



# औद्योगिक क्षेत्र व्यावस्थापन लिमिटेड

(नेपाल सरकारको स्वामित्व भएको)

प्राविधिक सेवा ईन्जिनियरिङ्ग समुह/सिभिल उपसमुह सिभिल ईन्जिनियर तह-७ पदको  
खुला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

यो पाठ्यक्रमलाई देहाय अनुसार दुई चरणमा विभाजन गरिएको छ :

- १) प्रथम चरण: लिखित परीक्षा-पूर्णाङ्क २००
- २) द्वितीय चरण: सीप परीक्षण-१० र अन्तरवार्ता-पूर्णाङ्क ३०

## परीक्षा योजना (Examination Scheme)

१. प्रथम चरण: लिखित परीक्षा

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली		प्रश्न संख्या र अङ्कभार	जम्मा अङ्क	समय
प्रथम	सामान्य ज्ञान तथा सेवा सम्बन्धी विषय	१००	४०	(क) सामान्य ज्ञान र बौद्धिक परीक्षण	वस्तुगत बहुवैकल्पिक प्रश्न	(२५X२)	५०	२ घण्टा
				(ख) समस्या समाधानमुलक प्रश्न	छोटो प्रश्न	(१०X५)	५०	
द्वितीय	सेवा सम्बन्धी	१००	४०	विषयगत	लामो प्रश्न	(१०X१०)	१००	३ घण्टा

२. द्वितीय चरण: सीप परीक्षण र अन्तरवार्ता

विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	समय
सीप परीक्षण	१०	-	प्रयोगात्मक	१५ मिनेट
व्यक्तिगत अन्तरवार्ता	३०	-	मौखिक	-

### द्रष्टव्यः

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।
- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- लिखित परीक्षामा यथासम्भव पाठ्यक्रमका सबै एकाईबाट प्रश्नहरू सोधिनेछ ।
- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको गलत उत्तर दिएमा प्रत्येक गतल उत्तर बापत २० प्रतिशत अंक कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अंक दिइने छैन र अंक कट्टा पनि गरिने छैन ।
- विषयगत प्रश्नहरूको हकमा एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरू (Short notes) सोध्न सकिनेछ ।
- विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तर पुस्तिकाहरू हुनेछन । परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरूको उत्तर सोहि खण्डका उत्तर पुस्तिकामा लेख्नु पर्नेछ ।
- यस पाठ्यक्रममा जे सुकै लेखिएको भएता पनि पाठ्यक्रममा परेका ऐन नियम तथा विनियमहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- परीक्षामा कालो मसी भएको कलम वा डटपेन मात्र प्रयोग गर्नुपर्नेछ ।
- वस्तुगत प्रश्नहरूको परीक्षामा कुनै प्रकारको क्यालकुलेटर (Calculator) प्रयोग गर्न पाईने छैन । परीक्षामा सोधिने प्रश्नहरू क्यालकुलेटरको प्रयोग विना नै समाधान गर्न सकिने सोधिनेछ ।
- प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
- पाठ्यक्रम लागू मिति: २०७८।०३।०७ गते ।



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## प्रथमपत्र: सामान्य ज्ञान तथा सेवा सम्बन्धी विषय

### खण्ड (क): सामान्य ज्ञान र बौद्धिक परीक्षण

५० अङ्क

#### १. सामान्य ज्ञान:

(५X२=१०)

- १.१ विश्वको भुगोल: महादेश, महासागर, अक्षांश, देशान्तर, अन्तर्राष्ट्रिय तिथी रेखा, समय, पर्वत श्रृंखला, नदी, हिमनदी, ताल, हिमताल ।
- १.२ नेपालको भुगोल, धरातलीय स्वरूपको किसिम र विशेषता, नेपालमा पाईने हावापानीको किसिम र विशेषता, नदीनाला, तालतलैया, खनिज पदार्थ, प्राकृतिक स्रोत साधन, विद्युत ।
- १.३ नेपालको शिक्षा, जनसंख्या, स्वास्थ्य र सञ्चार सम्बन्धी जानकारी ।
- १.४ नेपालको आर्थिक तथा सामाजिक कृयाकलाप, सामाजिक एवं सांस्कृतिक अवस्था, प्रथा, परम्परा, धर्म, जातजाति, भाषाभाषी, कला, संस्कृति र साहित्य ।
- १.५ नेपालमा औद्योगिक विकास, ऊर्जाका स्रोत र सम्भावना ।
- १.६ नेपालको संघीय, प्रादेशिक र स्थानीय संरचना तथा शासन प्रणाली सम्बन्धी जानकारी ।
- १.७ संयुक्त राष्ट्र संघ र यसका एजेन्सीहरू (UNO and Its Agencies), दक्षिण एशियाली क्षेत्रीय सहयोग संगठन (SAARC), विमस्टेक, आसियान युरोपियन संघ सम्बन्धी जानकारी ।
- १.८ राष्ट्रिय तथा अन्तर्राष्ट्रिय महत्वका समसामयिक घटना तथा नवीनतम् गतिविधिहरू ।

