लोक सेवा आयोग

नेपाल कृषि सेवा, एगृ. इन्जिनियरिङ्ग समूह, राजपत्र अनंकित प्रथम श्रेणी, ओभरसियर वा सो सरह पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :- अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

परीक्षा योजना (Examination Scheme)

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

पत्र	विषय	पूर्णाङ्क	उर्तीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या ×अङ्क	समय
प्रथम	सामान्य ज्ञान र सार्वजनिक व्यवस्थापन (General Awareness & Public Management)	१००	४०	वस्तुगत (Objective)	बहुवैकल्पिक प्रश्न (MCQs)	२० प्रश्न ×२ अङ्क	४५ मिनेट
	सेवा सम्बन्धित कार्य-ज्ञान (Job Based - knowledge)					३० प्रश्न ×२ अङ्क	
द्वितीय	सेवा सम्बन्धित कार्य-ज्ञान (Job Based - knowledge)	१००	४०	विषयगत (Subjective)	छोटो उत्तर (Short Answer) लामो उत्तर (Long Answer)	१२ प्रश्न × ५ अङ्क ४ प्रश्न ×१० अङ्क	२ घण्टा १५ मिनेट

द्वितीय चरण : अन्तर्वार्ता (Interview) **पूर्णाङ्क :– ३०**

पत्र /विषय	पूर्णाङ्क	उर्तीर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता (Interview)	३०		मौखिक (Oral)

द्रष्टव्य :

१. यो पाठ्यक्रमको योजनालाई प्रथम चरण र द्वितीय चरण गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको प्रश्नपत्रको माध्यम भाषा पाठ्यक्रमको विषयवस्तु जुन भाषामा दिइएको छ सोही भाषाको आधारमा नेपाली वा अंग्रेजी मध्ये कुनै एक मात्र भाषा हुनेछ । तर विषयवस्तुलाई स्पष्ट गर्नुपर्ने अवस्थामा दुवै भाषा समेत प्रयोग सकिने छ ।

३. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

४. प्रथम पत्र र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । तर एकैदिनमा परीक्षा लिइनेछ ।

५. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नको 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 ।

६. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षरहरु (Capital letters): A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षरहरू (Small letters): a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

७. बहुवैकल्पिक प्रश्न हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

८. विषयगत प्रश्नहरुको 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 सकिने छ ।

९. विषयगत प्रश्न हुनेका हकमा प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरू हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नको उत्तर सोहीखण्डको उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

१०. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा दिइए अनुसार हुनेछ ।

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११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, 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 ।

१२. प्रथम चरणको परीक्षाबाट छनोट भएका उम्मेदवारलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१३. यस भन्दा अगाडि लागू भएको माथि उल्लेखित सेवा, समूहको पाठ्यक्रम खारेज गरिएको छ ।

१४. **पाठ्यक्रम लागू मिति : - २०८०/१०/२२**

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प्रथम पत्र (Paper I) :-

सामान्य ज्ञान र सार्वजनिक व्यवस्थापन तथा सेवा सम्बन्धित कार्य-ज्ञान

भाग (Part I) :

सामान्य ज्ञान र सार्वजनिक व्यवस्थापन

(General Awareness and Public Management)

खण्ड (Section - A) : (१० प्रश्न× २ अङ्क = २० अङ्क)

1. **सामान्य ज्ञान (General Awareness)**
   - 1.1 नेपालको भौगोलिक अवस्था, प्राकृतिक स्रोत र साधनहरू
   - 1.2 नेपालको ऐतिहासिक, सांस्कृतिक र सामाजिक अवस्था सम्वन्धी जानकारी
   - 1.3 नेपालको आर्थिक अवस्था र चालु आवधिक योजना सम्वन्धी जानकारी
   - 1.4 जैविक विविधता, दिगो विकास, वातावरण, प्रदुषण, जलवायु परिवर्तन र जनसंख्या व्यवस्थापन
   - 1.5 मानव जीवनमा प्रत्यक्ष प्रभाव पार्ने विज्ञान र प्रविधिका महत्वपूर्ण उपलब्धिहरू
   - 1.6 जनस्वास्थ्य, रोग, खाद्य र पोषण सम्बन्धी सामान्य जानकारी
   - 1.7 नेपालको संविधान (भाग १ देखि ५ सम्म र अनुसूचीहरू)
   - 1.8 संयुक्त राष्ट्रसंघ र यसका विशिष्टीकृत संस्था सम्वन्धी जानकारी
   - 1.9 क्षेत्रीय संगठन (सार्क, बिमस्टेक, आसियान र युरोपियन संघ) सम्वन्धी जानकारी
   - 1.10 राष्ट्रिय र अन्तर्राष्ट्रिय महत्वका समसामयिक गतिविधिहरू

