species and Asparagus species
- 2.4.3.6. Ring rot disease on potato
- 2.4.3.7. Bean mosaic disease

3. Bryophytes, Pteridophytes, Gymnosperms and Palaeobotany (5 Marks)

3.1. Bryophytes

- 3.1.1. General introduction, classification and economic importance of Bryophytes with reference to Nepal.
- 3.1.2. A detailed study of the following genera:
 - 3.1.2.1. Marchantia
 - 3.1.2.2. Anthoceros
 - 3.1.2.3. Polytrichum

3.2. Pteridophytes

- 3.2.1. General introduction, classification and economic importance of pteridophytes with reference to Nepal.
- 3.2.2. A detailed study of the following genera:
 - 3.2.2.1. Lycopodium
 - 3.2.2.2. Selaginella
 - 3.2.2.3. Equisetum
 - 3.2.2.4. Pteris
 - 3.2.2.5. Marsilea

3.3. Gymnosperms

- 3.3.1. General introduction, classification and economic importance of Gymnosperms with reference to Nepal.
- 3.3.2. A detailed study of the following genera:
 - 3.3.2.1. Cycas
 - 3.3.2.2. Pinus
 - 3.3.2.3. Taxaceae

3.4. Palaeobotany

- 3.4.1. General account and geological eras and periods
- 3.4.2. Types of fossils and its formation
- 3.4.3. Morphology and anatomy of Rhynia fossil

4. Taxonomy and Economic Botany (10 Marks)

4.1. Taxonomy

- 4.1.1. Classification system of Bentham and Hooker in higher plants
- 4.1.2. International system in botanical nomenclatures
- 4.1.3. History of botanical exploration in Nepal
- 4.1.4. Role and importance of National Herbarium and its significance
- 4.1.5. Role and importance of Botanical Gardens and its significance

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4.1.6. Systematic study, economic importance and affinity of the following families:

Dicotyledon;

- 4.1.6.1. Ranunculaceae
- 4.1.6.2. Cruciferae
- 4.1.6.3. Rutaceae
- 4.1.6.4. Rosaceae
- 4.1.6.5. Solanaceae
- 4.1.6.6. Malvaceae
- 4.1.6.7. Leguminosae
- 4.1.6.8. Labiatae
- 4.1.6.9. Scrophulariaceae
- 4.1.6.10. Polygonaceae

Monocotolyden;

- 4.1.6.11. Gramineae
- 4.1.6.12. Orchidaceae

4.2. **Economic Botany**

4.2.1. General account and distribution of the following medicinal plants with reference to Nepal:

4.2.2. **Tropical and sub-tropical plants:**

- 4.2.2.1. Piper longum Linn., Piperaceae (Pipla/Murjhang)
- 4.2.2.2. Rauwolfia serpentina Benth. ex Kurz, Apocynaceae (Chad Maruwa/ Sarpaganda)
- 4.2.2.3. Terminalia chebula Retz., Combretaceae (Harro)
- 4.2.2.4. Phyllanthus emblica Linn. Euphorbiaceae (Amala)
- 4.2.2.5. Cinnamomum tamala Nees., Lauraceae (Tej Pat)
- 4.2.2.6. Asparagus racemosus Willd., Asparagaceae (Kurilo)
- 4.2.2.7. Acorus calamus Linn., Araceae (Bojho)

4.2.3. **Temperate plants:**

- 4.2.3.1. Swertia chirata Ham., Gentianaceae (Chiraito)
- 4.2.3.2. Valeriana wallichii DC., Valerianaceae (Sugandhwala)
- 4.2.3.3. Zanthoxylum armatum DC., Rutaceae (Timur)
- 4.2.3.4. Taxus contorta Griff., Taxaceae (Laugh Sallo)
- 4.2.3.5. Taxus mairei (Lemee & H. Lev.) S. Y. Hu, Taxaceae (Laugh Sallo)
- 4.2.3.6. Taxus wallichiana Zucc., Taxaceae (Laugh Sallo)

4.2.4. **Sub-Alpine and Alpine plants:**

- 4.2.4.1. Ophiocordyceps sinensis (Berk) G. H. Sung, J. M. Sung, Hywel-Jones & Spatofora Ophiocordycipitaceae, fungus (Yarsa Gumba)
- 4.2.4.2. Ephedra gerardiana Wall., Gnetaceae (Bhutu Kesh/ Somalata)
- 4.2.4.3. Nardostachys jatamansi DC., Valerianaceae (Jatamansi)
- 4.2.4.4. Dactylorhiza hategira (D. Don) Soo. Orchidaceae (Panch Aunla)
- 4.2.4.5. Neopicrorhiza scrophulariiflora (Pennell) D. Y. Hong, Plantaginaceae (Kutki)

