

प्रदेश लोक सेवा आयोग

लुम्बिनी प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत इञ्जिनियरिङ्ग सेवा, सिभिल समूह, विल्डिङ्ग एण्ड आर्किटेक्ट उप-समूह पाँचौ तह सब इञ्जिनियर पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

पाठ्यक्रमको रूपरेखा:— यस पाठ्यक्रम योजनालाई तीन चरणमा विभाजन गरिएको छ ।

प्रथम चरण:- लिखित परीक्षा

पूर्णाङ्क:- १००

द्वितीय चरण:- लिखित परीक्षा

पूर्णाङ्क:- १००

अन्तिम चरण:- अन्तर्वार्ता

पूर्णाङ्क:- ३०

लिखित परीक्षा योजना (Written Examination)

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली		प्रश्न संख्या ^x अङ्कभार	समय
प्रथम चरण							
प्रथम	सामान्यज्ञान र सार्वजनिक व्यवस्थापन (General Awareness & Public Management)	१००	४०	वस्तुगत (Objective)	बहुवैकल्पिक (MCQs)	२० प्रश्न ^x २ अङ्क = ४०	४५ मिनेट
	सेवा सम्बन्धी कार्य ज्ञान (Job Based-Knowledge)					३० प्रश्न ^x २ अङ्क = ६०	
द्वितीय चरण							
द्वितीय	सेवा सम्बन्धी कार्य ज्ञान (Job Based-Knowledge)	१००	४०	विषयगत (Subjective)	छोटो उत्तर (Short Answer) लामो उत्तर (Long Answer)	१२ प्रश्न ^x ५ अङ्क = ६० ४ प्रश्न ^x १० अङ्क = ४०	२ घण्टा १५ मिनेट

अन्तिम चरण:-

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक अन्तर्वार्ता (Oral Interview)

द्रष्टव्य:-

- यो पाठ्यक्रम योजनालाई प्रथम चरण र द्वितीय चरण गरी दुई चरणमा विभाजन गरिएको छ ।
- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।
- लिखित परीक्षामा यथासम्भव निम्नानुसार प्रश्नहरू सोधिनेछ ।

प्रथम पत्रका एकाइ	१	२	३	४	५	६	७	८	९	१०	११	१२	१३	
प्रश्न संख्या	१०	१०	२	३	३	३	३	२	३	२	३	३	३	
द्वितीय पत्रका एकाइ	१	२	३	४	५	६	७	८	९	१०	११			
द्वितीय पत्रका खण्ड	खण्ड क						खण्ड ख							
प्रश्न संख्या	६ प्रश्न x ५ अङ्क = ३० अङ्क र २ प्रश्न x १० अङ्क = २० अङ्क						६ प्रश्न x ५ अङ्क = ३० अङ्क र २ प्रश्न x १० अङ्क = २० अङ्क							

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४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
५. प्रथम पत्र र द्वितीय पत्रको लिखित परीक्षा छुट्टा छुट्टै हुनेछ ।
६. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरू परीक्षाको विज्ञापन हुदाँका वखत (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
७. बहुवैकल्पिक प्रश्नहरू हुने परीक्षामा कुनै प्रकारको मेमोरीयुक्त बिद्युतीय उपकरणहरू जस्तै: क्याल्कुलेटर मोबाइल फोन, स्मार्ट घडी लगायतका कुनै पनि वस्तुहरू प्रयोग गर्न पाइने छैन ।
८. विषयगत प्रश्नहरूको हकमा तोकिएको अंकको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुईभन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरू (Short notes) सोध्न सकिनेछ ।
९. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्क भार यथासम्भव सम्बन्धित पत्र/विषयमा दिइए अनुसार हुनेछ ।
१०. विषयगत प्रश्न हुने पत्र/विषयका प्रत्येक खण्डका लागि छुट्टा-छुट्टै उत्तरपुस्तिकाहरू हुनेछन् । परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरूको उत्तर सोही खण्डको उत्तरपुस्तिकामा लेख्नु पर्नेछ ।
११. प्रथम चरणको लिखित परीक्षामा न्युनतम उत्तीर्णाङ्क प्राप्त गरेका उम्मेदवारहरूलाई मात्र द्वितीय चरणको लिखित परीक्षामा सम्मिलित गराइनेछ ।
१२. प्रथम चरणको लिखित परीक्षामा प्राप्त गरेको प्रासाङ्क र द्वितीय चरणको लिखित परीक्षामा न्युनतम उत्तीर्णाङ्क प्राप्त गर्ने उम्मेदवारहरूले प्राप्त गरेको प्रासाङ्क जोडी प्राप्त हुने कूल प्रासाङ्कको योग्यताका आधारमा बर्णानुक्रम अनुसार लिखित परीक्षाको नतिजा प्रकाशन गरिनेछ ।
१३. लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र अन्तर्वार्तामा सम्मिलित गराइनेछ ।
१४. प्रथम तथा द्वितीय चरणको लिखित परीक्षाको प्रासाङ्क र अन्तर्वार्ताको प्रासाङ्कको कुल अङ्कको योगका आधारमा योग्यताक्रम निर्धारण गरी माथिल्लो योग्यताक्रमका आधारमा अन्तिम नतिजा प्रकाशित गरिनेछ ।
१५. यसभन्दा अगाडि लागु भएको माथी उल्लेखित सेवा समूह/उपसमूहको पाठ्यक्रम खारेज गरिएको छ ।
१६. पाठ्यक्रम लागू मिति:— २०८१।०९।२४

