नेपाल दूरसञ्चार प्राधिकरण

प्राविधिक सेवाःइञ्जिनियरिङ्ग समूह, उपनिर्देशक (अधिकृत स्तर द्वितीयश्रेणी) को आन्तरिक प्रतियोगिताको लिखित परीक्षाको पाठ्यक्रम एवं परीक्षायोजना

पाठ्यक्रमको रुपरेखा :– यस पाठ्यक्रमको आधारमानिम्नानुसार चरणमा परीक्षालिइने छ :

प्रथम चरण :– लिखित परीक्षा — पूर्णाङ्क :– १००

द्वितीय चरण :– अन्तर्वार्ता — पूर्णाङ्क :– २०

१.प्रथमचरणः – लिखितपरीक्षा **पूर्णाङ्क :– १००**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्याX अङ्क	समय
प्रथम	दूरसंचारव्यवस्थापन तथानियमन सम्बन्धी	१००	४०	विषयगत	छोटो उत्तर	८प्रश्नX ५अङ्क	३ घण्टा
					लामो उत्तर	४प्रश्नX १० अङ्क	
					समस्या समाधान	१प्रश्नX २० अङ्क	

२. द्वितीय चरण : –अन्तर्वार्ता **पूर्णाङ्क :– २०**

विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	२०	-	मौखिक

द्रष्टव्य :

१. लिखित परीक्षाको माध्यमभाषा नेपालीवाअंग्रेजीवादुवै हुन सक्नेछ ।

२. लिखित परीक्षामायथासम्भव पाठ्यक्रमका सबै एकाईबाट प्रश्नहरु सोधिनेछ ।

३. विषयगतप्रश्नमाप्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

४. यस पाठ्यक्रम योजनाअन्तर्गतकापत्र/विषयकाविषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियमतथानीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधनभएकावा संशोधनभई हटाईएकावाथप गरी संशोधनभई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

५. प्रथमचरणको परीक्षाबाट छनौट भएकाउम्मेदवारहरुलाई मात्रद्वितीयचरणको परीक्षामा सम्मिलित गराइनेछ ।

६. यस भन्दा अगाडि लागू भएकामाथिउल्लिखित सेवा, समूहको पाठ्यक्रमखारेज गरिएको छ ।

७. पाठ्यक्रमलागू मिति :–

नेपाल दूरसञ्चार प्राधिकरण

प्राविधिक सेवाःइञ्जिनियरिङ्ग समूह, उपनिर्देशक (अधिकृत स्तर द्वितीयश्रेणी) को आन्तरिक प्रतियोगिताको लिखित परीक्षाको पाठ्यक्रम

प्रथमपत्रः दूरसंचार ब्यवस्थापनतथा सेवा सम्बन्धी

Section (A) – 50 Marks

1. Telecommunications and Society

1.1 Social and cultural aspects of Telecommunication Technologies & services
1.2 Role of ICT in national development
1.3 Information superhighway
1.4 Convergence Technologies
1.5 Declaration of Principles of the World Society on Information Systems (WSIS), 2003 and Agreement on the Tunis Commitment, 2005
1.6 WSIS Outcomes and the WSIS+10 Vision for WSIS Beyond 2015
1.7 Sustainable Development Goals (SDGs),
1.8 Indicators as adopted by the nations of the world, especially those related to eradication of poverty & hunger, achievement of universal primary education,reduction of child mortality, and improvement of maternal health
1.9 ITU, APT, SATRC, ICAO
1.10 Disaster Communications
1.11 Principles of unbundling, Local loop unbundling, shared access and Bit Stream Access

2. Regulatory Aspects

2.1 **Licensing of Telecom Services**
- 2.1.1 Licensing Service
- 2.1.2 Licensing Objective
- 2.1.3 Licensing Process
- 2.1.4 Licensing rules in WTO regulation reference paper

