

प्रदेश लोक सेवा आयोग

सुदूरपश्चिम प्रदेश

प्रदेश निजामती सेवा र स्थानीय सरकारी सेवा अन्तर्गत इन्जिनियरिङ सेवा, सिभिल समूह, स्यानिटरी उपसमूह, अधिकृत नवौं 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 (First Phase) : लिखित परीक्षा (Written Examination)

पूर्णांक : २००

द्वितीय चरण (Second Phase) : अन्तरवार्ता (Interview)

पूर्णांक : २५

परीक्षा योजना (Examination Scheme)

प्रथम चरण : लिखित परीक्षा (Written Examination)

पूर्णांक : २००

पत्र	विषय	खण्ड	पूर्णाङ्क	उत्तीर्णांक	परीक्षा प्रणाली	प्रश्न संख्या × अंक	समय
प्रथम	General Subject	Section (A) : Administration & Management	100	40	Subjective	6 × 5 = 30 (Short Answer)	3 hrs.
		Section (B) : Engineering Construction & Development Management				2 × 10 = 20 (Long Answer) 1 × 20 = 20 (Problem Solving)	
		Section (C) : Service/Group related – Acts, Rules & Policies				2 × 5 = 10 (Short Answer) 2 × 10 = 20 (Long Answer)	
द्वितीय	Technical Subject	100	40	Subjective	1 × 5 = 5 (Short Answer) 1 × 10 = 10 (Long Answer) 3 × 15 = 45 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3 hrs.	

द्वितीय चरण : अन्तरवार्ता (Interview)

पूर्णांक : २५

द्रष्टव्य :

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।
- इन्जिनियरिङ सेवा, सिभिल समूह अन्तर्गतका उप-समूहहरू (जनरल, हाईवे, इरिगेशन, स्यानिटरी, विलिडिङ एण्ड आर्किटेक्ट, हाइड्रोपावर, हाईड्रोलोजी) को लागि प्रथम पत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीय पत्रको पाठ्यक्रम उप-समूह अनुरूप फरक फरक हुनेछ ।
- प्रथम पत्रको लिखित परीक्षा सिभिल समूह अन्तर्गतका उप-समूहहरू (जनरल, हाईवे, इरिगेशन, स्यानिटरी, विलिडिङ एण्ड आर्किटेक्ट, हाइड्रोपावर, हाईड्रोलोजी) को लागि संयुक्त रूपमा एउटै प्रश्नपत्रबाट एकै दिन हुनेछ । तर द्वितीय पत्रको परीक्षा उप-समूह अनुसार अलग अलग दिन छुट्टाछुट्टै प्रश्नपत्रबाट हुनेछ ।
- प्रथम पत्रमा प्रत्येक खण्ड (Section) का लागि छुट्टाछुट्टै उत्तरपुस्तिका हुनेछन् । उम्मेदवारले प्रत्येक खण्डको प्रश्नको उत्तर सोही खण्डको उत्तरपुस्तिकामा लेख्नु पर्नेछ र द्वितीय पत्रमा प्रत्येक प्रश्न/खण्ड (Section) का लागि छुट्टाछुट्टै उत्तरपुस्तिका हुनेछन् । उम्मेदवारले प्रत्येक प्रश्न/खण्डको उत्तर छुट्टाछुट्टै उत्तरपुस्तिकामा लेख्नु पर्नेछ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएता पनि पाठ्यक्रममा परेका ऐन, नियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- प्रथम चरणको लिखित परीक्षा बाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको अन्तरवार्तामा सम्मिलित गराइनेछ ।
- पाठ्यक्रम लागु मिति : २०८१।०६।११ गते देखि ।

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प्रथमपत्र : General Subject

Section (A)