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प्रथम पत्र (Paper I):

सामान्य ज्ञान र सार्वजनिक व्यवस्थापन तथा सेवा सम्बन्धी कार्य-ज्ञान

खण्ड क (Section A)

सामान्य ज्ञान र सार्वजनिक व्यवस्थापन

(General Awareness & Public Management)

(२० प्रश्न * २ अङ्क = ४० अङ्क)

1. सामान्य ज्ञान (General Awareness) (१० प्रश्न * २ अङ्क = २० अङ्क)

- 1.1. नेपालको भौगोलिक अवस्था, प्राकृतिक स्रोत र साधनहरू
- 1.2. नेपालको ऐतिहासिक, सांस्कृतिक र सामाजिक अवस्था सम्बन्धी जानकारी
- 1.3. लुम्बिनी प्रदेशको भौगोलिक, ऐतिहासिक, सांस्कृतिक र सामाजिक अवस्था सम्बन्धी जानकारी
- 1.4. नेपालको आर्थिक अवस्था र चालु आवधिक योजना सम्बन्धी जानकारी
- 1.5. लुम्बिनी प्रदेशको आर्थिक अवस्था र चालु आवधिक योजना सम्बन्धी जानकारी
- 1.6. जैविक विविधता, दिगो विकास, वातावरण प्रदुषण, जलवायु परिवर्तन र जनसंख्या व्यवस्थापन
- 1.7. जनस्वास्थ्य, रोग, खाद्य र पोषण सम्बन्धी सामान्य जानकारी
- 1.8. नेपालको संविधान (भाग १ देखि ५ सम्म र अनुसूचीहरू)
- 1.9. संयुक्त राष्ट्रसंघ र यसका विशिष्टीकृत संस्था सम्बन्धी जानकारी
- 1.10. क्षेत्रीय संगठन (सार्क, बिमस्टेक, आसियान र युरोपियन संघ) सम्बन्धी जानकारी
- 1.11. राष्ट्रिय र अन्तर्राष्ट्रिय महत्वका समसामयिक गतिविधिहरू

2. सार्वजनिक व्यवस्थापन (Public Management) (१० प्रश्न * २ अङ्क = २० अङ्क)

- 2.1. कार्यालय व्यवस्थापन (Office Management)
 - 2.1.1. कार्यालय: (Office) परिचय, महत्व, कार्य र प्रकार
 - 2.1.2. सहायक कर्मचारीका कार्य र गुणहरू
 - 2.1.3. कार्यालय स्रोत साधन (Office Resources): परिचय र प्रकार
 - 2.1.4. कार्यालयमा सञ्चारको महत्व, किसिम र साधन
 - 2.1.5. कार्यालय कार्यविधि (Office Procedure): पत्र व्यवहार (Correspondence), दर्ता र चलानी (Registration & Dispatch), परिपत्र (Circular), तोक आदेश (Order), टिप्पणी लेखन र टिप्पणी तयार गर्दा ध्यान दिनुपर्ने कुराहरू
 - 2.1.6. अभिलेख व्यवस्थापन (Record Management)
- 2.2. निजामती सेवा ऐन, २०४९ र नियमावली, २०५० तथा प्रदेश निजामती सेवा ऐन, २०८० र नियमावली, २०८० मा रहेका देहायका व्यवस्थाहरू
 - 2.2.1. निजामती सेवा, प्रदेश निजामती सेवा र स्थानीय सरकारी सेवाको गठन, संगठन संरचना, पदपूर्ति गर्ने तरिका र प्रक्रियाहरू
 - 2.2.2. कर्मचारीको नियुक्ति, सरुवा, बढुवा, बिदा, विभागीय सजाय अवकाश र सुविधा
 - 2.2.3. कर्मचारीले पालन गर्नुपर्ने आचरण र कर्तव्यहरू
- 2.3. सरकारी बजेट, लेखा र लेखापरीक्षण प्रणाली सम्बन्धी सामान्य जानकारी
- 2.4. सार्वजनिक सेवा प्रवाहको अर्थ, सेवा प्रवाह गर्ने निकाय, तरिका र माध्यमहरू
- 2.5. मानव अधिकार, सुशासन र सूचनाको हक सम्बन्धी सामान्य जानकारी
- 2.6. सार्वजनिक बडापत्र (Public/citizen Charter) महत्त्व र आवश्यकता