खण्ड (Section - B) : (१० प्रश्न× २ अङ्क = २० अङ्क)

2. **सार्वजनिक व्यवस्थापन (Public Management)**
   - 2.1 कार्यालय व्यवस्थापन (Office Management)
     - 2.1.1 कार्यालय (Office) : परिचय, महत्व, कार्य र प्रकार
     - 2.1.2 सहायक कर्मचारीका कार्य र गुणहरु
     - 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), फाइलिङ (Filing), परिपत्र (Circular), तोक आदेश (Order), टिप्पणी लेखन र टिप्पणी तयार पार्दा ध्यान दिनुपर्ने कुराहरू
     - 2.1.6 अभिलेख व्यवस्थापन (Record Management)
   - 2.2 निजामती सेवा ऐन र नियमावलीमा भएका देहायका व्यवस्थाहरू
     - 2.2.1 निजामती सेवाको गठन, संगठन संरचना, पदपूर्ति गर्ने तरिका र प्रक्रियाहरू
     - 2.2.2 कर्मचारीको नियुक्ति, सरुवा, बढुवा, बिदा, विभागीय सजाय र अवकाश
     - 2.2.3 कर्मचारीले पालन गर्नुपर्ने आचरण, नैतिक दायित्व र कर्तव्यहरू
   - 2.3 संघीय मामिला तथा सामान्य प्रशासन मन्त्रालय सम्बन्धी जानकारी
   - 2.4 संवैधानिक निकाय सम्बन्धी जानकारी
   - 2.5 सरकारी बजेट, लेखा र लेखापरीक्षण प्रणाली सम्बन्धी सामान्य जानकारी
   - 2.6 सार्वजनिक सेवा प्रवाहको अर्थ, सेवा प्रवाह गर्ने निकाय, तरिका र माध्यमहरु
   - 2.7 मानव अधिकार, सुशासन र सूचनाको हक सम्वन्धी सामान्य जानकारी
   - 2.8 सार्वजनिक बडापत्र (Public Charter)
   - 2.9 व्यवस्थापनको अवधारणा तथा सार्वजनिक व्यवस्थापनमा निर्देशन, नियन्त्रण, समन्वय, निर्णय प्रक्रिया, उत्प्रेरणा र नेतृत्व सम्वन्धी जानकारी
   - 2.10 मानवीय मूल्य मान्यता (Human Values), नागरिक कर्तव्य र दायित्व तथा अनुशासन

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भाग (Part II) :-

सेवा सम्बन्धित कार्य-ज्ञान (Job Based - Knowledge)

(३० प्रश्न× २ अङ्क = ६० अङ्क)

1. **General Agriculture and Agricultural Engineering**
   - 1.1 Principles of agronomy (cereals, cash crops, pulses, vegetables, fruits and oilseed)
   - 1.2 Introduction to sociology and rural development
   - 1.3 Elements of soil science (soil fertility, properties and classification)
   - 1.4 Soil water, soil moisture tension, infiltration, permeability, wilting coefficient and conductivity
   - 1.5 Plant water relationship, evaporation, transpiration and consumptive use, evapotranspiration (ET) estimation methods
   - 1.6 Water requirements, irrigation frequencies, and irrigation effectiveness
   - 1.7 Method of Irrigation (Furrow irrigation, border irrigation and check basin irrigation, Sprinkler and drip/tickle irrigation)
   - 1.8 Type of drainage system, surface and sub surface drainage system
   - 1.9 Ground water and aquifers, hydraulics of wells
   - 1.10 Water erosion (rain drop erosion, rill erosion, gully erosion, stream channel erosion)
   - 1.11 Human, animal, electrical and mechanical powers
   - 1.12 Introduction to primary and secondary agricultural implements

