नेपाल टेलिकम

नेपाल दूरसंचार कम्पनी लिमिटेड

अधिकृतस्तर तह ७, प्राविधिक सेवा, टेलिकम ईन्जिनियरिङ समूह, इलेक्ट्रोनिक्स एण्ड कम्युनिकेसन उपसमूह, इलेक्ट्रोनिक्स एण्ड कम्युनिकेसन ईन्जिनियर पदको खुला तथा समावेशी र आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

पाठ्यक्रमको रुपरेखा :– यस पाठ्यक्रमको आधारमा निम्नानुसार चरणमा परीक्षा लिइने छ :

प्रथम चरण :– लिखित परीक्षा — पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता — पूर्णाङ्क :– ३०

परीक्षा योजना (Examination Scheme)

१. प्रथम चरण : लिखित परीक्षा (Written Examination) — **पूर्णाङ्क :- २००**

पत्र	विषय	खण्ड	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्नसंख्या × अङ्क	समय
प्रथम	General Subject	General Awareness & General Ability Test	१००	४०	वस्तुगत बहुवैकल्पिक प्रश्न (MCQ)	५० प्रश्न X १ अङ्क = ५०	४५ मिनेट
		Management & Institutional Awareness			विषयगत	१० प्रश्न X ५ अङ्क = ५०	१ घण्टा ३० मिनेट
द्वितीय	Technical Subject		१००	४०	वस्तुगत बहुवैकल्पिक प्रश्न (MCQ)	३० प्रश्न X १ अङ्क	३० मिनेट
					विषयगत	२ प्रश्न X ५ अङ्क ६ प्रश्न X १० अङ्क	२ घण्टा ३० मिनेट

२. द्वितीय चरण :

विषय	पूर्णाङ्क	परीक्षा प्रणाली	समय
व्यक्तिगत अन्तर्वार्ता	३०	मौखिक	

द्रष्टव्य :

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

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुबै हुनेछ ।

३. प्रथम र द्वितीयपत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

४. लिखित परीक्षामा सोधिने प्रश्न संख्या र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा दिईए अनुसार हुनेछ ।

५. वस्तुगत बहुवैकल्पिक (Multiple Choice)प्रश्नहरुको 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 अक्षर (Capital letter) A,B,C,D मा लेख्नुपर्नेछ । सानो अक्षर (Small letter) a,b,c,d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

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

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीयचरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रमलागु मिति :-२०७८।०४।०१

नेपाल टेलिकम
नेपाल दूरसंचार कम्पनी लिमिटेड
अधिकृतस्तर तह ७, प्राविधिक सेवा, टेलिकम ईन्जिनियरिङ समूह, इलेक्ट्रोनिक्स एण्ड कम्युनिकेसन उपसमूह, इलेक्ट्रोनिक्स एण्ड कम्युनिकेसन ईन्जिनियर पदको खुला तथा समावेशी र आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

प्रथम पत्र **(Paper I): General Subject**

Section (A) : - General Awareness & General Ability Test (50% Marks)

1. **General Awareness and Contemporary Issues(25×1 Mark = 25 Marks)**

1.1 **Geography of Nepal and the World (5 Marks)**
- 1.1.1 Continent, ocean, pole, latitude, longitude, time, distance, mountains, deserts, rivers, glaciers, lakes, climate, trade winds, monsoon.
- 1.1.2 Physical, socio-cultural and economic geography, major natural resources and demography of Nepal.

1.2 **History & Culture (5 Marks)**
- 1.2.1 Major historical events of the World.
- 1.2.2 Notable events, personalities and socio-cultural aspects of ancient, medieval and modern history of Nepal.
- 1.2.3 Customs, traditions, values, religions, ethnicity, languages, cultures, arts, literature, music and heritages of Nepal.

1.3 **Economic aspects of Nepal (5 Marks)**
- 1.3.1 Economic indicators (economic growth, GDP, GNP, per capita income, remittance, foreign aid & investment)
- 1.3.2 Infrastructures of development (agriculture, industry, trade, tourism, transportation, communication, health, electricity)
- 1.3.3 Government planning and budgeting.

