

रेडियो प्रसार सेवा विकास समिति (रेडियो नेपाल)

खूला तथा आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम एवं परीक्षा योजना
सेवा: ईन्जिनियरिङ्ग, समुह: ईन्जिनियरिङ्ग, तह: ७, पद: ईन्जिनीयर

प्रथम चरण :- लिखित परीक्षा
द्वितीय चरण :- अन्तर्वार्ता

पूर्णाङ्क :- २००
पूर्णाङ्क :- ३०

लिखित परीक्षा योजना						
पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या X अङ्कभार	समय
प्रथम	कम्युनिकेशन ईन्जिनियरिङ्ग	१००	४०	वस्तुगत बहुउत्तर छोटो छोटो उत्तर लामो उत्तर	२५X२=५० ८ X५=४० १X१० = १०	३ घण्टा
द्वितीय	सेवा सम्बन्धी	१००	४०	वस्तुगत बहुउत्तर छोटो छोटो उत्तर लामो उत्तर	२५X२=५० ८ X५=४० १X१० = १०	३ घण्टा

द्रष्टव्यः

१. यस पाठ्यक्रम अनुसार दुई पत्रको लिखित परीक्षा लिइनेछ ।
२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी हुनेछ ।
३. प्रत्येक पत्रको लागि छुट्टाछुट्टै उत्तर पुस्तिका हुनेछन् । वस्तुगत र विषयगत प्रश्नहरूको उत्तरपुस्तिका छुट्टाछुट्टै हुनेछन् ।
४. यथासम्भव प्रश्नहरू नेपालको सन्दर्भमा सोधिने छन् ।
५. यस पाठ्यक्रममा जेसुकै लेखिएको भएता पनि पाठ्यक्रममा परेका ऐन, नियमहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
६. यस भन्दा अगाडि लागू भएको माथि उल्लिखित समूहको पाठ्यक्रम खारेज गरिएको छ ।

रेडियो प्रसार सेवा विकास समिति (रेडियो नेपाल)
खूला तथा आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम
सेवा: ईन्जिनियरिङ्ग, समुह: ईन्जिनियरिङ्ग, तह: ७, पद: ईन्जिनियर

प्रथम पत्र: कम्प्युनिकेशन इन्जिनियरिङ्ग

पूर्णाङ्क: १००

खण्ड (क)

1. Communication Engineering

Frequency spectrum (discrete and continuous) and bands, coulomb's law and electric field intensity, electric flux density and gauss' law, Spectral density, Noises (atmospheric, thermal, partition, white noise, Gaussian noise, Noise ratio(s)), Maxwell's first equation and application, divergence theorem, energy and potential, Fourier series, 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 (Horn, slot, parabolic, yagi, Cassegrain, lens), polarization, radiation from dipole antenna, wave guides(broad-band guides, Cylindrical, ridged)

2. Telecommunications and advanced communications

Different between Telecommunications and Radio Communication, return loss transformer and hybrid circuit, signal and noise measurements, echo and singing, space/time/frequency /wave length division multiplexing, erlang B formulae, queuing theorem, OSI layers, telephony, functions of switching, electro mechanical switches, stored programmed controlled switch (TS/ST/TST/STS switching, no. 5 and no. 7 control signaling), general concept of ISDN, BISDN, ATM, PDH/SDH, DSL, HDSL, ADSL, numbering, routing and channeling plans; UMTS, IMT-2000, NGN (Next Generation Network), real time protocol, VoIP, IP/PSTN platform, Overview to IN (Intelligent Network), Basics of GIS (Geographical Information System)

3. OpticalSystem

Laser, Photocell, photo device (LED, CRT, photovoltaic, photo-multipliers, APD's PCN), Principle of optical communication, Total internal reflection, Snell's law, Chemical vapour Deposition, optical fibers types, capacity and properties, optical transmission, optical transmitters and receivers, interconnected and switched, Joining techniques, splices, connectors and coupling, fiber optics networks, optical switching, underground cabling (Route and ambient consideration, tension prediction)

4. Wireless Communications

Radio frequency band, Propagation theory (groundwave, spacewave, tropospheric, ionospheric), Euler-Larmour theory, LOS (line of sight) and non-LOS model, Okumara and Hata model, Mobile Technologies (DECT, GSM, CDMA2000-1x and etc.), Fundamental of satellite communication (tracking, Satellite orbits and Radio spectrum, satellite wave propagation and satellite antennas), digital satellite communication system, earth stations, Kepler's laws of orbital motion, signal to noise ratio, interference between different wireless systems. Antennas (Directional, Non-directional, reflective), impedance and effective length of antenna as transmitter & receiver, Radiation pattern, broad-side pattern, Eudfire pattern, Pattern synthesis