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5. Cytology and Genetics, Plant Breeding, Evolution, Anatomy and Embryology (8 Marks)

5.1. Cytology and Genetics

- 5.1.1. Structural organization of prokaryotic and eukaryotic cells
- 5.1.2. Ultra-structure and function of cell wall, cell membrane, endoplasmic reticulum, golgi bodies, vacuoles, microbodies, mitochondria, plastids, microtubules, centrosome, flagella, nucleus and nucleolus
- 5.1.3. Structure and function of Nucleic acids referring double helix and circular DNA & RNA
- 5.1.4. Physical and chemical nature of chromosomes
- 5.1.5. Chromosomal behaviour during mitotic and meiotic divisions
- 5.1.6. Cell cycle and its different phases and significance
- 5.1.7. Significance of linkage, chiasma formation and crossing over
- 5.1.8. Elementary idea of different types of mutation in chromosome;
 - 5.1.8.1. Chromosomal aberration
 - 5.1.8.2. Chromosomal number variation (polyploidy)
 - 5.1.8.3. Gene mutation
- 5.1.9. Mendel's laws of inheritance, post-Mendelian expression and interaction of genes and multiple alleles

5.2. Plant Breeding

- 5.2.1. Nature and scope of plant breeding
- 5.2.2. Selection, Hybridization and Mutation breeding process as tools of crop improvement

5.3. Evolution

- 5.3.1. Natural variation and Darwinian evolution

5.4. Anatomy

- 5.4.1. Structure and classification of meristem
- 5.4.2. Apical cell and Histogen theories in the differentiation of root and shoot apices
- 5.4.3. Secondary growth in root and stem and occurrence of anomalous secondary structure in some plants
- 5.4.4. Anatomical modification and ecological adaptation

5.5. Embryology

- 5.5.1. General account of microsporogenesis and megasporogenesis
- 5.5.2. Development of male and female gametophytes
- 5.5.3. Fertilization and endosperm formation
- 5.5.4. Embryogenesis in a typical dicotyledonous & monocotyledonous plants

6. Ecology (5 Marks)

- 6.1. General concept and scopes of ecology
- 6.2. Biotic and abiotic ecological factors
- 6.3. Biogeochemical cycles of Carbon, Water, Phosphorous, Nitrogen and Sulphur
- 6.4. Plant community and succession
- 6.5. Concept of ecosystem (forest, grassland and fresh water)
- 6.6. Environmental pollution with reference to air and water
- 6.7. Vegetation (phytogeography) in Nepal and major natural resources
- 6.8. National parks and Conservation Areas of Nepal as tools of Nature conservation

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7. Plant physiology (5 Marks)

- 7.1. Macro and Micro-nutrients in plants and their roles
- 7.2. Absorption, translocation and transpiration
- 7.3. Growth regulating substances (auxins, cytokinins, gibberellins, ethylene and abscissic acid)
- 7.4. Tropism- Phototropism
- 7.5. Photoperiodism and Vernalization
- 7.6. An overview of respiration and factors affecting respiration
- 7.7. An overview of photosynthesis and factors affecting photosynthesis
- 7.8. Concept of C3 and C4 plants
- 7.9. Relationship between biochemistry and Plant physiology

8. Applied technology and Convention and Treaties (7 Marks)

8.1. Applied technology

- 8.1.1. Introduction, scope and importance of biotechnology
- 8.1.2. Grafting, budding and cutting methods in plant propagation
- 8.1.3. General account of In vitro culture techniques and principles
- 8.1.4. Application of In vitro cultures
- 8.1.5. Cloning and its significance
- 8.1.6. Genetically modified (GM) crops or Living modified organism (LMO)

8.2. Convention, Treaties, Acts and Regulations

- 8.2.1. Convention on Biodiversity (CBD)
- 8.2.2. Convention on International Trade in Endangered species of Wild Fauna and Flora (CITES)
- 8.2.3. Forest Act and Regulation
- 8.2.4. Sudurpashchim Province Forest Act and Regulation
- 8.2.5. Initial Environmental Examination and Environmental Impact Assessment Guideline
- 8.2.6. Medicinal and Non- timber Forest Products (NTFPs) Policy, 2061
- 8.2.7. Scope of tissue culture in NTFP promotion
- 8.2.8. Climate Change Policy, 2076
- 8.2.9. Nepal Environmental Policy and Action Plan (NEPAP)
- 8.2.10. Sudurpashchim Province Environment Protection Act
- 8.2.11. United Nations Framework Convention on Climate Change (UNFCCC)