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- 2.7. व्यवस्थापनको अवधारणा तथा सार्वजनिक व्यवस्थापनमा नेतृत्व, निर्देशन, समन्वय, निर्णय प्रक्रिया, उत्प्रेरणा र नियन्त्रण सम्बन्धी जानकारी
- 2.8. मानवीय मूल्य मान्यता (Human Values), नागरिक कर्तव्य र दायित्व तथा अनुशासन
- 2.9. सार्वजनिक खरिद ऐन, २०६३ (परिच्छेद २)
- 2.10. स्थानीय सरकार सञ्चालन ऐन, २०७४
- 2.11. भ्रष्टाचार निवारण ऐन, २०५९ (परिच्छेद २: भ्रष्टाचारको कसुर र सजाय सम्बन्धी व्यवस्था)
- 2.12. वातावरण संरक्षण ऐन, २०७७
- 2.13. सार्वजनिक खरिद सम्बन्धी प्रदेश नियमावली, २०७६ (लुम्बिनी प्रदेश)
- 2.14. लुम्बिनी प्रदेश सरकार (कार्य विभाजन) नियमावली

खण्ड ख (Section B)

सेवा सम्बन्धी कार्य ज्ञान

(Job Based-Knowledge)

(३० प्रश्न × २ अङ्क = ६० अङ्क)

3. Surveying

3.1. General

- 3.1.1. Primary divisions of survey
- 3.1.2. Classification based on instruments and methods
- 3.1.3. Basic principle of surveying
- 3.1.4. Scales, plans and maps
- 3.1.5. System of field booking of surveying and levelling data
- 3.1.6. Theodolite survey
- 3.1.7. Total station survey

3.2. Levelling

- 3.2.1. Classification of levelling work
- 3.2.2. Methods of leveling
- 3.2.3. Levelling instruments and accessories
- 3.2.4. Principles of levelling
- 3.2.5. Temporary and permanent adjustments of a level
- 3.2.6. Profile leveling
- 3.2.7. Booking and reducing levels

3.3. Errors and their effects

- 3.3.1. Kinds of errors
- 3.3.2. Source of errors in chaining, levelling, plane tabling and compass surveying
- 3.3.3. Effects of errors
- 3.3.4. Precision and accuracy

3.4. Plane Tabling

- 3.4.1. Equipment's used
- 3.4.2. Working operations
- 3.4.3. Methods of plane tabling
- 3.4.4. Merits and demerits of plane tabling

3.5. Contouring

- 3.5.1. Definitions of terms

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3.5.2. Properties of contour

3.5.3. Use of contour maps

3.6. Setting out

3.6.1. Small buildings

3.6.2. Simple curves

3.6.3. Locating the boundaries of farm lands

4. Drawing

4.1. General

4.1.1. Importance, aims and objectives of drawing

4.1.2. Drawing equipments

4.1.3. Architectural discipline

4.1.4. Standard drawing sheets sizes

4.1.5. Drafting techniques and methods in common practice

4.1.6. Scales: Choice, use and conversion

4.2. Measured Drawing

4.2.1. Methods of measurement of horizontal and vertical dimensions

4.2.2. Sectional measurements

4.2.3. Dimensioning of sketches

4.2.4. Checking for missing details in field

4.3. Working Drawing

4.3.1. Role of working drawing

4.3.2. Interrelationship with estimate and specification

4.3.3. Construction detailing in plan and section

4.3.4. Significance of detailing in terms of accuracy of estimation, bill of quantities and construction supervision

4.3.5. Working drawing for private and public buildings, sanitary installation electrification

4.3.6. Structural working drawings

5. Estimating and Costing

5.1. General

5.1.1. Purpose of estimating

5.1.2. Main items of work

5.1.3. Units of measurement and payment of various items of work and materials

5.1.4. Degree of accuracy

5.1.5. Standard estimate formats of Government of Nepal

5.1.6. Data for estimate

5.1.7. Preliminary estimate

5.1.8. Approximate quantity estimate

5.1.9. Detailed estimate

5.1.10. Revised estimate

5.2. Rate Analysis

5.2.1. Manufactures' cost

5.2.2. Transportation cost

5.2.3. Overheads

5.2.4. Need for contingencies

5.2.5. Use of Government Rate Analysis Norms

5.3. Specifications

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लुम्बिनी प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत इञ्जिनियरिङ्ग सेवा, सिभिल समूह, बिल्डिङ्ग एण्ड आर्किटेक्ट उप-समूह पाँचौं तह सव इञ्जिनियर पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