#### २. औद्योगिक विकास र संस्थागत जानकारी:

(५X२=१०)

- २.१ नेपालमा सार्वजनिक संस्थान स्थापनाको उद्देश्य तथा यसका भूमिका, उपलब्धी एवं चुनौतिहरू ।
- २.२ नेपालको औद्योगिक विकासमा औद्योगिक क्षेत्र व्यवस्थापन लिमिटेड र नीजि क्षेत्रको भूमिका ।
- २.३ संघीय अवधारणा अनुसार औद्योगिक क्षेत्र व्यवस्थापन लिमिटेडको पुनः संरचना ।
- २.४ आवधिक योजनामा औद्योगिक विकास सम्बन्धी व्यवस्था ।
- २.५ औद्योगिक विकास र नियमनकारी निकायहरूको जानकारी ।

#### ३. व्यवस्थापकीय ज्ञान र सेवा सम्बन्धी ऐन तथा कानूनहरू:

(५X२=१०)

- ३.१ व्यवस्थापनका सिद्धान्त र कार्यक्रम ।
- ३.२ मानव संशाधन व्यवस्थापन तथा आर्थिक प्रशासन सम्बन्धी जानकारी ।
- ३.३ व्यवस्थापन सूचना प्रणाली र कम्प्युटर सम्बन्धी आधारभुत ज्ञान (Windows, Word, Excel, Power Point, Auto CAD) ।
- ३.४ प्रतिवेदन लेखन ।
- ३.५ औद्योगिक नीति, २०६७ ।
- ३.६ औद्योगिक क्षेत्र व्यवस्थापन लिमिटेडको प्रबन्ध पत्र र नियमावली ।
- ३.७ औद्योगिक क्षेत्र व्यवस्थापन लिमिटेड कर्मचारी सेवा शर्त नियमावली, २०५४ (संशोधन समेत) ।
- ३.८ औद्योगिक क्षेत्र सञ्चालन तथा व्यवस्थापन नियमावली, २०७१ ।
- ३.९ औद्योगिक व्यवसाय ऐन, २०७३ ।
- ३.१० सार्वजनीक खरिद ऐन, २०६३ तथा नियमावली, २०६४ ।
- ३.११ वातावरण ऐन, २०५३ तथा नियमावली, २०५४ ।
- ३.१२ भवन निर्माण आचार संहिता (Nepal National Building Code) ।
- ३.१३ विपद् जोखिम न्यूनीकरण तथा व्यवस्थापन ऐन, २०७४ ।
- ३.१४ भ्रष्टाचार निवारण ऐन, २०५९ ।
- ३.१५ कम्पनी ऐन, २०६३ ।
- ३.१६ नेपाल इन्जिनियरिङ्ग परिषद ऐन, २०५५ तथा नियमावली २०५७ ।



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## बौद्धिक परीक्षण:

[10x2=20]

- a. **Verbal and Non-verbal Aptitude:** Vocabulary, Alphabetical ordering of words, Classification, Coding-Decoding, Insert the missing character, Direction and Distance sense test, Ranking order test, Relationship Test, Logical sequence of words, Common sense test, Assertion and Reason, Logical reasoning, Figure series, Figure analogy, Figure Classification, Figure Matrix, Pattern completion/finding, Construction of squares and triangles, Analytical reasoning.
- b. **Numerical Ability and Quantitative Aptitude :** Arithmetical reasoning, Insert the correct mathematical signs, Decimal and Fraction, Percentage, Ratio, Average, Profit and Loss, Time and work.