Administration & Management

1. राज्य र सरकार

- 1.1. नेपालको संविधान
- 1.2. राज्यशक्तिको बाँडफाँड, शक्ति पृथकीकरण, सन्तुलन र नियन्त्रण
- 1.3. सरकारको कार्यक्षेत्र र भूमिका
- 1.4. सङ्घीय प्रणाली: नेपालमा प्रशासनिक संघीयता र वित्तीय संघीयता
- 1.5. संघ, प्रदेश र स्थानीय तहको अधिकार
- 1.6. संघ, प्रदेश र स्थानीय तहका सरकार बीचको अन्तरसम्बन्ध र समन्वय
- 1.7. सार्वजनिक नीति विश्लेषण, तर्जुमा, कार्यान्वयन, अनुगमन र मूल्यांकन

2. लोकतन्त्र, मानव अधिकार र नेपाली समाज

- 2.1. समावेशी लोकतन्त्र
- 2.2. कानुनी राज्य र मानव अधिकार
- 2.3. प्रतिनिधित्वको सिद्धान्त र समानुपातिक प्रतिनिधित्व
- 2.4. सामाजिक न्याय र सामाजिक सुरक्षा
- 2.5. नेपाली समाजका विविध जात/जाति/वर्ग/समुदायको सामाजिक, सांस्कृतिक, आर्थिक अवस्था र रहनसहन
- 2.6. सकारात्मक विभेद, विविधता व्यवस्थापन र यसका चुनौतीहरू
- 2.7. सूचनाको हक एवम् सार्वजनिक निकायको दायित्व

3. सार्वजनिक प्रशासन

- 3.1. सार्वजनिक प्रशासनको अवधारणा, सिद्धान्त र कार्यहरू
- 3.2. कर्मचारी प्रशासनका आधारभूत पक्षहरू
- 3.3. प्रशासन र राजनीति बीच अन्तरसम्बन्ध
- 3.4. सार्वजनिक सेवा प्रवाह र यसका नवीनतम अभ्यासहरू
- 3.5. आर्थिक प्रशासन : बजेट तर्जुमा, कार्यान्वयन, अनुगमन, मूल्यांकन
- 3.6. सार्वजनिक वित्त व्यवस्थापन (सार्वजनिक आय, खर्च र ऋण)
- 3.7. आन्तरिक नियन्त्रण प्रणाली

4. व्यवस्थापन

- 4.1. व्यवस्थापनको अवधारणा, सिद्धान्त र नवीनतम प्रवृत्तिहरू
- 4.2. व्यवस्थापकको कार्य, भूमिका र सीपहरू
- 4.3. उत्प्रेरणा, मनोबल, नेतृत्व, नियन्त्रण, समन्वय र निर्णय प्रक्रिया
- 4.4. समूह गतिशीलता, संगठनात्मक व्यवहार, समूहकार्य र कार्य संस्कृति
- 4.5. सार्वजनिक क्षेत्र व्यवस्थापन र नवोदित अवधारणाहरू
- 4.6. व्यवस्थापन सूचना प्रणाली र सूचना प्रविधिको उपयोग
- 4.7. गुनासो व्यवस्थापन, तनाव व्यवस्थापन, सूचना व्यवस्थापन र समय व्यवस्थापन
- 4.8. सामूहिक सौदाबाजी र ट्रेड युनियन

5. विकासका आयामहरू

- 5.1. विकास र पूर्वाधार प्रशासनको अवधारणाहरू र नवीनतम उपागमहरू
- 5.2. नेपालमा योजनावद्ध विकास, चालु आवधिक योजना र सुदूरपश्चिम प्रदेश आवधिक योजना
- 5.3. विकासका आयामहरू : मानव विकास, दिगो विकास, समावेशी विकास, गरीबी निवारण, विश्वव्यापीकरण र स्थानीयकरण
- 5.4. हरित, उत्थानशिल र समावेशी विकासको अवधारणा
- 5.5. वातावरण, जनसंख्या, रोजगार र बसाँईसराई
- 5.6. जलवायु परिवर्तनले सामाजिक जीवनमा पारेको प्रभाव र अनुकूलन