- 5.3.1. Purpose
- 5.3.2. Types
- 5.3.3. Necessity
- 5.3.4. Interpretation of Specifications
- 5.4. Estimating
 - 5.4.1. Earthwork
 - 5.4.2. Estimate of different components building
 - 5.4.3. Estimate of sanitary installations
 - 5.4.4. Estimate of electrical wiring and sanitary works
 - 5.4.5. Annual maintenance
 - 5.4.6. Basic knowledge of Public Procurement
- 5.5. Valuation
 - 5.5.1. Purpose of valuation
 - 5.5.2. Methods of valuation
 - 5.5.3. Standard formats used for property valuation in Nepal
- 6. Management**
 - 6.1. Organization
 - 6.1.1. Need for Organization
 - 6.1.2. Building agencies
 - 6.1.3. Structure of the Provincial Ministry of Urban Development and Building construction
 - 6.1.4. Responsibilities of a building sub- engineer
 - 6.1.5. Relation between owner, contractor and consultants
 - 6.2. Accounts
 - 6.2.1. Familiarity with related Nepalese accounting system
 - 6.2.2. Administrative approval and technical sanction
 - 6.3. Planning and Control
 - 6.3.1. List of activities
 - 6.3.2. Construction schedule
 - 6.3.3. Equipment and materials schedule
 - 6.3.4. Construction stages and operations
 - 6.3.5. Bar Chart,
 - 6.4. Municipal Building By – laws
 - 6.4.1. Sheet sizes
 - 6.4.2. Scales
 - 6.4.3. Setback
 - 6.4.4. Height Controls
 - 6.4.5. Other requirements specified by the Municipalities
 - 6.4.6. Floor Area Ratio (FAR)
- 7. Building Service**
 - 7.1. Water Supply
 - 7.1.1. General Principle of water supply
 - 7.1.2. Water requirement standard for different buildings
 - 7.1.3. Storage and distribution of water
 - 7.1.4. Heating of water, storage and distribution requirements
 - 7.2. Disposal system
 - 7.2.1. Septic tank, soak pit, vent and manhole
 - 7.2.2. Pipes for different sewage

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7.2.3. Incinerators

1.1 Electricity

7.2.4. General principles of electrical installation and distribution

7.2.5. Wiring systems in private and public building

7.2.6. Ducts for electrical distribution

7.2.7. Safety precautions

7.3. Lighting

7.3.1. General principles of lighting

7.3.2. Illumination requirements and standards

7.3.3. Combination of artificial and natural light

7.3.4. Lighting fixtures

8. Construction Materials

8.1. Stone

8.1.1. Rocks and their characteristics

8.1.2. Formation and availability of stones in Nepal

8.1.3. Quarrying excavation, Wedging and blasting

8.1.4. Methods of laying and construction with various stones

8.2. Aggregates

8.2.1. Fine aggregates

8.2.2. Coarse aggregates

8.2.3. Availability and practice in Nepal

8.3. Cement

8.3.1. Ingredients, properties and manufacture of cement

8.3.2. Types of cement

8.3.3. Storage and transport

8.3.4. Admixtures

8.4. Metals and Alloys.

8.4.1. Wrought iron: Properties, use

8.4.2. Steel: - composition, properties, appearance, strength, constructional forms and manufacture

8.4.3. Corrosion and its prevention

8.4.4. Brass: uses

8.5. Brick

8.5.1. Type

8.5.2. Manufacture

8.5.3. Laying

8.5.4. Availability and practice in Nepal

8.6. Lime

8.6.1. Manufacture

8.6.2. Types and properties

8.6.3. Uses

8.7. Paints and Varnishes

8.7.1. Type and selection

8.7.2. Preparation techniques

8.7.3. Uses

8.8. Floor Finishes

8.8.1. Punning

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- 8.8.2. Tiles: mosaic, clay, concrete, vinyl
- 8.8.3. Marble and flagstones
- 8.8.4. Wooden boarding and parqueting
- 8.9. Wall Finishes
 - 8.9.1. Plasters: cement, lime, mud
 - 8.9.2. Punning: cement, lime
 - 8.9.3. Cladding: wood, stone, tiles
- 8.10. Roofing Materials
 - 8.10.1. Clay tiles, ceramic tiles and slate
 - 8.10.2. CGI and UPVC
- 8.11. Miscellaneous Materials
 - 8.11.1. Glass
 - 8.11.2. Plastics
 - 8.11.3. Asphalt and Bitumen
 - 8.11.4. Surkhi
- 9. Structural Design**
 - 9.1. Timber Structures
 - 9.1.1. Allowable stresses
 - 9.1.2. Design of compression members
 - 9.1.3. Design of solid rectangular beams,
 - 9.1.4. Types of joints and their connections
 - 9.2. Steel Structures
 - 9.2.1. Design of simple steel beams
 - 9.2.2. Rivetted and welded connections: types, uses and detailing
 - 9.2.3. Detailing of simple roof trusses
 - 9.2.4. Detailing of rolled steel beams
 - 9.2.5. Detailing of column bases
 - 9.3. R.C. Sections in Bending
 - 9.3.1. Basis assumptions
 - 9.3.2. Position of neutral axis
 - 9.3.3. Moment of resistance
 - 9.3.4. Under reinforced, over reinforced and balanced sections
 - 9.3.5. Analysis of singly and doubly reinforced rectangular sections
 - 9.3.6. Analysis of singly reinforced flanged sections
 - 9.4. Shear and Bond for Reinforced Concrete (RC) Sections
 - 9.4.1. Behavior of R.C. section in shear
 - 9.4.2. Shear resistance of R. C. section
 - 9.4.3. Types of shear reinforcement and their design
 - 9.4.4. Local and anchorage bond
 - 9.4.5. Determination of anchorage length
 - 9.4.6. Bar curtailment
 - 9.5. Axially Loaded R.C. columns
 - 9.5.1. Short and long columns
 - 9.5.2. Design of a rectangular column section
 - 9.5.3. Reinforcement detailing
 - 9.6. Design and Detailing of R.C Structures
 - 9.6.1. IS code requirements