2.2 **Numbering and Interconnection**
- 2.2.1 ITU Recommendations for numbering system for Telephone & Voice
- 2.2.2 National Numbering Plan
- 2.2.3 Mobile Number Portability
- 2.2.4 Interconnection issues
- 2.2.5 Interconnection Guidelines, 2065

2.3 **Universal Service Obligation (USO)**
- 2.3.1 Provisions on RTDFin Telecommunication Act, 2053
- 2.3.2 Provisions on RTDF in Telecommunication Policy, 2060
- 2.3.3 RTDF Bylaw 2012 A. D,

2.3.4 Issues on RTDF Utilization: Technical Domain, Financial Domainand Business Domain, Practices, Limitation,Challenges and Opportunities for the Disbursement of RTDF

2.4 **Radio Spectrum Management**

2.4.1 Spectrum Management Principles

2.4.2 National Spectrum Management Policies

2.4.3 National Frequency Allocation Plan (NFAP), 2060

2.4.4 Radio Spectrum Measurementand Monitoring

2.4.5 Techniques adopted for Assignment of spectrum: Administrative Pricing, Beauty Contest, and Auctioning of Spectrum

2.4.6 Spectrum Pricing

2.5 **Standardization of Telecommunication Equipment and Services**

2.5.1 Telecommunication Equipment Standardization

2.5.2 Type Approval of Radio Telecommunication Terminal Equipments

2.5.3 Standards on EMR from Mobile Tower

2.5.4 Testing of Radio Telecommunication Terminal Equipments- EMC, Safety, RF, SAR

2.5.5 Quality of Experience (QoE)

2.5.6 QoS benchmarks as set out by NTA

2.5.7 QoS benchmarks for Telephone services including Mobile Service based on GSM/3G/4G technology and for Internet Services

2.5.8 Billing performance, Billing Accuracy & its Audit

2.5.9 Benchmarks indicating percentage of customers satisfied with reliability & availability of network

2.5.10 Customer satisfaction

2.5.11 Method for evaluation of achievement of QoS benchmarks by service providers as set out by NTA

3. **Engineering Economics**

3.1 Demand and Supply

3.2 Laws of return

3.3 Types of business organization

3.4 Capital budgeting

3.5 Financial analysis

3.6 Risk analysis

3.7 Basic methodology of engineering economic studies

3.8 E-Bidding

3.9 Fundaments of Electronic Commerce

3.10 Concept and Practices of Cyber Law in e-commerce/e-governance

4. Management: Concept and Principles

4.1 Strategic Management and its implementation in Corporate sector
4.2 Authority and Delegation
4.3 Basic priciple of HRD/ H & M and Human Resource planning
4.4 Conflict Management
4.5 MIS and its application in NTA
4.6 Negotiation Skills and Arbitration
4.7 SWOT relating to NTA and NTA's functions and initiatives regarding its policies, plan, program and activities

5. Project Management

5.1 The project life cycle
5.2 Setting project objectives and goals
5.3 Network model: CPM & PERT
5.4 Resource leveling
5.5 Systems of project control
5.6 Preparation of operational budget
5.7 Negotiating for Materials, Supplies and Services
5.8 Bringing the project to a Successful conclusion

6. **Legislative Provisions**

6.1 Telecommunication Policy 2060,
6.2 Radio Frequency Policy for Telecommunications Services (Distribution & Pricing), 2069,
6.3 Broadband Policy, 2071
6.4 ICT Policy, 2072
6.5 Long-term Policy of Information and Communication Sector, 2059 (2003),
6.6 ITU Radio Regulations
6.7 Radio Act, 2014
6.8 National Broadcasting Act, 2047
6.9 Telecommunications Act, 2053
6.10 Telecommunications Regulations, 2054
6.11 Company Act,2063,
6.12 Privatization Act, 2050
6.13 Consumer Protection Act, 2054
6.14 Competition Promotion and Market Protection Act, 2063
6.15 Procurement Act, 2063 (with amendment)
6.16 Procurement Regulation, 2064 (with amendment)
6.17 Anti-Corruption Act,2059
6.18 RTDF Disbursment Bylaw, 2068,
6.19 Nepal Telecommunication Authority Financial Management bylaw, 2067