1.4 **Governance & Organisations (5 Marks)**
- 1.4.1 The Constitution of Nepal; federal, provincial and local governments
- 1.4.2 General information on the UNO, WTO, ITU, WB, ADB, AIIB, SAARC & BIMSTEC.

1.5 **Contemporary Issues (5 Marks)**
- 1.5.1 Information on sustainable development, environment, pollution, climate change, biodiversity, demography, urbanization, science and technology.
- 1.5.2 Recent advance and major achievements in telecommunication sectors.
- 1.5.3 Major Events and Current Affairs of National and International Importance.

2. **General Ability Test (15 ×1 Mark = 15 Marks)**

2.1 **Verbal and Non- Verbal Ability Test** (8×1 Marks = 8 Marks)
Jumble words, Coding-Decoding, Ranking Order Test, Direction and Distance Sense Test, Logical Reasoning, Statement and Conclusions, Series, Analogy, Classification, Matrix, Analytical Reasoning, Figure Formation and Analysis, Rule Detection, Water images, Mirror images, Cubes and Dice & Venn-diagram

2.2 **Numerical Ability Test** (7×1 Marks = 7 Marks)
Series, Analogy, Classification, Coding, Arithmetical reasoning/operation, Percentage, Ratio, Average, Loss & Profit, Time & Work, Data interpretation & Data verification

3. **Mathematics and Statistics (10 ×1 Mark = 10 Marks)**
   - 3.1 Function and Limit, Maxima and Minima, Differentiation and Integration and their interpretation, Equations of straight lines, circle, parabola, hyperbola, spheres, cylinders and cones, Linear differential equations (up to second order), Fourier series, Fourier Transforms, Fourier integral, inverse Fourier integral formula, odd and even function, Laplace transforms, Line, surface and volume integral, Taylor series, Zeros and Poles, Z-transforms
   - 3.2 Introduction of statistics and descriptive statistics, Mean, Mode, Variance, Dispersion, Probability, Discrete random variables and probability distribution, continuous random variables and probability distributions, Samples, Sampling theorems, Linear regression, Population mean & sample mean and accuracy, pi & bar diagrams, error functions.

Section (B) : - Management and Institutional Awareness Test (50% Marks)

4. **Management Concepts (10 Marks)**
   - 4.1 Concept of Management, Modern approaches to management
   - 4.2 Vision, Mission, Goal, Objectives, Targets, Strategies, Organization Structure, Authority and Power Delegation, Leadership, Control, Coordination, Motivation, Teamwork and Group Dynamics
   - 4.3 Managing work force diversity and appreciative inquiry
   - 4.4 Quality management & TQM techniques
   - 4.5 Time Management, Conflict Management, MIS, Customer Care, Decision Support System, Outsourcing, Inventory Control, Job Description, training, service portfolio and tariff structure of Nepal Telecom.
   - 4.6 Corporate and strategic planning and management, corporate social responsibility,
   - 4.7 Ethics, Integrity and responsibility in business/service like institution

5. **Project Management & Marketing (10 Marks)**
   - 5.1 Definitions, the project life cycle, Setting project objectives & goals, Network model: CPM & PERT, Gantt Chart, Project scheduling, Resource leveling, Systems of project control, Cost control, Preparation of operational budget, Introduction to budgetary control, Planning of quality, time & cost dimensions, Negotiating for Materials, Supplies & Services, project monitoring and evaluation, Bringing the project to a successful conclusion.
   - 5.2 Concept of EIRR(Economic internal rate of return) and FIRR(Financial internal rate of return)
   - 5.3 Business Strategic planning, Marketing Process, Product Planning, Developing the Marketing Program

6. **Finance and General Accounting Principles (10 Marks)**
   - 6.1 Essential business & accounting terminology, Cost classification & analysis, Interest & time value of money, Basic methodology of engineering economics, cost and benefit analysis, risk analysis, investment decisions, demand analysis and sales forecasting,
   - 6.2 Basic knowledge of trial balance & Balance Sheet, income statements, revenue and capital expenditure, budgeting and capitalization, depreciation and subsidy, Procurement procedures (FOB, CIF, Liquidated Damages, Letter of Credit, Insurance, Invoice, Bid Security, performance bond),Competitive bidding.