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- 9.6.2. Methods of design
- 9.6.3. Singly reinforced T and L. beams,
- 9.6.4. Simple one-way and two-way slabs.
- 9.6.5. Simple pad footings for columns
- 9.6.6. Preparation of bar bending for RC design
- 9.7. Earthquake Resistant Design of Non-engineered Structures
 - 9.7.1. History of Earthquake in Nepal and damages
 - 9.7.2. Weakness of existing building
 - 9.7.3. Site consideration
 - 9.7.4. Building form, shape and size
 - 9.7.5. Size and location of openings
 - 9.7.6. Selection of materials
 - 9.7.7. Construction technology
 - 9.7.8. Seismic resistant components: through stone, vertical and horizontal reinforcement, diaphragm, boxing of building, lateral restrainers, unsupported length of wall, corner and junction of wall/connection of building components

10. Building Construction Technology

- 10.1. Foundations
 - 10.1.1. Function and necessity
 - 10.1.2. Subsoil exploration: test pit
 - 10.1.3. Safe bearing capacity of soils and its improvement
 - 10.1.4. Type and suitability of different foundations: shallow, deep (pile and well)
 - 10.1.5. Methods of excavating
 - 10.1.6. Shoring and dewatering
 - 10.1.7. Elements of simple spread foundation
 - 10.1.8. Stone masonry foundations
 - 10.1.9. Raft foundation
 - 10.1.10. Combined footing foundation
- 10.2. Walls
 - 10.2.1. Types of walls: solid wall, partition wall, cavity wall, curtain wall
 - 10.2.2. Features and their functions
 - 10.2.3. Types of stone masonry: rubble, hammer dressed and ashlar masonry
 - 10.2.4. Brick Masonry: English, Flemish, garden rat trap, monk
 - 10.2.5. Types of concrete blocks
 - 10.2.6. Choosing wall thickness, height to length relation
 - 10.2.7. Use of scaffolding
 - 10.2.8. Procedure of constructing various masonry walls
- 10.3. Damp Proofing
 - 10.3.1. Source of dampness
 - 10.3.2. Remedial measures to prevent dampness
 - 10.3.3. Vertical and horizontal damp proofing
 - 10.3.4. Damp proofing materials
- 10.4. Concrete Technology
 - 10.4.1. Constituents, mixing and use of lime concrete
 - 10.4.2. Constituents of cement concrete
 - 10.4.3. Grading of aggregates
 - 10.4.4. Concrete mixes

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- 10.4.5. Water cement ratio
- 10.4.6. Workability
- 10.4.7. Concrete laying
- 10.4.8. Factors affecting strength of concrete
- 10.4.9. Form work
- 10.4.10. Vibrators
- 10.4.11. Curing
- 10.4.12. General introduction to Precast RC units
- 10.4.13. Hydration and segregation
- 10.5. Wood Work
 - 10.5.1. Frame and shutters of doors and windows
 - 10.5.2. Timber construction of upper floors
 - 10.5.3. Design and construction of stairs
 - 10.5.4. Double timber roofs
 - 10.5.5. False ceiling
 - 10.5.6. Sky-light elements, functions and construction details
- 10.6. Steel Work
 - 10.6.1. Steel work in windows: Standards, elements and functions
 - 10.6.2. Tubular and angle steel roofs
 - 10.6.3. Iron grill and lattice work

Architecture - Maintenance of building

11. Building Design

- 11.1. Analysis of Building Elements
 - 11.1.1. Bed
 - 11.1.2. Kitchen/Dining
 - 11.1.3. Living Hall
 - 11.1.4. Class Room
 - 11.1.5. Working Office Space
 - 11.1.6. Library
- 11.2. Design Consideration
 - 11.2.1. Specific program: space requirements
 - 11.2.2. Site: topography, orientation, environment
 - 11.2.3. Functional relationship between activities
 - 11.2.4. Culture: tradition, values, taste
 - 11.2.5. Economics: efficient use of space and materials
 - 11.2.6. Availability to technology and material
 - 11.2.7. Structure type and efficiency
 - 11.2.8. Optimum use of natural light and ventilation
 - 11.2.9. Aesthetics
 - 11.2.10. Building Bye Laws
- 11.3. Climatology
 - 11.3.1. Climate: sun, wind, rain, humidity
 - 11.3.2. Orientation of the building with respect to the sun and wind: best optimum, bad
 - 11.3.3. Determination of length of roof projection to act as sunshade

12. Architectural Modelling

- 12.1. Modelling Materials and Practices

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- 12.1.1. Use of models
- 12.1.2. Choice of materials
- 12.1.3. Modelling techniques
- 12.1.4. Accuracy of models
- 12.1.5. Determination of degree of detailing
- 12.1.6. Model construction of multi-storey buildings
- 12.1.7. Contour models of sites
- 12.2. Equipment's Required
 - 12.2.1. Choice of cutting tools
 - 12.2.2. Choice of adhesives
 - 12.2.3. Choice of colour and tone
 - 12.2.4. Choice of paint and brushes
 - 12.2.5. Miscellaneous tools