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- 5.7. विपद् व्यवस्थापन, विपद् व्यवस्थापन सम्बन्धी राष्ट्रिय/अन्तराष्ट्रिय अभ्यासहरू
- 5.8. नेपालमा विकासका चुनौती तथा राष्ट्रिय एवम् सुदूरपश्चिम प्रदेशका विकासका मुद्दा/सवालहरू
- 5.9. सुदूरपश्चिम प्रदेशमा वित्तीय र प्रशासनिक संघीयताका चुनौती र अवसरहरू
6. शासकीय सुधार, सुशासन र व्यवसायिकता
 - 6.1. नेपालमा शासकीय प्रशासन सुधारका प्रयास र चुनौतीहरू
 - 6.2. सार्वजनिक सेवाको अवधारणा, विशेषता र आधारभुत मान्यताहरू
 - 6.3. सुशासन, पारदर्शीता र जवाफदेहिता
 - 6.4. सदाचार, व्यवसायिक नैतिकता र मूल्यहरू (Values)
 - 6.5. सम्पत्ति शुद्धीकरण (Money Laundering), भ्रष्टाचार निवारण
 - 6.6. विद्युतीय शासन (E- Governance)
 - 6.7. सार्वजनिक सेवा प्रवाहमा नवप्रवर्तन (Innovation)

Section (B)

Engineering Construction and Development Management

1. Project Management

- 1.1 Project Planning: Project identification and formulation, Feasibility study, Detailed Engineering Design, Economic and Financial analysis, Evaluation of Alternatives- Present worth, Future Worth, Annual Worth, NPV, IRR, B/C Analysis, Project Appraisal, Project Approval, Project Documentation
- 1.2 Project Budget and Cost Management: Capital planning procedures, Project budget, Cost aggregation, Reserve analysis, Funding limit reconciliation, Preparation of job site administration and submittals
- 1.3 Work Breakdown Structure (WBS), Bar Chart/ Gantt chart, Network Analysis (CPM and PERT), Critical Path and Floats, Project Scheduling and Resource Management, Resource Levelling, Project Organizations, Role of Stakeholders
- 1.4 Construction Planning: Principles and Steps of Planning, Site Planning, Construction Documents, Plant and Equipment Management, Inventory Management
- 1.5 Project Monitoring, Control and Evaluation: Supervision and Monitoring, Project Control (Time, Cost and Quality), S-curve, Earned Value Analysis, Quality Circles, Quality Assurance (QA), Total Quality Management (TQM), Specifications and its importance in Quality Assurance, technical Auditing (Validation, Verification, Precisions, Accuracy and Tolerance)
- 1.6 Occupational Health and Safety: Concept of risk and Hazard, Sources and Types of Risk, Risk Analysis, Risk Response Planning, Accident at work places, Causes of Accident, Prevention of Accidents, Workplace Safety Policy and Procedures, Grievance Redress.

2. Procurement Management

- 2.1 Concept and Principles of Public Procurement, Procurement Cycles /Processes, Procurement Strategy, Procurement Planning, Contract Types (Unit Rate, Lump Sum, Cost Plus, Construction Management Contract, Design-Build, Turn Key, EPC, EPCF, Hybrid Annuity Model, Various Models of PPP like BOOT, BOT, BTO, BOO etc.), Procurement Methods (Works, Goods and Services), Contract Packaging
- 2.2 Standard Bid Documents (Works, Goods and Services), bidding Procedures, E- bidding, Bid Evaluation, Protest and Review, Contract Award
- 2.3 Procurement Guidelines of Development Partners (ADB, WB, AIIB)

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3. Contract Management

- 3.1 Contract: Essentials of Valid Contract, Conditions of Contract, FIDIC Conditions of Contract, MDB Harmonized Version, Contract Documents of Development Partners (ADB, WB)
- 3.2 Major Issues of Contract Management: Date of Contract Effectiveness, Payment, Delay and Extension of Time (EOT), Liquidated Damage and Bonus, Compensation Events, Variations, Dispute Management, Price Adjustment, Contract Termination, Take Over and Acceptance, Settlement of Project Account, Release of Retention Money and Performance Security
- 3.3 Conflict Management: Causes, Analysis and Resolution Techniques, Dispute Management (Amicable Settlement, Adjudication and Arbitration)
- 3.4 Construction Claims: Causes and Remedial Measures