नेपाल टेलिकम

नेपाल दूरसंचार कम्पनी लिमिटेड

अधिकृतस्तर तह ७, प्राविधिक सेवा, टेलिकम ईन्जिनियरिङ समूह, इलेक्ट्रोनिक्स एण्ड कम्युनिकेसन उपसमूह, इलेक्ट्रोनिक्स एण्ड कम्युनिकेसन ईन्जिनियर पदको खुला तथा समावेशी र आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

7. संस्थागत ज्ञान र सम्वद्ध कानुनहरु (20 Marks)

7.1 नेपाल दूरसंचार कम्पनी स्थापनाको उद्देश्य, संगठनात्मक संरचना, कार्यक्षेत्र र चुनौती

7.2 नेपाल दूरसंचार कम्पनी लिमिटेडको शेयर संरचना, vision, mission, goal, objectives, strategies

7.3 नेपाल दूरसंचार कम्पनी लिमिटेडले प्रवाह गर्ने सेवाका प्रकारहरु, अवलम्वन गरिएका प्रविधिहरु, सो को गुणस्तर, गुणस्तर नियन्त्रण तथा सेवाग्राहीको सन्तुष्टी तथा सेवाको मूल्य निर्धारण सम्वन्धी व्यवस्था

7.4 नेपाल दूरसंचार प्राधिकरणको स्थापना, लक्ष्य, उद्देश्य, कार्यहरु र नियमनकारी भूमिका

7.5 नेपाल दूरसंचार कम्पनी र नेपाल सरकार तथा सम्वद्ध निकायहरु संगको सम्वन्ध र समन्वय

7.6 दूरसंचार ऐन, २०५३ तथा दूरसंचार नियमावली, २०५४

7.7 नेपाल दूरसंचार कम्पनी लिमिटेडको प्रवन्धपत्र र नियमावली

7.8 नेपाल दूरसंचार कम्पनी लिमिटेडको कर्मचारी विनियमावली, २०७८ को बिदा, आचरण तथा अनुशासन, सजाय र पूनरावेदन , अवकाश,उपदान, निवृत्तभरण तथा अन्य सुविधा

7.9 नेपाल दुरसंचार कम्पनी लिमिटडको आर्थिक बिनियमाली २०७१को भाग २ को खरिद सम्वन्धी कार्यविधि, भाग ३ को परिच्छेद (१) योजना तर्जूमा वार्षिक कार्यक्रम र बजेट, परिच्छेद(३) कम्पनीको सम्पत्तिको जिम्मा,त्यसको लगत, संरक्षण र बरबुझारथ सम्वन्धी व्यवस्था

7.10 कम्पनी ऐन, २०६३ को परिच्छेद २, ३ र ५

7.11 दुरसंचार नीति,२०६०

7.12 सूचना तथा सञ्चार प्रविधि नीति, २०७२

7.13 भ्रष्टाचार निवारण ऐन, २०५९

नेपाल टेलिकम
नेपाल दूरसंचार कम्पनी लिमिटेड
अधिकृतस्तर तह ७, प्राविधिक सेवा, टेलिकम ईन्जिनियरिङ समूह, इलेक्ट्रोनिक्स एण्ड कम्युनिकेसन उपसमूह, इलेक्ट्रोनिक्स एण्ड कम्युनिकेसन ईन्जिनियर पदको खुला तथा समावेशी र आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

द्वितीय पत्र (Paper II): Technical Subject

Section (A) : - (50% Marks)

1. **Electronic Devices and circuit**

   Bipolar transistors switching characteristics, MOS transistor switching characteristics, TTL logic circuits, NMOS/CMOS logic circuits, Memory: RAM, DRAM, PROM, EPROM, Operational amplifiers, Butterworth and Chebysev filters, A/D Converters, Adders, Arithmetic operations, Digital comparators, Parity check generator, Multiplexer & Demultiplexers, Flipflops, Shift register, Counters, Sequence generators, Power electronics: Thyristor Controlled rectifier circuits, 7 segment display, Untuned amplifier, Push-pull amplifier, tuned power amplifiers, Feedback amplifiers, bode plot analysis, Wien bridge oscillators, tuned LC oscillators, resonant circuits, crystal oscillator.