13. Graphics and presentation

- 13.1. Principles of Composition
 - 13.1.1. Balance
 - 13.1.2. Scale
 - 13.1.3. Rhythm
 - 13.1.4. Monotony
 - 13.1.5. Contrast
 - 13.1.6. Unity
 - 13.1.7. Focal point
- 13.2. Tone
 - 13.2.1. Light
 - 13.2.2. Medium
 - 13.2.3. Dark
 - 13.2.4. Flat
 - 13.2.5. Graded
- 13.3. Free Hand Works
 - 13.3.1. Drawing lines
 - 13.3.2. Drawing letters
 - 13.3.3. Three dimensional objects
- 13.4. Presentation
 - 13.4.1. Textures
 - 13.4.2. Exterior and interior objects
 - 13.4.3. Human figures
 - 13.4.4. Shadows
- 13.5. Medium for Presentation
 - 13.5.1. Pencil techniques
 - 13.5.2. Colour history and type: pencil colour, water colour, Poster colour
 - 13.5.3. Primary, secondary and tertiary colours
 - 13.5.4. Warm and cool Colours
 - 13.5.5. Properties of colour
 - 13.5.6. Colour circle
 - 13.5.7. Colour scheme: monochromatic, analogous, complementary and triad
- 13.6. Data Presentation in Graphical Forms

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13.6.1. Translation of numerical data into diagrams and vice versa

13.6.2. Pie chart, bar chart and XY graphs

13.7. Cartography

13.7.1. Tracing of land-use maps

13.7.2. Presentation of land-use maps

द्वितीय पत्र (Paper II):

सेवा सम्बन्धी कार्य-ज्ञान (Job Based- Knowledge)

खण्ड (क)

पूर्णाङ्क: ५०

1. Surveying

1.1. General

1.1.1. Primary divisions of survey

1.1.2. Classification based on instruments and methods

1.1.3. Basic principle of surveying

1.1.4. Scales, plans and maps

1.1.5. System of field booking of surveying and levelling data

1.1.6. Theodolite survey

1.1.7. Total station survey

1.2. Levelling

1.2.1. Classification of levelling work

1.2.2. Methods of leveling

1.2.3. Levelling instruments and accessories

1.2.4. Principles of levelling

1.2.5. Temporary and permanent adjustments of a level

1.2.6. Profile leveling

1.2.7. Booking and reducing levels

1.3. Errors and their effects

1.3.1. Kinds of errors

1.3.2. Source of errors in chaining, levelling, plane tabling and compass surveying

1.3.3. Effects of errors

1.3.4. Precision and accuracy

1.4. Plane Tabling

1.4.1. Equipment's used

1.4.2. Working operations

1.4.3. Methods of plane tabling

1.4.4. Merits and demerits of plane tabling

1.5. Contouring

1.5.1. Definitions of terms

1.5.2. Properties of contour

1.5.3. Use of contour maps

1.6. Setting out

1.6.1. Small buildings

1.6.2. Simple curves

1.6.3. Locating the boundaries of farm lands

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2. Drawing

2.1. General

- 2.1.1. Importance, aims and objectives of drawing
- 2.1.2. Drawing equipments
- 2.1.3. Architectural discipline
- 2.1.4. Standard drawing sheets sizes
- 2.1.5. Drafting techniques and methods in common practice
- 2.1.6. Scales: Choice, use and conversion

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- 2.2.1. Methods of measurement of horizontal and vertical dimensions
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- 2.3.6. Structural working drawings

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- 3.1.1. Purpose of estimating
- 3.1.2. Main items of work
- 3.1.3. Units of measurement and payment of various items of work and materials
- 3.1.4. Degree of accuracy
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- 3.1.7. Preliminary estimate
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- 3.2.2. Transportation cost
- 3.2.3. Overheads
- 3.2.4. Need for contingencies
- 3.2.5. Use of Government Rate Analysis Norms

3.3. Specifications

- 3.3.1. Purpose
- 3.3.2. Types
- 3.3.3. Necessity
- 3.3.4. Interpretation of Specifications

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- 3.4.1. Earthwork
- 3.4.2. Estimate of different components building

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- 3.4.3. Estimate of sanitary installations
- 3.4.4. Estimate of electrical wiring and sanitary works
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- 3.5. Valuation
 - 3.5.1. Purpose of valuation
 - 3.5.2. Methods of valuation
 - 3.5.3. Standard formats used for property valuation in Nepal
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 - 5.2. Disposal system
 - 5.2.1. Septic tank, soak pit, vent and manhole
 - 5.2.2. Pipes for different sewage
 - 5.2.3. Incinerators
 - 1.2 Electricity
 - 5.2.4. General principles of electrical installation and distribution
 - 5.2.5. Wiring systems in private and public building
 - 5.2.6. Ducts for electrical distribution
 - 5.2.7. Safety precautions
 - 5.3. Lighting

प्रदेश लोक सेवा आयोग

लुम्बिनी प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत इञ्जिनियरिङ्ग सेवा, सिभिल समूह, बिल्डिङ्ग एण्ड आर्किटेक्ट उप-समूह पाँचौं तह सव इञ्जिनियर पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