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प्रतियोगितात्मक परीक्षाको पाठ्यक्रम
द्वितीय पत्र : Technical Subject

Section (A) – 30 Marks

1. Algae and Lichens

(10 Marks)

1.1. Algae

- 1.1.1. General account, classification and economic importance of algae with reference to Nepal.
- 1.1.2. Structure and life cycle of the following genera:
 - 1.1.2.1. Oscillatoria
 - 1.1.2.2. Anabaena
 - 1.1.2.3. Chlamydomonas
 - 1.1.2.4. Ulothrix
 - 1.1.2.5. Spirogyra
 - 1.1.2.6. Volvox
 - 1.1.2.7. Oedogonium
 - 1.1.2.8. Vaucheria
 - 1.1.2.9. Chara
 - 1.1.2.10. Batrachospermum

1.2. Lichens

- 1.2.1. Structure and different forms.
- 1.2.2. Economic importance of lichens with reference to Nepal.
- 1.2.3. Lichens as a bio-indicator of the air pollution and a pioneer in the plant succession.

2. Fungi, Bacteria, Virus and Plant Pathology

(10 Marks)

2.1. Fungi

- 2.1.1. General account, classification and economic importance of fungi with reference to Nepal.
- 2.1.2. Structure and life cycle of the following taxa:
 - 2.1.2.1. Plasmodiophora
 - 2.1.2.2. Saprolegnia
 - 2.1.2.3. Albugo
 - 2.1.2.4. Rhizopus
 - 2.1.2.5. Yeast
 - 2.1.2.6. Eurotium
 - 2.1.2.7. Puccinia
 - 2.1.2.8. Agaricus
 - 2.1.2.9. Alternaria

2.2. Bacteria: Structure, nutrition, reproduction and economic importance

2.3. Virus: General concept of virus.

2.4. Plant pathology

- 2.4.1. Introduction and scope of plant pathology.
- 2.4.2. Symptoms and plant diseases caused by fungi, bacteria and virus.
- 2.4.3. Study of causal organism, symptom, etiology and control measure of the following diseases in plants:
 - 2.4.3.1. Damping off disease
 - 2.4.3.2. Late blight disease on potato

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- 2.4.3.3. Downy mildew disease on spinach
- 2.4.3.4. Rust disease on wheat
- 2.4.3.5. Fusarium wilt disease on Dalbergia species and Asparagus species
- 2.4.3.6. Ring rot disease on potato
- 2.4.3.7. Bean mosaic disease

3. Bryophytes, Pteridophytes, Gymnosperms and Palaeobotany (10 Marks)

3.1. Bryophytes

- 3.1.1. General introduction, classification and economic importance of Bryophytes with reference to Nepal.
- 3.1.2. A detailed study of the following genera:
 - 3.1.2.1. Marchantia
 - 3.1.2.2. Anthoceros
 - 3.1.2.3. Polytrichum

3.2. Pteridophytes

- 3.2.1. General introduction, classification and economic importance of pteridophytes with reference to Nepal.
- 3.2.2. A detailed study of the following genera:
 - 3.2.2.1. Lycopodium
 - 3.2.2.2. Selaginella
 - 3.2.2.3. Equisetum
 - 3.2.2.4. Pteris
 - 3.2.2.5. Marsilea

3.3. Gymnosperms

- 3.3.1. General introduction, classification and economic importance of Gymnosperms with reference to Nepal.
- 3.3.2. A detailed study of the following genera:
 - 3.3.2.1. Cycas
 - 3.3.2.2. Pinus
 - 3.3.2.3. Taxaceae

3.4. Palaeobotany

- 3.4.1. General account and geological eras and periods
- 3.4.2. Types of fossils and its formation
- 3.4.3. Morphology and anatomy of Rhynia fossil

Section (B) – 30 Marks

4. Taxonomy and Economic Botany (20 Marks)

4.1. Taxonomy

- 4.1.1. Classification system of Bentham and Hooker in higher plants
- 4.1.2. International system in botanical nomenclatures
- 4.1.3. History of botanical exploration in Nepal
- 4.1.4. Role and importance of National Herbarium and its significance
- 4.1.5. Role and importance of Botanical Gardens and its significance