4. Innovative Approaches of Development Management

- 4.1 Development Planning
 - 4.1.1 System Planning (Roads, Irrigation, Hydropower etc.)
 - 4.1.2 Sectoral Planning (Agriculture sector, Energy sector, Transport sector etc.)
 - 4.1.3 Strategic Planning (Cross Sectoral Decision Making)
- 4.2 Multi-Stakeholder Analysis
- 4.3 Peoples' Participation in Planning, Implementation and in Decision Making Process.
- 4.4 Public Accountability in Infrastructure Management (Public Audit, Public Hearing, Citizen-State Joint Monitoring)
- 4.5 Financing Infrastructure Development: Traditional Government Funding (Internal Resources Plus Development Partners' Assistance), Government and Multi-lateral Investment Agencies
- 4.6 Green Technology and Innovation, Utility Inventory, Utility Infrastructure and Service Regulation
- 4.7 Utilization of Global Climate Fund for Infrastructures in Nepal: Potentiality, necessary preparation and development methodology

Section (C)

Service/Group related- Acts, Rules and Policies

1. नेपाल इन्जिनियरिङ्ग परिषद ऐन, २०५५ र नियमावली, २०५६
2. निजामती सेवा ऐन, २०४९ र नियमावली, २०५०
3. सुदूरपश्चिम प्रदेश निजामती सेवा ऐन, २०७९
4. सार्वजनिक खरिद ऐन, २०६३ र सुदूरपश्चिम प्रदेश सार्वजनिक खरीद नियमावली, २०७८
5. सुदूरपश्चिम प्रदेश आर्थिक कार्यविधि तथा वित्तीय उत्तरदायित्व ऐन, २०७९ र नियमावली, २०८०
6. सुदूरपश्चिम प्रदेश सुशासन ऐन, २०७५
7. सूचनाको हक सम्बन्धी ऐन, २०६४
8. वातावरण संरक्षण ऐन, २०७६
9. सुदूरपश्चिम प्रदेश वातावरण संरक्षण ऐन, २०७७
10. विदेशी लगानी तथा प्रविधि हस्तान्तरण ऐन, २०७५
11. जग्गा प्राप्ति ऐन, २०३४
12. सार्वजनिक- निजी साझेदारी तथा लगानी नीति ऐन, २०७५

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13. प्रदेश विपद् जोखिम न्यूनीकरण तथा व्यवस्थापन ऐन, २०७५
14. स्थानीय सरकार सञ्चालन ऐन, २०७४
15. विकास समिति ऐन, २०१३
16. राष्ट्रिय जलवायु परिवर्तन नीति, २०७६
17. अन्तराष्ट्रिय विकास सहायता परिचालन नीति, २०७६
18. सार्वजनिक निजी साझेदारी नीति, २०७२
19. राष्ट्रिय भू-उपयोग नीति, २०७२
20. भू-उपयोग ऐन, २०७६ र भू-उपयोग नियमावली, २०७९
21. नेपाल राष्ट्रिय भवन संहिता एन.बि.सी. १०५:२०७७

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प्रदेश लोक सेवा आयोग

सुदूरपश्चिम प्रदेश

प्रदेश निजामती सेवा र स्थानीय सरकारी सेवा अन्तर्गत इन्जिनियरिङ सेवा, सिभिल समूह, स्यानिटरी उपसमूह, अधिकृत नवौं तह वा सो सरह पदको खुला, अन्तर तह र आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

द्वितीय पत्र : Technical Subject

Section (A)