- 5.3.1. General principles of lighting
- 5.3.2. Illumination requirements and standards
- 5.3.3. Combination of artificial and natural light
- 5.3.4. Lighting fixtures

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पूर्णाङ्क:५०

6. Construction Materials

- 6.1. Stone
 - 6.1.1. Rocks and their characteristics
 - 6.1.2. Formation and availability of stones in Nepal
 - 6.1.3. Quarrying excavation, Wedging and blasting
 - 6.1.4. Methods of laying and construction with various stones
- 6.2. Aggregates
 - 6.2.1. Fine aggregates
 - 6.2.2. Coarse aggregates
 - 6.2.3. Availability and practice in Nepal
- 6.3. Cement
 - 6.3.1. Ingredients, properties and manufacture of cement
 - 6.3.2. Types of cement
 - 6.3.3. Storage and transport
 - 6.3.4. Admixtures
- 6.4. Metals and Alloys.
 - 6.4.1. Wrought iron: Properties, use
 - 6.4.2. Steel: - composition, properties, appearance, strength, constructional forms and manufacture
 - 6.4.3. Corrosion and its prevention
 - 6.4.4. Brass: uses
- 6.5. Brick
 - 6.5.1. Type
 - 6.5.2. Manufacture
 - 6.5.3. Laying
 - 6.5.4. Availability and practice in Nepal
- 6.6. Lime
 - 6.6.1. Manufacture
 - 6.6.2. Types and properties
 - 6.6.3. Uses
- 6.7. Paints and Varnishes
 - 6.7.1. Type and selection
 - 6.7.2. Preparation techniques
 - 6.7.3. Uses
- 6.8. Floor Finishes
 - 6.8.1. Puning
 - 6.8.2. Tiles: mosaic, clay, concrete, vinyl
 - 6.8.3. Marble and flagstones
 - 6.8.4. Wooden boarding and parqueting
- 6.9. Wall Finishes
 - 6.9.1. Plasters: cement, lime, mud

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- 6.9.2. Punning: cement, lime
- 6.9.3. Cladding: wood, stone, tiles

6.10. Roofing Materials

- 6.10.1. Clay tiles, ceramic tiles and slate
- 6.10.2. CGI and UPVC

6.11. Miscellaneous Materials

- 6.11.1. Glass
- 6.11.2. Plastics
- 6.11.3. Asphalt and Bitumen
- 6.11.4. Surkhi

7. Structural Design

7.1. Timber Structures

- 7.1.1. Allowable stresses
- 7.1.2. Design of compression members
- 7.1.3. Design of solid rectangular beams, design of simple steel beams
- 7.1.4. Types of joints and their connections

7.2. Steel Structures

- 7.2.1. Design of simple steel beams
- 7.2.2. Rivetted and welded connections: types, uses and detailing
- 7.2.3. Detailing of simple roof trusses
- 7.2.4. Detailing of rolled steel beams
- 7.2.5. Detailing of column bases

7.3. R.C. Sections in Bending

- 7.3.1. Basis assumptions
- 7.3.2. Position of neutral axis
- 7.3.3. Moment of resistance
- 7.3.4. Under reinforced, over reinforced and balanced sections
- 7.3.5. Analysis of singly and doubly reinforced rectangular sections
- 7.3.6. Analysis of singly reinforced flanged sections

7.4. Shear and Bond for Reinforced Concrete (RC) Sections

- 7.4.1. Behavior of R.C. section in shear
- 7.4.2. Shear resistance of R. C. section
- 7.4.3. Types of shear reinforcement and their design
- 7.4.4. Local and anchorage bond
- 7.4.5. Determination of anchorage length
- 7.4.6. Bar curtailment

7.5. Axially Loaded R.C. columns

- 7.5.1. Short and long columns
- 7.5.2. Design of a rectangular column section
- 7.5.3. Reinforcement detailing

7.6. Design and Detailing of R.C Structures

- 7.6.1. IS code requirements
- 7.6.2. Methods of design
- 7.6.3. Singly reinforced T and L. beams,
- 7.6.4. Simple one-way and two-way slabs.
- 7.6.5. Simple pad footings for columns
- 7.6.6. Preparation of bar bending for RC design

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7.7. Earthquake Resistant Design of Non-engineered Structures

7.7.1. History of Earthquake in Nepal and damages

7.7.2. Weakness of existing building

7.7.3. Site consideration

7.7.4. Building form, shape and size

7.7.5. Size and location of openings

7.7.6. Selection of materials

7.7.7. Construction technology

7.7.8. Seismic resistant components: through stone, vertical and horizontal reinforcement, diaphragm, boxing of building, lateral restrainers, unsupported length of wall, corner and junction of wall/connection of building components