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**खण्ड (ख): व्यवस्थापन र सेवा सम्बन्धी जानकारी**

(५० अङ्क )

1. खण्ड (क) को सामान्य ज्ञान, औद्योगिक विकास तथा संस्थागत जानकारी, व्यवस्थापकीय ज्ञान र सेवा सम्बन्धी ऐन कानूनबाट सोधिने प्रश्नहरू (३×५=१५)
2. **Infrastructure and industrial development in Nepal:** [2x5=10]
  - a. History of infrastructure and industrial development in Nepal.
  - b. Recent trends in infrastructure development of Nepal and prospects, opportunities and challenges for its development.
  - c. Industrial district management limited: objective, functions, corporate structure, achievement and challenges.
3. **Planning and development:** [1x5= 5]
  - a. General concept of development.
  - b. Planning in Nepal: past efforts, achievement and challenges.
  - c. Role of private sector in development.
  - d. Periodic planning, salient features of periodic planning, priorities of government of Nepal
  - e. Sustainable Development Goals.
4. **Management and financial analysis:** [2x5= 10]
  - a. Concept of management.
  - b. Motivation, leadership, control, coordination and team work, decision making.
  - c. Corporate planning and strategic management.
  - d. Corporate social responsibility.
  - e. Project management: project cycle, use of network models (CPM, PERT), manpower planning and resource scheduling/levelling, project monitoring and control.
  - f. Financial analysis: methods of financial analysis such as benefit cost ratio, internal rate of return, net present value, payback period, minimum attractive rate of return and their application; concept of EIRR and FIRR; tariff structure.
5. **Governance & new trends of infrastructure development:** [2x5= 10]
  - a. Meaning, features and dimensions of governance.
  - b. Present Constitution of Nepal, Federal, provincial and local level governance.
  - c. Various sectors of infrastructure: trend, possibilities and challenges.
  - d. Role of infrastructure in industrial development: opportunities and challenges.
  - e. Connectivity and infrastructure: national, sub-regional, regional and international connectivity.



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## द्वितीय पत्र: सेवा सम्बन्धी

1. **Engineering survey:** [1x10=10]
  - a. Introduction and principles of surveying.
  - b. Linear (distance) measurement: distance measurement techniques, instruments and tools, obstacles in measurement, scales, error, correction of errors, precision, and accuracy.
  - c. Types of surveying: as per purpose, as per equipment (compass, theodolite, total station), as per method (tachometry, use of stadia method, compass) bearing computation, determination of error and adjustment introduction and use of total station instruments and its importance.
  - d. Leveling: general knowledge of leveling, principle and method of leveling, contour and method of contouring, use of contour map, profile leveling, fly leveling, cross sectioning, trigonometrically leveling (both case of base is accessible, inaccessible) and reciprocal leveling, booking of field data, computation.
  - e. Traversing in surveying: need of traverse, computation (coordinate), omitted measurement, determination of error and adjust.
  - f. Special technique of surveying: triangulation and trilateration, orientation, resection and intersection.
  - g. Curve surveying: types of curve, elements of curves, design and calculation of vertical curve, horizontal curve and setting out of simple circular curve, elements of transition curve.
  - h. Photogrammetry remote sensing, global positioning system (GPS) and geographical information system (GIS): working principles, and use of GPS, application of GIS to civil engineering projects.
2. **Construction materials:** [0.5x10=5]
  - a. Properties of building materials: physical, chemical, constituents, thermal.
  - b. Major types of construction material (stones, timber, clay product, binding material, metals, miscellaneous material.
  - c. Stones: characteristics and selection of good building stone.
  - d. Clay product: bricks and tiles types and characteristics, testing.
  - e. Timber and wood: characteristics, seasoning, preservation.
  - f. Binding (cementing) materials: type, properties and uses (cement, lime).
  - g. Metals: types and properties (steel, alloy).
  - h. Miscellaneous material (asphalt, bitumen and tar, plastic material, PVC material, composite material, thermal & sound insulating materials, paints, varnish & enamels, plastics, rubber, gypsum board.
3. **Structural analysis and design:** [1.5x10=15]
  - a. Concept of stress and strain, theory of torsion and flexure: moment of inertia.
  - b. Analysis of beam and frames; shear force, bending moment and deflection of beam and frames; determinate structure- energy methods; three hinged systems, indeterminate structures- slope deflection methods and moment distribution method, use of influence line diagrams for simple beams, unit load method.
  - c. Reinforced concrete structures: difference between working stress method & limit state method, analysis of RC beams, and slabs in bending, shear, deflection, bond and end anchorage, design axially loaded columns; isolated and combined footing.
  - d. Steel structure: analysis and design, types of connection, tension members, design of column, beam plate girder, and roof components.