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4.1.6. Systematic study, economic importance and affinity of the following families:

Dicotyledon;

- 4.1.6.1. Ranunculaceae
- 4.1.6.2. Cruciferae
- 4.1.6.3. Rutaceae
- 4.1.6.4. Rosaceae
- 4.1.6.5. Solanaceae
- 4.1.6.6. Malvaceae
- 4.1.6.7. Leguminosae
- 4.1.6.8. Labiatae
- 4.1.6.9. Scrophulariaceae
- 4.1.6.10. Polygonaceae

Monocotolyden;

- 4.1.6.11. Gramineae
- 4.1.6.12. Orchidaceae

4.2. Economic Botany

4.2.1. General account and distribution of the following medicinal plants with reference to Nepal:

4.2.2. Tropical and sub-tropical plants:

- 4.2.2.1. Piper longum Linn., Piperaceae (Pipla/Murjhang)
- 4.2.2.2. Rauwolfia serpentina Benth. ex Kurz, Apocynaceae (Chad Maruwa/ Sarpaganda)
- 4.2.2.3. Terminalia chebula Retz., Combretaceae (Harro)
- 4.2.2.4. Phyllanthus emblica Linn. Euphorbiaceae (Amala)
- 4.2.2.5. Cinnamomum tamala Nees., Lauraceae (Tej Pat)
- 4.2.2.6. Asparagus racemosus Willd., Asparagaceae (Kurilo)
- 4.2.2.7. Acorus calamus Linn., Araceae (Bojho)

4.2.3. Temperate plants:

- 4.2.3.1. Swertia chirata Ham., Gentianaceae (Chiraito)
- 4.2.3.2. Valeriana wallichii DC., Valerianaceae (Sugandhwala)
- 4.2.3.3. Zanthoxylum armatum DC., Rutaceae (Timur)
- 4.2.3.4. Taxus contorta Griff., Taxaceae (Laugh Sallo)
- 4.2.3.5. Taxus mairei (Lemee & H. Lev.) S. Y. Hu, Taxaceae (Laugh Sallo)
- 4.2.3.6. Taxus wallichiana Zucc., Taxaceae (Laugh Sallo)

4.2.4. Sub-Alpine and Alpine plants:

- 4.2.4.1. Ophiocordyceps sinensis (Berk) G. H. Sung, J. M. Sung, Hywel-Jones & Spatofora Ophiocordycipitaceae, fungus (Yarsa Gumba)
- 4.2.4.2. Ephedra gerardiana Wall., Gnetaceae (Bhutu Kesh/ Somalata)
- 4.2.4.3. Nardostachys jatamansi DC., Valerianaceae (Jatamonsi)
- 4.2.4.4. Dactylorhiza hategira (D.Don) Soo. Orchidaceae (Panch Aunla)
- 4.2.4.5. Neopicrorhiza scrophulariiflora (Pennell) D. Y. Hong, Plantaginaceae (Kutki)

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5. Plant physiology (10 Marks)

- 5.1. Macro and Micro-nutrients in plants and their roles
- 5.2. Absorption, translocation and transpiration
- 5.3. Growth regulating substances (auxins, cytokinins, gibberellins, ethylene and abscissic acid)
- 5.4. Tropism- Phototropism
- 5.5. Photoperiodism and Vernalization
- 5.6. An overview of respiration and factors affecting respiration
- 5.7. An overview of photosynthesis and factors affecting photosynthesis
- 5.8. Concept of C₃ and C₄ plants
- 5.9. Relationship between biochemistry and Plant physiology

Section (C) – 20 Marks

6. Cytology and Genetics, Plant Breeding, Evolution, Anatomy and Embryology (20 Marks)

6.1. Cytology and Genetics

- 6.1.1. Structural organization of prokaryotic and eukaryotic cells
- 6.1.2. Ultra-structure and function of cell wall, cell membrane, endoplasmic reticulum, golgi bodies, vacuoles, microbodies, mitochondria, plastids, microtubules, centrosome, flagella, nucleus and nucleolus
- 6.1.3. Structure and function of Nucleic acids referring double helix and circular DNA & RNA
- 6.1.4. Physical and chemical nature of chromosomes
- 6.1.5. Chromosomal behaviour during mitotic and meiotic divisions
- 6.1.6. Cell cycle and its different phases and significance
- 6.1.7. Significance of linkage, chiasma formation and crossing over
- 6.1.8. Elementary idea of different types of mutation in chromosome;
 - 6.1.8.1. Chromosomal aberration
 - 6.1.8.2. Chromosomal number variation (polyploidy)
 - 6.1.8.3. Gene mutation
- 6.1.9. Mendel's laws of inheritance, post-Mendelian expression and interaction of genes and multiple alleles