6.20 Monitoring Working Procedure Bylaws Final 2068
6.21 NTA work performance bylaw, 2068,
6.22 Type Approval Working Procedure for Customer Premises Radio Telecommunication Equipment-2072 (TAP-04),
6.23 Tariff Guidelines, 2060
6.24 Interconnection Guidelines, 2065

Section (B) – 50 Marks

7. Telecommunication Systems and Engineering Design Data Systems

7.1 Telecommunication Network
7.2 Transmission Media
7.3 Transmission lines
7.4 signal and noise measurements
7.5 Echo and singing
7.6 Space/time/frequency/wave length division multiplexing
7.7 Packet, Message and circuit switching
7.8 X.25 Protocol
7.9 Frame relay
7.10 TCP/IPProtocol
7.11 Functions of switching
7.12 Stored Programmed Controlled switch, TS/ST/TST/STS switching, No 5 and No 7 signaling
7.13 ISDN, BISDN, ATM, PDH/SDH, DSL
7.14 Navigational systems,
7.15 Numbering, Routing and charging plans
7.16 LTE,UMTS, IMT-2000, WiMAX, IMS, NGN, MPLS, Real time protocol, Voice over IP, IP/PSTN Platform, IN, SSP, SCP, SCP, SSP, SMS and basics of GIS

8. **Communication Engineering for Voice and Data**

8.1 Transmission and Switching
8.2 Multiplexing and Signaling
8.3 Alerting and Supervision
8.4 Call traffic Engineering
8.5 Network Optimization
8.6 Busy hour
8.7 Carried traffic,Offered traffic
8.8 Transmission Systems
8.9 Digital Multiplexing

8.10 Broadband techniques- DSL, ATM, SDH, SONET, ISDN, VoIP, OSI model, Frame relay, TCPIP, Real time Protocol, MPLS, NGN, IMS
8.11 Optical fiber communication
8.12 Difference between analog and digital communications
8.13 Basic communications elements
8.14 Signal and noise in communication system
8.15 AM, DSC-SC, SSB-SC, PM, FM
8.16 Super heterodyne AM and FM receiver
8.17 Digital to analog and analog to digital conversion
8.18 Sampling theorem,
8.19 Sample and hold Circuit, A law, μ-law, quantizer
8.20 Coding: NRZ/HDB3/AMI,
8.21 Error detection and correction
8.22 PCM/ADPCM
8.23 Digital Modulation: ASK/PSK/FSK /QPSK /MSK / QAM
8.24 Modulation and demodulation circuits
8.25 Frequency converter and mixers
8.26 Phase locked loop
8.27 Internet and World Wide Web, Protocols used in network and applications, Capabilities, Privacy and security issues

9. **Digital Networks and Wireless Network**

9.1 Architecture
9.2 Network components
9.3 Framing, Channelisation and Signaling
9.4 Digital Voice and Video, Packet and Switched Services-ATM, xDSL, Frame Relay, X-25,
9.5 Encryption and Security issues
9.6 Convolutional codes,Viterbi codes
9.7 Trellis coding and decoding
9.8 Low Power Radio communication Devices and its Regulation
9.9 Unlicensed Band and its regulation with existing national practices
9.10 Wireless LAN development tools
9.11 IEEE802.11 products
9.12 IEEE 802.15 products
9.13 IEE802.16 products
9.14 WiFi
9.15 Other Low Power Devices like Bluetooth
9.16 Ultra-Wideband (UMB) device
9.17 Radio Frequency Identification (RFID), Software Defined Radio

9.18 Cognitive Radio
9.19 Speed Spectrum Encoding: Direct Sequence Spread Spectrum
9.20 Frequency Hopping Spread Spectrum
9.21 Dynamic Frequency Selection (DFS)
9.22 Orthogonal Frequency Division Multiplexing (OFDM)