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- e. Timber structure: types of joints, design of column and beams design of riveted, bolted and Welded connection.
4. **Concrete technology:** [0.5x10=5]  
a. Properties and ingredients of cement concrete; physical, chemical.  
b. Grade and strength of concrete, concrete mix design, quality control of concrete, testing.  
c. Mixing, transportation, placing and curing of concrete.  
d. Admixture and use of different admixtures, high strength concrete & pre-stressed concrete.
5. **Estimating and costing, valuation, and specification:** [0.5x10=5]  
a. Types and purpose of estimating, types, purpose, importance, requirement of analysis of rate, key component of estimating, basis of rate analysis.  
b. Methods of measurement and taking out quantities.  
c. Purpose of valuation, terms used in valuation: capitalized value, depreciation, rent, mortgage, and lease, methods of determining value of property.  
d. Norms and specification purpose, types and its importance in construction industry.  
e. Complete estimate of cost of building, road works, water supply and sanitary/sewerage works, split up annual repair and maintenance estimate.  
f. Bill of quantities (BoQ) and abstract of cost.
6. **Engineering economics:** [1x10=10]  
a. Definition of economics, role of economics in engineering, law of demand, law of supply, principles of engineering economy, cash flow diagram, interest and time value of money, concept of time value of money, simple and compound interest, effective rate of interest, continuous compounding.  
b. Basic methods of engineering economic analysis, minimum attractive rate of return (MARR), payback period method, accounting rate of return, equivalent worth method: present worth method, future worth method, annual worth method, rate of return method: internal rate of return, external rate of return, simple benefit cost ratio, comparative analysis of alternatives.  
c. Depreciation, methods of depreciation: straight line method, sinking fund method, sum of the year digit method, declining balance method, modified accelerated cost recovery system (MACRS).  
d. Risk analysis, sources of project risks, methods of identifying project risks: sensitivity analysis, breakeven analysis, scenario analysis, probability concept of economic analysis, decision tree and sequential investment decision.  
e. Capital investment, types of capital: common stock, preferred stock, bonds bond amortization and retirement, inflation, measuring inflation equivalence calculation under inflation.  
f. Taxation, introduction to corporate income tax, property tax, excise tax, types of taxes: direct tax, indirect tax and value added tax, cash flow estimate.
7. **Public Procurement and Construction management:** [1x10=10]  
a. Organization: need of organization, responsibilities of supervisor, relation between client, consultant and contractor, Construction planning and scheduling: Work Break Down Structure (WBS), Project Scheduling with Gantt Chart.  
b. Public Procurement: procurement of works, goods and services.  
c. Bid Document Preparation: pre-qualification and post-qualification, conditions of contract, bid and performance securities, tender notice, bid evaluation, selection and award.  
d. Planning of Construction: material handling, construction equipment, appropriateness of use of equipment.



# औद्योगिक क्षेत्र व्यवस्थापन लिमिटेड

(नेपाल सरकारको स्वामित्व भएको)

प्राविधिक सेवा ईन्जिनियरिङ्ग समुह/सिभिल उपसमुह सिभिल ईन्जिनियर तह-७ पदको  
खुला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

- e. Occupational Safety and Health Requirements: safety and health rules and awareness, safety tools and accessories, site safety management, safety in construction operations, safety in the use of construction equipment, personal protection equipment, contractual provisions.
  - f. Management principles, personnel management, leadership styles, centralization and decentralization, communication styles and importance, management and trade unions.
  - g. Contract Management: kick off meeting, relation between owner, consultant and contractor, responsibility of site engineer, supervising work of contractor, management meeting, record keeping, progress report, quality tests, interim/final payment certificate, defect liability period, contractual claims and dispute.
  - h. Quality assurance, monitoring and evaluation and technical audit,
  - i. Maintenance management: planning and scheduling of maintenance, estimation and financing of maintenance.
- 8. Geotechnical Engineering:**
- a. Formation of Soil General Classification of soil depending on transporting agent and deposit media
  - b. Three phase of soil basic term relation between basic term volumetric relationship mass and volume weight and volume specific gravity of soil and lab test field density and determination of method.
  - c. Type of Water in soil moisture content and relationship organic content in soil.
  - d. Index properties of soil.
- 9. Road and Drainage:** [1.5x10=15]
- a. Modes of transportation and comparison between them.
  - b. History and development of road transportation.
  - c. Road classification in Nepal (NRS, NRRS).
  - d. Highway alignment and its requirement: factors controlling highway alignment geometric design of highway: map study, basic design control and criteria, cross sectional elements, radius of horizontal curve, super elevation, extra widening, transition curves, sight distances, setback distances, gradients, grade compensation design of vertical curves, right of way, traffic engineering.
  - e. Highway drainage: surface drainage system including design of side drains, subsurface drainage system, cross drainage system, energy dissipating structures.
  - f. Road pavement: definition and types of pavement and their applicability, difference between flexible and rigid pavements, factors controlling pavement design, flexible pavement design methods, California Bearing Ratio (CBR) method, road note 31 method (catalogue method), Nepalese guidelines, IRC method, details-of-Asphalt-Institute (AI) method.
  - g. Road construction technology and maintenance: road construction activities, tools, equipment and plants, construction of earthen and gravel roads, WBM roads, construction of soil stabilized roads, construction of bituminous roads (interface treatment, surface dressing, otta seal, grouted macadam, bituminous carpet, mastic asphalt, asphalt concrete), cement concrete pavement, classification of highway maintenance, maintenance priorities, pavement distress evaluation (Benkelman beam test), flexible and rigid pavement failures, causes and remedial measures.