2. **Surveying**
   - 2.1 General
     - 2.1.1 Classifications
     - 2.1.2 Principle of surveying
     - 2.1.3 Selection of suitable method
     - 2.1.4 Scales, plans and maps
     - 2.1.5 Entry into survey field books and level books
   - 2.2 Leveling
     - 2.2.1 Methods of leveling
     - 2.2.2 Leveling instruments and accessories
     - 2.2.3 Principles of leveling
   - 2.3 Plane Tabling
     - 2.3.1 Equipment required
     - 2.3.2 Methods of plane tabling
     - 2.3.3 Two and three point problems
   - 2.4 Theodolite and Traverse surveying
     - 2.4.1 Basic difference between theodolites
     - 2.4.2 Temporary adjustments of theodolites
     - 2.4.3 Fundamental lines and desired relations
     - 2.4.4 Tachometry: stadia method
     - 2.4.5 Trigonometrical leveling
     - 2.4.6 Checks in closed traverse
   - 2.5 Contouring
     - 2.5.1 Characteristics of contour lines
     - 2.5.2 Method of locating contours
     - 2.5.3 Contour plotting

2.6 Setting Out
- 2.6.1 Small buildings
- 2.6.2 Simple curves

3. **Construction Materials**

3.1 Stone
- 3.1.1 Formation and availability of stones in Nepal
- 3.1.2 Methods of laying and construction with various stones

3.2 Cement
- 3.2.1 Different cements: Ingredients, properties and manufacture
- 3.2.2 Storage and transport
- 3.2.3 Admixtures

3.3 Clay and Clay Products
- 3.3.1 Brick: type, manufacture, laying, bonds

3.4 Paints and Varnishes
- 3.4.1 Type and selection
- 3.4.2 Preparation techniques
- 3.4.3 Use

4. **Mechanics of Materials and Structures**

4.1 Mechanics of Materials
- 4.1.1 Internal effects of loading
- 4.1.2 Ultimate strength and working stress of materials

4.2 Mechanics of Beams
- 4.2.1 Relation between shear force and bending moment
- 4.2.2 Thrust, shear and bending moment diagrams for statically determinate beams under various types of loading

4.3 Simple Strut Theory

5. **Hydraulics**

5.1 General
- 5.1.1 Properties of fluid: mass, weight, specific weight, density, specific volume, specific gravity, viscosity
- 5.1.2 Pressure and Pascal's Law

5.2 Hydro Kinematics and Hydro Dynamics
- 5.2.1 Energy of flowing liquid: elevation energy, kinetic energy, potential energy, internal energy

5.3 Measurement of Discharge
- 5.3.1 Weirs and notches
- 5.3.2 Discharge formulas

5.4 Flows
- 5.4.1 Characteristics of pipe flow and open channel flow

6. **Soil Mechanics**

6.1 General
- 6.1.1 Soil types and classification
- 6.1.2 Three phase system of soil
- 6.1.3 Unit weight of soil mass: bulk density, saturated density, submerged density and dry density

6.1.4 Interrelationship between specific gravity, void ratio, porosity, degree of saturation, percentage of air voids air content and density index

6.2 Soil Water Relation
- 6.2.1 Terzaghi's principle of effective stress
- 6.2.2 Darcy's law
- 6.2.3 Factors affecting permeability

6.3 Compaction of Soil
- 6.3.1 Factors affecting soil compaction\
- 6.3.2 Optimum moisture content
- 6.3.3 Relation between dry density and moisture content

6.4 Shear Strength of Soils
- 6.4.1 Mohr-Coulomb failure theory
- 6.4.2 Cohesion and angle of internal friction

6.5 Earth Pressures
- 6.5.1 Active and passive earth pressures
- 6.5.2 Lateral earth pressure theory
- 6.5.3 Rankine's earth pressure theory

6.6 Foundation Engineering
- 6.6.1 Terzaghi's general bearing capacity formulas and their application

7. **Structural Design**

7.1 R.C. Section in Bending
- 7.1.1 Under reinforced, over reinforced and balanced sections
- 7.1.2 Analysis of single and double reinforced rectangular sections

7.2 Shear and Bond for a R.C Section
- 7.2.1 Shear resistance of a R.C section
- 7.2.2 Types of shear reinforcement and their design
- 7.2.3 Determination of anchorage length

7.3 Axially Loaded R.C. columns
- 7.3.1 Short and long columns
- 7.3.2 Design of a rectangular column section

7.4 Design and Drafting of R.C. Structures
- 7.4.1 Singly and doubly reinforced rectangular beams
- 7.4.2 Simple one way and two way slabs
- 7.4.3 Axially loaded short and long columns