2. **Electromagnetic field and waves**

   Coulomb's law and Electric field intensity, Electric Flux Density and Gauss' law, Maxwell's first equation and application, divergence theorem, energy & potential, Laplace equation and Poisson equation, Biot-Svart's law, Ampere's circuital law, Curl, Wave motion in free space, Perfect dielectric and losses, Wave medium, Skin effect, Impedance matching, Antenna fundamental, Polarizations, Radiation from dipole antenna, wave guides and mixtures.

3. **Control system**

   Open loop and closed loop control system, System Stability and Sensitivity, System transfer functions and responses, Poles and Zeros locations and their significance, Root locus method, Frequency response method.

4. **Signal Analysis and Processing**

   Information theory, Shannon-Hartley law, Transmission of signals, Impulse response and convolution, Fourier series, Fourier Transform, Unit step, Delta, Sinc&Signum function, Helbert transform, LTI system, System described by Differential & Difference equations, FIR & IIR Filters, Discrete Fourier Transforms, IDFT, FFT, Circular convolutions, Parseval's theorem, Energy & power and auto correlation, Z transform.

5. **Basic Analog and Digital Communications**

   Difference between analog and digital communications, Basic communications elements, Signal and noise in communication system, AM, DSC-SC, SSB-SC, PM, FM, Super heterodyne AM and FM receiver, Digital to analog and analog to digital conversion, Sampling theorem, Sample & hold Circuit, A law, m-law, Quantizer, Coding: NRZ/HDB3/AMI, Error detection and correction, PCM/ADPCM, Digital Modulation: ASK/PSK/FSK /QPSK /MSK / QAM, Modulation and demodulation circuits, Frequency converter and Mixers, Phase locked loop.

Section (B) : - (50% Marks)

6. **Telecommunications and advanced communications**

   Evolution of telecommunications, Telecommunication network, Transmission media, transmission lines, characteristic impedance, Return loss, transformer and hybrid circuit, signal and noise measurements, echo & singing, space /time /frequency /wavelength division multiplexing, Erlang B formula, Queuing theorem, Data communication and computer networking basics, Packet, Message and circuit switching, X.25 Protocol, Frame relay, TCP/IP Protocol, OSI layers, Telephony, Functions of switching, electromechanical switches, Stored Programmed Controlled switch, TS/ST/TST/STS switching, No 5 and No 7 signaling, ISDN, BISDN, ATM, PDH/SDH, DSL, Radar system, Navigational systems, Numbering, Routing and charging plans. UMTS, IMT-2000, NGN (Next Generation Network), MPLS, Real time protocol, Voice over IP, IP/PSTN Platform, Introduction to IN(Intelligent Network), basics of GIS (Geographical Information System).

7. **Optical Communication**

   Total internal reflection, Snell's law, Optical Fiber types and properties, optical transmission, Optical transmitters and receivers, Interconnected and switched; splices, connectors & coupling, Fiber Optics Networks, Optical switching, Submarine cable.

8. **Wireless Communications**

   Evolution from 1G to 5G, Propagation theory, LOS (Line of Sight) & Non-LOS model, Okumura and Hata Model, GMSK, OQPSK, BPSK, FDMA/TDMA/CDMA technologies (GSM, 4G(LTE), CDMA, WiMAX), Fundamental of satellite communication, stabilization, tracking, satellite orbit and radio spectrum, satellite wave propagation and satellite antennas, Digital satellite communication systems, earth stations, Kepler's laws of orbital motion, signal to noise ratio, interference between different wireless systems.

9. **Basic Electricity**

   Circuit elements, series & parallel circuits, resistance, resistivity, Ohm's laws, Kirchoff's laws, Single phase & three phase circuit analysis, Measurement of current, voltage, power, energy, insulation resistance, Primary & Secondary cells, Cells in series & parallel, star & delta connections, Fundamentals of transformers, Generators and Induction motors, Electrical shock hazards, Earthing and shielding techniques for telecom equipments, Lightning protections.

10. **Information and Communications Technology Basics**

    Computer architecture, Microprocessor fundamentals, Microcomputer systems: Bus structure, Memory systems (main, auxiliary, virtual, cache, I/O devices, parallel and serial interfaces, RS-232 standards, Flow charts, algorithms, variables, constants, data types, arithmetic expression, arrays, Concept of ROM,RAM, MS-DOS, Windows, MS-Office packages, basic concept on internet and e-mail.