1 Hydraulics and Hydrology

1.1 Hydraulics

- 1.1.1 Flow in pipes, Flow regimes, Bernoulli's equation, Darcy-Weisbach equation, Hydraulic losses in fittings and transitions in pipes, Equivalent lengths, Flow coefficients, Flow measurement in pipelines, Specific energy, Energy grade line, Hydraulic grade line, Location of critical flow points, Significance of Reynold's number and Froude number, Momentum functions, Non-uniform flow, Transitions, Lateral inflows, Lateral outflows
- 1.1.2 Open channel hydraulics (Chezy's equation, Manning's equation, Best hydraulic cross-sections, Controls in open channel flow)
- 1.1.3 Steady and unsteady flow
- 1.1.4 Water hammer, surge analysis, surge protection measures
- 1.1.5 Hydraulic jumps
- 1.1.6 Mechanics of sediment transport
- 1.1.7 Pressure equations

1.2 Hydrology

- 1.2.1 Elements of hydrologic cycle (Evaporation, Transpiration, Evapotranspiration, Condensation)
- 1.2.2 Measurement of precipitation and snow, Effective depth of precipitation, Events during precipitation, Surface runoff and infiltration
- 1.2.3 Stream hydrograph (base flow recessions, Storm hydrograph, Gaining and losing streams), Rainfall-Runoff relationship, Flow duration curve and Measurement of stream flow
- 1.2.4 Occurrence and types of surface and ground water
- 1.2.5 Surface and ground water movement
- 1.2.6 Flooding and inundation
- 1.2.7 Estimation of drainage discharge and design
- 1.2.8 River and bank protection design
- 1.2.9 Ground water recharge

Section (B)

2 Water Supply

2.1 Drinking Water

- 2.1.1 General overview of water resources in Nepal
- 2.1.2 Present status of water supply and sanitation in Nepal
- 2.1.3 Current issues and challenges of water supply in rural and urban area
- 2.1.4 Sources and watershed management
- 2.1.5 Design principles and guidelines of water supply system
- 2.1.6 Pipe, fittings and appurtenance
- 2.1.7 Principles related to unit operations and processes: Aeration; Flocculation and coagulation; Sedimentation process (Type I, II, III & IV); Filtration Process: Slow sand filtration/Rapid filtration/Pressure filtration/ Ultra filtration/ Reverse osmosis, Disinfection process; Sludge handling and disposal; Sludge stream - Solid-liquid separation

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2.2 Design and Treatment

2.2.1 Water Supply System

- 2.2.1.1 Pollutants (sources, types and effects), water demand and quantity, estimation of future population, design period
- 2.2.1.2 Design of intake structures for rural and urban water supply system (dams, weirs with essential components, impounding reservoirs, infiltration galleries, infiltration fields, sump wells, spring intakes and tower intake)
- 2.2.1.3 Safety of intakes against sliding, overturning and overtopping
- 2.2.1.4 Design of rain water collection for domestic use and harvesting for other purposes including ground water recharge
- 2.2.1.5 Pipeline design: design criteria, design of transmission and distribution system, network analysis, District Metering Area (DMA) - closed and dead-end systems
- 2.2.1.6 Reservoirs: types, size determination, design and management of multiple reservoir systems (hydraulic and operational control)
- 2.2.1.7 Instrumentation, control and automation (SCADA, PLC, IOT)
- 2.2.1.8 Design considerations for climate resilient water supply system
- 2.2.1.9 Design of pumping water supply system, selection of pumps and pump capacity
- 2.2.1.10 Design of surge protection

2.2.2 Drinking Water Treatment Facility

- 2.2.2.1 Design of pre-treatment facility: Intake, Bar Screen, Grit Chamber etc.
- 2.2.2.2 Design of treatment facilities: Sedimentation, Coagulation, Flocculation, Softening, Filtration systems (slow, rapid and pressure), Neutralization and Disinfection
- 2.2.2.3 Advanced treatment: Absorption by activated carbon, ion exchange, multimedia filtration, ultra-filtration, reverse osmosis, Straw, Disc & Nano filtrations, ozonation, ultra violet disinfection, demineralization/remineralization, new development in water treatment operation like compact modules