8. **Building Construction Technology**

8.1 Foundations
- 8.1.1 Subsoil exploration
- 8.1.2 Type and suitability of different foundations: shallow, deep
- 8.1.3 Shoring and dewatering
- 8.1.4 Design of simple brick / stone masonry and RCC foundations

8.2 Walls
- 8.2.1 Type of walls and their functions
- 8.2.2 Choosing wall thickness, height to length relation
- 8.2.3 Use of scaffolding

8.3 Damp Proofing
- 8.3.1 Sources of dampness
- 8.3.2 Remedial measures to prevent dampness

8.4 Concrete Technology
- 8.4.1 Constituents of cement concrete
- 8.4.2 Grading of aggregates
- 8.4.3 Concrete mixes
- 8.4.4 Water cement ratio

8.5 Factors affecting strength of concrete
8.6 Form work
8.7 Curing

9. **Soil and Water Engineering**

9.1 Water Conveyance and Control
- 9.1.1 Design of open channels, channel linings, drop structures and spillways, water control and division structures
- 9.1.2 Design of under ground pipe conveyance system

9.2 Land Development
- 9.2.1 Land leveling-grading design methods, estimation of earthwork quantities, leveling and grading procedures, equipment for land grading and field layout

9.3 Ground Water, Irrigation Wells and Pumps
- 9.3.1 Design of wells
- 9.3.2 Wells construction procedures
- 9.3.3 Indigenous water lifting devices, positive displacement pumps, centrifugal pumps, vertical turbine pumps, submersible pumps, propeller and mixed flow pumps, selection of pumps and their performances, repaired and maintenance

9.4 Water Erosion and Control Measures
- 9.4.1 Soil losses and its measurement
- 9.4.2 Erosion control measures (engineering and bioengineering methods)
- 9.4.3 Conservation structures, watershed management and water harvesting techniques

10. **Farm Structure Development**

10.1 Planning of farmstead, farm residence, water supply and sanitation
10.2 Farm road, farm fencing, farm ponds, farm irrigation and drainage
10.3 Animal Shelters
- 10.3.1 Dairy barn (housing requirements, stanchion and loose housing barns with milking barn, pen barn)
- 10.3.2 Poultry housing (housing requirements, types of poultry house, brooder house
- 10.3.3 Ship and goat housing (types, housing requirements, construction material, layout
- 10.3.4 Swine housing (types, housing requirements, construction materials, layout
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  - 13.2.9 Pipe line design and hydraulic grade line
- 13.3 Bio engineering Measures
- 13.4 Renewable Energy

प्रथम पत्रको लागि यथासम्भव निम्नानुसार प्रश्नहरू सोधिने छ ।

प्रथम पत्र (वस्तुगत)					
भाग	**खण्ड**	**विषयबस्तु**	**परीक्षा प्रणाली**	**अङ्कभार**	**प्रश्न संख्या × अङ्क**
I	**(A)**	सामान्य ज्ञान (General Awareness)	बहुवैकल्पिक प्रश्न (MCQs)	२०	१० प्रश्न × २ अङ्क = २०
	(B)	सार्वजनिक व्यवस्थापन (Public Management)		२०	१० प्रश्न × २ अङ्क = २०
II	-	सेवा सम्बन्धित कार्य-ज्ञान (Job Based -knowledge)		६०	३० प्रश्न × २ अङ्क = ६०

प्रथम पत्रको **<u>भाग (Part II)</u>** सेवा सम्बन्धित कार्य-ज्ञान (Job based -knowledge) को पाठ्यक्रमका इकाईबाट परीक्षामा यथासम्भव देहाय बमोजिम प्रश्नहरू सोधिने छ ।

इकाई	1	2	3	4	5	6	7	8	9	10	11	12	13
प्रश्न संख्या	4	3	3	2	2	2	2	2	2	2	2	2	2

लोक सेवा आयोग

नेपाल कृषि सेवा, एगृ. इन्जिनियरिङ्ग समूह, राजपत्र अनंकित प्रथम श्रेणी, ओभरसियर वा सो सरह पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

द्वितीय पत्र (Paper II) :-

सेवा सम्बन्धित कार्य-ज्ञान (Job Based -Knowledge)