6.2. Plant Breeding

- 6.2.1. Nature and scope of plant breeding
- 6.2.2. Selection, Hybridization and Mutation breeding process as tools of crop improvement

6.3. Evolution

- 6.3.1. Natural variation and Darwinian evolution

6.4. Anatomy

- 6.4.1. Structure and classification of meristem
- 6.4.2. Apical cell and Histogen theories in the differentiation of root and shoot apices
- 6.4.3. Secondary growth in root and stem and occurrence of anomalous secondary structure in some plants
- 6.4.4. Anatomical modification and ecological adaptation

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6.5. Embryology

- 6.5.1. General account of microsporogenesis and megasporogenesis
- 6.5.2. Development of male and female gametophytes
- 6.5.3. Fertilization and endosperm formation
- 6.5.4. Embryogenesis in a typical dicotyledonous & monocotyledonous plants

Section (D) – 20 Marks

7. Ecology

(10 Marks)

- 7.1. General concept and scopes of ecology
- 7.2. Biotic and abiotic ecological factors
- 7.3. Biogeochemical cycles of Carbon, Water, Phosphorous, Nitrogen and Sulphur
- 7.4. Plant community and succession
- 7.5. Concept of ecosystem (forest, grassland and fresh water)
- 7.6. Environmental pollution with reference to air and water
- 7.7. Vegetation (phytogeography) in Nepal and major natural resources
- 7.8. National parks and Conservation Areas of Nepal as tools of Nature conservation

8. Applied technology and Convention and Treaties

(10 Marks)

8.1. Applied technology

- 8.1.1. Introduction, scope and importance of biotechnology
- 8.1.2. Grafting, budding and cutting methods in plant propagation
- 8.1.3. General account of In vitro culture techniques and principles
- 8.1.4. Application of In vitro cultures
- 8.1.5. Cloning and its significance
- 8.1.6. Genetically modified (GM) crops or Living modified organism (LMO)

8.2. Convention, Treaties, Acts and Regulations

- 8.2.1. Convention on Biodiversity (CBD)
- 8.2.2. Convention on International Trade in Endangered species of Wild Fauna and Flora (CITES)
- 8.2.3. Forest Act and Regulation
- 8.2.4. Sudurpaschim Province Forest Act and Regulation
- 8.2.5. Initial Environmental Examination and Environmental Impact Assessment Guideline
- 8.2.6. Medicinal and Non- timber Forest Products (NTFPs) Policy, 2061
- 8.2.7. Scope of tissue culture in NTFP promotion
- 8.2.8. Climate Change Policy, 2076
- 8.2.9. Nepal Environmental Policy and Action Plan (NEPAP)
- 8.2.10. Sudurpashchim Province Environment Protection Act
- 8.2.11. United Nations Framework Convention on Climate Change (UNFCCC)

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द्वितीय चरण (Second Phase) : सामूहिक परीक्षण (Group Test) र अन्तरवार्ता (Interview)

सामूहिक परीक्षण (Group Test)

(१० अंक)

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 रूपमा अवलम्बन गरिने छ। दिइएको प्रश्न वा Topic का विषयमा पालैपालोसंग निर्दिष्ट समय भित्र समूह बीच छलफल गर्दै प्रत्येक उम्मेदवारले व्यक्तिगत प्रस्तुति (Individual Presentation) गर्नु पर्नेछ।

सामूहिक छलफलमा दिइने नमुना प्रश्न वा Topic

उदाहरणको लागि - उर्जा संकट, गरीबी निवारण, बाली बीमा, सामाजिक सुरक्षा, खाद्य सुरक्षा, प्रतिभा पलायन, स्वास्थ्य बीमा, जलवायु परिवर्तन, आरक्षण जस्ता समसामयिक विषयवस्तुहरुबाट कुनै एक Topic दिइनेछ।

अन्तरवार्ता (Interview)

(२५ अंक)

मौखिक (Oral)

ΩΩ THE END ΩΩ