2.3 Management and Other related aspects

- 2.3.1 Estimation and management of Non-Revenue Water (NRW), Water balance model development, Active leak detection mechanism, Pressure management
- 2.3.2 Business plan of a water system: Operation and maintenance including preparation of manual, legal and management aspects, institutional development
- 2.3.3 Tariff structure, tariff rates and affordability, System cost recovery, Life cycle costing (CapEx, OpEx, CapManEx, Direct Support and CapEmEx)
- 2.3.4 Vulnerability Risk Assessment (VRA)
- 2.3.5 Benchmarking of water services and utility
- 2.3.6 Education and training

2.4 Ground Water Development

2.4.1 Ground Water Flow

- 2.4.1.1 Aquifer types and properties (Porosity, Specific yield, Hydraulic conductivity, Permeability, Water-Table and Potentiometric Surface maps, Gradient of potentiometric surface)

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- 2.4.1.2 Ground water occurrences, Principles of ground water flow, Equations of ground water flow (Confined & Unconfined), Estimating aquifer transmissivity and specific capacity, Aquifer test designs, Chemical characteristics and properties of ground water
- 2.4.1.3 Geophysical Investigations (Electrical Resistivity, Electromagnetic Conductivity, Seismic Methods, Ground- Penetrating Radar and Magnetometer Surveys, Gravity and Aeromagnetic Methods)
- 2.4.1.4 Ground water exploration and methods of ground water withdrawal.
- 2.4.2 Design of Deep Tube well
 - 2.4.2.1 Tube well design
 - 2.4.2.2 Drilling methods for tube well
 - 2.4.2.3 Well logging
 - 2.4.2.4 Pumping test, pump design and selection
 - 2.4.2.5 Well development
 - 2.4.2.6 Well sealing
- 2.4.3 Ground Water Quality
 - 2.4.3.1 Groundwater contamination (Septic tanks and Cesspools, Landfills, Chemical spills and leaking underground tanks, mining)
 - 2.4.3.2 Ground water treatment (aerator, iron removal plant, lime removal) requirement based on ground water quality
 - 2.4.3.3 Disinfecting wells and piping
 - 2.4.3.4 Maintaining well yield
 - 2.4.3.5 Sanitary protection for ground water supplies
 - 2.4.3.6 Conservation and utility of ground water
- 2.5 Water Quality Issues
 - 2.5.1 Introduction Water resources and ecosystem, water cycle, fresh water and competitive use of water
 - 2.5.2 Water pollution: Types and sources of water pollution, point and non-point pollution sources, effects of pollution (river, lake and reservoir)
 - 2.5.3 Water quality and standards for various uses of water
 - 2.5.4 Testing methods and procedures for water quality parameters
 - 2.5.5 National drinking water quality standard
 - 2.5.6 Environmental quality modeling and management of water bodies

Section (C)

3 Wastewater

- 3.1 Wastewater Quality Issues
 - 3.1.1 Sources and nature of municipal and industrial wastewater, effluent quality and standards and impact on aquatic environment, effluent and stream standards
 - 3.1.2 Management: Strategies for water pollution control, water quality monitoring and surveillance
- 3.2 Principles and Design of Wastewater Treatment
 - 3.2.1 Municipal Wastewater
 - 3.2.1.1 Sources and nature of wastewater, wastewater characteristics