खण्ड (Section) (A) : - ५० अङ्क

1. **General Agriculture and Agricultural Engineering**
   - 1.1 Principles of agronomy (cereals, cash crops, pulses, vegetables, fruits and oilseed)
   - 1.2 Introduction to sociology and rural development
   - 1.3 Elements of soil science (soil fertility, properties and classification)
   - 1.4 Soil water, soil moisture tension, infiltration, permeability, wilting coefficient and conductivity
   - 1.5 Plant water relationship, evaporation, transpiration and consumptive use, evapotranspiration (ET) estimation methods
   - 1.6 Water requirements, irrigation frequencies, and irrigation effectiveness
   - 1.7 Method of Irrigation (Furrow irrigation, border irrigation and check basin irrigation, Sprinkler and drip/tickle irrigation)
   - 1.8 Type of drainage system, surface and sub surface drainage system
   - 1.9 Ground water and aquifers, hydraulics of wells
   - 1.10 Water erosion (rain drop erosion, rill erosion, gully erosion, stream channel erosion)
   - 1.11 Human, animal, electrical and mechanical powers
   - 1.12 Introduction to primary and secondary agricultural implements

2. **Surveying**
   - 2.1 General
     - 2.1.1 Classifications
     - 2.1.2 Principle of surveying
     - 2.1.3 Selection of suitable method
     - 2.1.4 Scales, plans and maps
     - 2.1.5 Entry into survey field books and level books
   - 2.2 Leveling
     - 2.2.1 Methods of leveling
     - 2.2.2 Leveling instruments and accessories
     - 2.2.3 Principles of leveling
   - 2.3 Plane Tabling
     - 2.3.1 Equipment required
     - 2.3.2 Methods of plane tabling
     - 2.3.3 Two and three point problems
   - 2.4 Theodolite and Traverse surveying
     - 2.4.1 Basic difference between theodolites
     - 2.4.2 Temporary adjustments of theodolites
     - 2.4.3 Fundamental lines and desired relations
     - 2.4.4 Tachometry: stadia method
     - 2.4.5 Trigonometrical leveling
     - 2.4.6 Checks in closed traverse
   - 2.5 Contouring
     - 2.5.1 Characteristics of contour lines
     - 2.5.2 Method of locating contours
     - 2.5.3 Contour plotting
   - 2.6 Setting Out
     - 2.6.1 Small buildings

2.6.2 Simple curves

3. **Construction Materials**
   - 3.1 Stone
     - 3.1.1 Formation and availability of stones in Nepal
     - 3.1.2 Methods of laying and construction with various stones
   - 3.2 Cement
     - 3.2.1 Different cements: Ingredients, properties and manufacture
     - 3.2.2 Storage and transport
     - 3.2.3 Admixtures
   - 3.3 Clay and Clay Products
     - 3.3.1 Brick: type, manufacture, laying, bonds
   - 3.4 Paints and Varnishes
     - 3.4.1 Type and selection
     - 3.4.2 Preparation techniques
     - 3.4.3 Use

4. **Mechanics of Materials and Structures**
   - 4.1 Mechanics of Materials
     - 4.1.1 Internal effects of loading
     - 4.1.2 Ultimate strength and working stress of materials
   - 4.2 Mechanics of Beams
     - 4.2.1 Relation between shear force and bending moment
     - 4.2.2 Thrust, shear and bending moment diagrams for statically determinate beams under various types of loading
   - 4.3 Simple Strut Theory

5. **Hydraulics**
   - 5.1 General
     - 5.1.1 Properties of fluid: mass, weight, specific weight, density, specific volume, specific gravity, viscosity
     - 5.1.2 Pressure and Pascal's Law
   - 5.2 Hydro Kinematics and Hydro Dynamics
     - 5.2.1 Energy of flowing liquid: elevation energy, kinetic energy, potential energy, internal energy
   - 5.3 Measurement of Discharge
     - 5.3.1 Weirs and notches
     - 5.3.2 Discharge formulas
   - 5.4 Flows
     - 5.4.1 Characteristics of pipe flow and open channel flow

6. **Soil Mechanics**
   - 6.1 General
     - 6.1.1 Soil types and classification
     - 6.1.2 Three phase system of soil
     - 6.1.3 Unit weight of soil mass: bulk density, saturated density, submerged density and dry density
     - 6.1.4 Interrelationship between specific gravity, void ratio, porosity, degree of saturation, percentage of air voids air content and density index