8. Building Construction Technology

8.1. Foundations

8.1.1. Function and necessity

8.1.2. Subsoil exploration: test pit

8.1.3. Safe bearing capacity of soils and its improvement

8.1.4. Type and suitability of different foundations: shallow, deep (pile and well)

8.1.5. Methods of excavating

8.1.6. Shoring and dewatering

8.1.7. Elements of simple spread foundation

8.1.8. Stone masonry foundations

8.1.9. Raft foundation

8.1.10. Combined footing foundation

8.2. Walls

8.2.1. Types of walls: solid wall, partition wall, cavity wall, curtain wall

8.2.2. Features and their functions

8.2.3. Types of stone masonry: rubble, hammer dressed and ashlar masonry

8.2.4. Brick Masonry: English, Flemish, garden rat trap, monk

8.2.5. Types of concrete blocks

8.2.6. Choosing wall thickness, height to length relation

8.2.7. Use of scaffolding

8.2.8. Procedure of constructing various masonry walls

8.3. Damp Proofing

8.3.1. Source of dampness

8.3.2. Remedial measures to prevent dampness

8.3.3. Vertical and horizontal damp proofing

8.3.4. Damp proofing materials

8.4. Concrete Technology

8.4.1. Constituents, mixing and use of lime concrete

8.4.2. Constituents of cement concrete

8.4.3. Grading of aggregates

8.4.4. Concrete mixes

8.4.5. Water cement ratio

8.4.6. Workability

8.4.7. Concrete laying

8.4.8. Factors affecting strength of concrete

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- 8.4.9. Form work
- 8.4.10. Vibrators
- 8.4.11. Curing
- 8.4.12. General introduction to Precast RC units
- 8.4.13. Hydration and segregation
- 8.5. Wood Work
 - 8.5.1. Frame and shutters of doors and windows
 - 8.5.2. Timber construction of upper floors
 - 8.5.3. Design and construction of stairs
 - 8.5.4. Double timber roofs
 - 8.5.5. False ceiling
 - 8.5.6. Sky-light elements, functions and construction details
- 8.6. Steel Work
 - 8.6.1. Steel work in windows: Standards, elements and functions
 - 8.6.2. Tubular and angle steel roofs
 - 8.6.3. Iron grill and lattice work

Architecture - Maintenance of building

9. Building Design

- 9.1. Analysis of Building Elements
 - 9.1.1. Bed
 - 9.1.2. Kitchen/Dining
 - 9.1.3. Living Hall
 - 9.1.4. Class Room
 - 9.1.5. Working Office Space
 - 9.1.6. Library
- 9.2. Design Consideration
 - 9.2.1. Specific program: space requirements
 - 9.2.2. Site: topography, orientation, environment
 - 9.2.3. Functional relationship between activities
 - 9.2.4. Culture: tradition, values, taste
 - 9.2.5. Economics: efficient use of space and materials
 - 9.2.6. Availability to technology and material
 - 9.2.7. Structure type and efficiency
 - 9.2.8. Optimum use of natural light and ventilation
 - 9.2.9. Aesthetics
 - 9.2.10. Building Bye Laws
- 9.3. Climatology
 - 9.3.1. Climate: sun, wind, rain, humidity
 - 9.3.2. Orientation of the building with respect to the sun and wind: best optimum, bad
 - 9.3.3. Determination of length of roof projection to act as sunshade

10. Architectural Modelling

- 10.1. Modelling Materials and Practices
 - 10.1.1. Use of models
 - 10.1.2. Choice of materials
 - 10.1.3. Modelling techniques
 - 10.1.4. Accuracy of models
 - 10.1.5. Determination of degree of detailing

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- 10.1.6. Model construction of multi-storey buildings
- 10.1.7. Contour models of sites
- 10.2. Equipment's Required
 - 10.2.1. Choice of cutting tools
 - 10.2.2. Choice of adhesives
 - 10.2.3. Choice of colour and tone
 - 10.2.4. Choice of paint and brushes
 - 10.2.5. Miscellaneous tools

11. Graphics and presentation

- 11.1. Principles of Composition
 - 11.1.1. Balance
 - 11.1.2. Scale
 - 11.1.3. Rhythm
 - 11.1.4. Monotony
 - 11.1.5. Contrast
 - 11.1.6. Unity
 - 11.1.7. Focal point
- 11.2. Tone
 - 11.2.1. Light
 - 11.2.2. Medium
 - 11.2.3. Dark
 - 11.2.4. Flat
 - 11.2.5. Graded
- 11.3. Free Hand Works
 - 11.3.1. Drawing lines
 - 11.3.2. Drawing letters
 - 11.3.3. Three dimensional objects
- 11.4. Presentation
 - 11.4.1. Textures
 - 11.4.2. Exterior and interior objects
 - 11.4.3. Human figures
 - 11.4.4. Shadows
- 11.5. Medium for Presentation
 - 11.5.1. Pencil techniques
 - 11.5.2. Colour history and type: pencil colour, water colour, Poster colour
 - 11.5.3. Primary, secondary and tertiary colours
 - 11.5.4. Warm and cool Colours
 - 11.5.5. Properties of colour
 - 11.5.6. Colour circle
 - 11.5.7. Colour scheme: monochromatic, analogous, complementary and triad
- 11.6. Data Presentation in Graphical Forms
 - 11.6.1. Translation of numerical data into diagrams and vice versa
 - 11.6.2. Pie chart, bar chart and XY graphs
- 11.7. Cartography
 - 11.7.1. Tracing of land-use maps
 - 11.7.2. Presentation of land-use maps