प्रदेश लोक सेवा आयोग

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- 3.2.1.2 Estimation of quantity of sanitary sewage and storm water sewage collection systems, sewers design criteria
- 3.2.1.3 Design of sanitary, storm water and combined sewer systems
- 3.2.1.4 Sewer Appurtenances: Manholes/drop manholes/cascades, Gas vents, Intermediate holding tanks, Inverted siphons, House connections, Storm water inlets
- 3.2.1.5 Design of primary treatment: Bar screen, grit chamber
- 3.2.1.6 Physical treatment: Screen/ Grit chamber/ Equalization/ Floatation/ Mixing/ Sedimentation/ Flocculation
- 3.2.1.7 Chemical Treatment: Neutralization, Chemical precipitation, Absorption, Ion exchange, Electrolysis, Disinfection
- 3.2.1.8 Biological Treatment: Aerobic and Anaerobic Process- Aerated lagoons, Activated sludge process, Moving Bed Biological Reactor (MBBR), Oxidation ditches, Community septic tanks, Anaerobic tanks, Facultative ponds, Maturation ponds, Sludge digestion, Sludge drying, Composting, Constructed wetland (planted treatment system for nutrient removal), Land application methods
- 3.2.1.9 Process, control and operational issues in activated sludge system (Sludge recycling, F:M ratio, Sludge bulking, Foaming in the treatment plant, Flow measurement facilities etc.)
- 3.2.1.10 Sludge treatment: Drying, Dewatering, Filtration, Centrifugation, Aerobic and anaerobic digestion, Chemical conditioning (immobilization), composting and incineration
- 3.2.1.11 Reuse and recycle of wastewater
- 3.2.2 Industrial Wastewater
 - 3.2.2.1 Introduction to nature and origin of industrial wastewater and their impacts on aquatic environment, flow characteristic, effluent and stream standards, wastewater treatment processes
 - 3.2.2.2 Pre and primary treatment: Equalization, neutralization, sedimentation, oil and grease separation, filtration, Heavy metal recovery processes
 - 3.2.2.3 Wastewater treatment techniques: Coagulation and precipitation, biological treatment (conventional activated sludge, Extended aeration process, MBBR, UASB), Absorption/ adsorption, Ion exchange, Precipitation, Chemical Oxidation Reduction
 - 3.2.2.4 Tertiary treatment for major polluting industries (tannery, textile, pulp and paper, sugar etc.)
 - 3.2.2.5 Sludge treatment, handling and disposal
 - 3.2.2.6 Industrial wastewater characteristics
 - 3.2.2.7 Concept of central effluent treatment plant advantages and disadvantages
 - 3.2.2.8 Design criteria for industrial wastewater system
- 3.3 Management and Other related aspects
 - 3.3.1 Waste water management, Fecal sludge management and sanitation service chain
 - 3.3.2 Tariff setting criteria and regulation of tariff
 - 3.3.3 Function of WASH planning
 - 3.3.4 Sewage pumping

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3.3.5 Legal and management aspects

3.3.6 Education and training

3.3.7 Operation and maintenance

3.3.8 Financial aspects: Tariff structure, tariff rates and affordability, system cost recovery

Section (D)

4 Solid Waste Management

4.1 Nature and Types Solid Waste

4.1.1 Solid waste management

4.1.2 Types of solid waste: Organic and inorganic, Recyclable and non- recyclable, inert waste, metals and glass, leather and cloths

4.1.3 Characteristics of solid waste: Weight, volume, specific weight, calorific value, moisture content

4.2 Solid Waste Collection and Treatment

4.2.1 Segregation of waste at source and storage

4.2.2 Collection and transportation

4.2.3 Material recovery facility

4.2.4 Treatment of waste

4.2.4.1 Organic: Composting (aerobic and anaerobic design), Waste to energy (biogas production and its design with wet and dry scrubbers for gas purification, reuse of the sludge), Manufacturing of RDF, Safe incineration without emission of Dioxin and Furans, Pyrolysis and production of Methanol, biochar

4.2.4.2 Inorganic: Recover and sell, Reuse, Repurpose, Recycle, Reduction (in volume through incineration with wet and dry scrubbers), Buy- Back Centers for plastics, metals, glass, leather, cloths

4.2.4.3 Final disposal: Sanitary landfill site (site selection, design of SLF, leachate treatment, gas venting/burning, O&M of SLF, environmental mitigation at SLF, grievance redress mechanism)

Section (E)