6.2 Soil Water Relation
- 6.2.1 Terzaghi's principle of effective stress
- 6.2.2 Darcy's law
- 6.2.3 Factors affecting permeability

6.3 Compaction of Soil
- 6.3.1 Factors affecting soil compaction\
- 6.3.2 Optimum moisture content
- 6.3.3 Relation between dry density and moisture content

6.4 Shear Strength of Soils
- 6.4.1 Mohr-Coulomb failure theory
- 6.4.2 Cohesion and angle of internal friction

6.5 Earth Pressures
- 6.5.1 Active and passive earth pressures
- 6.5.2 Lateral earth pressure theory
- 6.5.3 Rankine's earth pressure theory

6.6 Foundation Engineering
- 6.6.1 Terzaghi's general bearing capacity formulas and their application

खण्ड (Section) (B) : - ५० अङ्क

7. **Structural Design**

7.1 R.C. Section in Bending
- 7.1.1 Under reinforced, over reinforced and balanced sections
- 7.1.2 Analysis of single and double reinforced rectangular sections

7.2 Shear and Bond for a R.C Section
- 7.2.1 Shear resistance of a R.C section
- 7.2.2 Types of shear reinforcement and their design
- 7.2.3 Determination of anchorage length

7.3 Axially Loaded R.C. columns
- 7.3.1 Short and long columns
- 7.3.2 Design of a rectangular column section

7.4 Design and Drafting of R.C. Structures
- 7.4.1 Singly and doubly reinforced rectangular beams
- 7.4.2 Simple one way and two way slabs
- 7.4.3 Axially loaded short and long columns

8. **Building Construction Technology**

8.1 Foundations
- 8.1.1 Subsoil exploration
- 8.1.2 Type and suitability of different foundations: shallow, deep
- 8.1.3 Shoring and dewatering
- 8.1.4 Design of simple brick / stone masonry and RCC foundations

8.2 Walls
- 8.2.1 Type of walls and their functions
- 8.2.2 Choosing wall thickness, height to length relation
- 8.2.3 Use of scaffolding

8.3 Damp Proofing
- 8.3.1 Sources of dampness
- 8.3.2 Remedial measures to prevent dampness

8.4 Concrete Technology

8.4.1 Constituents of cement concrete
8.4.2 Grading of aggregates
8.4.3 Concrete mixes
8.4.4 Water cement ratio
8.5 Factors affecting strength of concrete
8.6 Form work
8.7 Curing

9. **Soil and Water Engineering**
9.1 Water Conveyance and Control
9.1.1 Design of open channels, channel linings, drop structures and spillways, water control and division structures
9.1.2 Design of under ground pipe conveyance system
9.2 Land Development
9.2.1 Land leveling-grading design methods, estimation of earthwork quantities, leveling and grading procedures, equipment for land grading and field layout
9.3 Ground Water, Irrigation Wells and Pumps
9.3.1 Design of wells
9.3.2 Wells construction procedures
9.3.3 Indigenous water lifting devices, positive displacement pumps, centrifugal pumps, vertical turbine pumps, submersible pumps, propeller and mixed flow pumps, selection of pumps and their performances, repaired and maintenance
9.4 Water Erosion and Control Measures
9.4.1 Soil losses and its measurement
9.4.2 Erosion control measures (engineering and bioengineering methods)
9.4.3 Conservation structures, watershed management and water harvesting techniques

10. **Farm Structure Development**
10.1 Planning of farmstead, farm residence, water supply and sanitation
10.2 Farm road, farm fencing, farm ponds, farm irrigation and drainage
10.3 Animal Shelters
10.3.1 Dairy barn (housing requirements, stanchion and loose housing barns with milking barn, pen barn)
10.3.2 Poultry housing (housing requirements, types of poultry house, brooder house
10.3.3 Ship and goat housing (types, housing requirements, construction material, layout
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पत्र	**विषय**	**खण्ड**	**अङ्कभार**	**छोटो उत्तर**	**लामो उत्तर**
द्वितीय	सेवा सम्बन्धित कार्य-ज्ञान (Job Based-Knowledge)	**(A)**	५०	६ प्रश्न × ५ अङ्क = ३०	२ प्रश्न × १० अङ्क = २०
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