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## 10. Water, sanitation, health and environment:

[1.5x10=15]

- Water, sanitation, health and environment, classification of sources of water: water demand and quantity determination, types of water demand, variation in demand of water, population forecasting - necessity and methods.
- Impurities in water, their classification and effects, living organisms in water, water related diseases, examination of water, national drinking water quality standards, objectives of water treatment.
- Major components of water supply system: design of intakes, transmission line, collection chamber, and break pressure tank, reservoir and distribution system.
- Sanitary and environmental engineering, sewage/wastewater, domestic sewage, industrial sewage, sanitary sewage, storm water, sludge, sewer, sewerage, rubbish, garbage, refuse/solid waste, environment, pollution, importance of wastewater and solid waste management, methods of collection, conveyance, treatment and disposal, sanitation systems, quantity estimation of waste water, design and construction of sewer, sewer appurtenances.
- Examination of waste water, wastewater disposal, wastewater treatment method, sludge treatment and disposal, disposal of sewage from isolated buildings, solid waste disposal, water treatment plant.
- Environmental health engineering, epidemiology, pathogen (bacteria, virus, helminthes, protozoa, water borne diseases).
- Environment Protection Act and Regulation, IEE and EIA.

## 11. Engineering professional practice and liabilities:

[1x10=10]

- Role of engineers in a society: ethical and unethical behaviors in professional practice, professional decisions by following existing regulatory and professional frameworks, select appropriate dispute and conflict resolution methods, and analyze professional engineering issues related to ethics, code of conduct, norms and standards and to render decisions on appropriateness of steps taken and assign degree of responsibility in specific cases.
- Legal provisions related to construction; construction quality and standards, environment law, labor law, building by-laws and codes, land acquisition and resettlement, Cyber Act, IPR Act, Nepal Engineering Council Act.
- Globalization and cross cutting issues: case studies related to practice of engineering profession: public safety, industrialization and protection of environment, conflict of interest, personal integrity, and personal privacy, cases involving professional negligence (duty, breach, proximate cause and damage), cases involving breach of duty, criminal law, tort, cases involving breach of NEC's code of conduct, cases involving breach of public procurement act and public procurement regulation, cases involving breach of intellectual property rights and copy rights, cases involving abuse of position and authority.



# औद्योगिक क्षेत्र व्यावस्थापन लिमिटेड

(नेपाल सरकारको स्वामित्व भएको)

प्राविधिक सेवा ईन्जिनियरिङ्ग समुह/सिभिल उपसमुह सिभिल ईन्जिनियर तह-७ पदको  
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## द्वितीय चरणको: कम्प्यूटर सीप परीक्षण (Computer Skill Test)

प्रयोगात्मक परीक्षा योजना (Practical Examination Scheme)

विषय	पूर्णाङ्क	परीक्षा प्रणाली	विषय वस्तु शिर्षक	अङ्क	समय
कम्प्यूटर सीप परीक्षण (Computer Skill Test)	१०	प्रयोगात्मक (Practical)	Devanagari Typing	२.५ अङ्क	५ मिनेट
			English Typing	२.५ अङ्क	५ मिनेट
			Windows basic and Word processing	५ अङ्क	५ मिनेट

### 1. Windows basic

#### Contents

- Introduction to graphical user Interface.
- Starting and shutting down Windows.
- Basic Windows elements - Desktop, Taskbar, My Computer, Recycle Bin.
- Concept of files and folders.
- Searching files and folders.

### 2. Word processing

- Creating, saving and opening documents.
- Typing in Devanagari and English.
- Text formatting (font, size, color, underline, italic, bold) and paragraph formatting (alignment, indentation, spacing).
- Inserting header, footer, page number.
- Page setting (margin, page size, orientation), previewing and printing of documents.

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