5 Regulatory and Environmental Framework

5.1 Regulation of Water Bodies and Systems

5.1.1 Quality of water in the natural water bodies

5.1.2 Effluent discharge into natural water bodies

5.1.3 Captive treatment plants, pre-treatment

5.1.4 Regulation of water (tanker, jar, bottle, piped systems) distribution

5.1.5 Quantity, quality, continuity, reliability regulation of water systems and the utility operators

5.1.6 Service level standards of water supply systems

5.1.7 Project bank

5.1.8 Survey, data acquisition and compilation (N-WASH, Open source platform tools for data collection, WASH facility assessment tool, GLASS, MICS)

5.1.9 WASH in emergency- Preparedness & contingency planning, MIRA, PDNA, SPHERE minimum standard, mitigation & adaptation to disasters, Disaster Risk Management (DRM), WASH response, recovery and reconstruction

प्रदेश लोक सेवा आयोग

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5.2 Environmental Health and Sanitation

5.2.1 Introduction: Fundamentals of epidemiology, infectious and non-infectious diseases, infectious disease transmission routes, organic and inorganic contaminants and health and water quality

5.2.2 Human excreta and its characteristics, pollution caused by excreta, health aspects of water supply and sanitation

5.2.3 Pathogens: Excreted bacteria, helminthes and their control, diseases transmitted by arthropod vectors (mosquito, flies, cockroaches, bugs, lice)

5.2.4 Excreta treatment and disposal: Options, On site sanitation system (septic tank), Off site sanitation (Septage/ Fecal Sludge collection, FSTP, lagoon, waste stabilization ponds, anaerobic digestion)

5.2.5 Engineering and infectious diseases: Water related, excreta related, refuse related, housing related, diseases; reuse of wastes, watershed reservoir sanitation; engineering control of infectious disease

5.2.6 Climate change and its impact in WASH

5.3 Environmental and Social Assessment

5.3.1 Environmental screening

5.3.2 Concept of environmental assessment, impact identification and prediction (AHP and RPCT tools)

5.3.3 Brief Environmental Study (BES)

5.3.4 Initial Environmental Examination (IEE)

5.3.5 Environmental Impact Assessment (EIA), role of EIA, types of environmental impacts and EIA principles

5.3.6 Environmental management plan and its implementation, mitigation and monitoring

Section (F)

6 Service/Group/Sub-group related- Specific (Acts, Rules and Policies)

6.1 नेपाल खानेपानी संस्थान ऐन, २०४६

6.2 जलश्रोत ऐन र नियमावली

6.3 खानेपानी व्यवस्थापन बोर्ड ऐन, २०६३

6.4 खानेपानी तथा सरसफाई ऐन, २०८०

6.5 उपभोक्ता हित संरक्षण ऐन, २०७५

6.6 आवश्यक सेवा सञ्चालन ऐन, २०१४

6.7 राष्ट्रिय खानेपानी, सरसफाई तथा स्वच्छता नीति, २०८०

6.8 राष्ट्रिय खानेपानी गुणस्तर कार्यान्वयन तथा अनुगमन निर्देशिका, २०७९

6.9 राष्ट्रिय खानेपानी गुणस्तर मापदण्ड, २०७९

6.10 खानेपानी तथा सरसफाई सम्बन्धी दीर्घकालिन अवधारणा

नोट:- यस पत्रमा माथि उल्लेखित पाठ्यक्रमको खण्ड (Section F) बाहेक प्रत्येक खण्ड (Section) बाट कम्तिमा एक प्रश्न समावेश हुने गरी लिखित परीक्षामा परीक्षा योजना (Examination Scheme) मा उल्लेख भए बमोजिमको संख्या र अंकभारका प्रश्नहरू सोधिने छ । तर खण्ड (Section F) बाट ५ अंकभारको छोटो उत्तर आउने एक प्रश्न र १० अंकभारको लामो उत्तर आउने एक प्रश्न गरी दुई प्रश्नहरू सोधिने छ ।