5. Computers and Network

Different between analogue and digital computer, Binary system and Boolean algebra, Gates, Computer structure (I/O devices, Storage devices, Memories) and typical processor architecture, CPU and memory organization, buses, Characteristics of I/O and storage devices, Processing unit and controller design, hardware and micro program control, Instruction sets and addressing modes, memory systems (main, auxiliary, virtual, cache), assembly language programming, I/O and interrupt servicing, Multiplexing, (time, frequency and code division multiplexing), Digital networks: ISDN, frame relay and ATM. Protocols: (such as ISO/OSI reference model, X.25, IP), LAN/WAN topologies, access schemes, medium access and logic layers; CSMA/CD and token ring protocols; segmented and hubbed LANs, Operating system principles, components, and usage(Multitasking and/or multiprocessing, Real-time aspects)

खण्ड (ख)

6. Information and Communications Technology (ICT)

Computer architecture, microprocessor fundamental, microcomputer systems, parallel and serial interfaces, RS-232 standards, flow charts, algorithms, variables, constants, data types, arithmetic expressions, arrays, concept of Operating System, Basic concept on internet, e-mail and web-page (such as DNS, IP, URL, http, ftp, IRQ, Routers). Server (Web, email, printer), General concept of Cyber security (digital signature, SPAM, VIRUS, WORM, hacking, cracking), Unicode

7. Electronic Device and Circuit

Diodes (Tunnel, varactor, zener, diac, Triac, bridge, Impatt, Gunn, photo) and applications, Bipolar transistors switching characteristics, unijunction transistor, MOS transistors switching characteristics, SCR, UJT, 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 and demultiplexer, flip-flops, shift register, counters, sequence generators, oscillators(wien bridge oscillators, tuned, LC oscillators, crystal, clap modification), resosant circuits, thyristor, controlled rectifier circuits, 7 segment display, amplifier (Untuned, push-pull, feed back amplifiers, Klystron, Magetrons) bode plot analysis, Emitter, clipper, collector, clamper circuits

8. Signal analysis and processing

Discrete probability theory, Information theory, Shannon-Hartley law, transmission of signal, impulse response and convolution, Fourier series, Fourier transform, unit step, delta, sinc and signum function, helbert transform, LTI system, system described by differential and difference equations, FIR and IIR filters, discrete Fourier transforms, IDFT, FFT, circular convolutions, Parseval's theorem, energy, power and autocorrelation, Z transform

9. Instrumentation & Control System

Dynamometer, Multimeter, Oscilloscopes, Signal generator, Impedance Bridges (Maxwell, Hay, Schering, Anderson, Desauty), Transducers (Strain Guages, Thermistor, Piezoelectric tacheometer, thermocoupler) Open loop and closed loop control system, system stability and sensitivity, system transfer functions and responses, poles and zeros location and their significance, root locus method, frequency response method, Bolometers technique for measurement of power

10. Basic Analog and Digital Communications

Difference between analog and digital communications, basic communication elements, signal and noise in communication system, AM, DSC-SC, PM, FM, Super-heterodyne AM and FM receiver, SSB, D/A and A/D Converters, sampling theorem, sample and hold circuit, A law, m-law, quantizer, coding (NRZ/HDB3/AMI), error detection and correction, Parity check, PCM/ADPCM, digital modulation (ASK/PSK/QPSK/MSK/QAM/CDMA/FDMA/DSSS), pulse modulation, modulation and demodulation circuits, Frequency hopping, frequency converter and mixers, phase locked loop

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सेवा: ईन्जिनियरिङ्ग, समुह: ईन्जिनियरिङ्ग, तह: ७, पद: ईन्जिनियर

द्वितीय पत्र: सेवा समूह सम्बन्धी

पूर्णाङ्क: १००

खण्ड (क)

1. Radio Communication

Radio propagation in different waves (long wave to SHF), propagation characteristics, frequency availability, limitation element at VHF, UHF, discrete and continuous spectrums, stray capacitance, internal load inductance, dummy load, Traveling and standing waves, match and mismatch lines, distribution component of line, Variable impedance along a mismatched line, Tune circuit and filters, Phase velocity, phase shift, group velocity, wave guides, antenna fundamentals (types, characteristics, pattern, matching), Modulation & demodulation types and techniques for analogue and digital system, different types of Noise and calculation, frequency generation, counters. Random signal theory (Ergodic processes, correction function, white noise)

2. Information Technology

Computer, Microprocessor, Signal processing, Database Management, Computer Architects and computer Graphics, Internet, email and Web-pages, e-strategies (e-government, e-business, e-learning, e-health, e-employment, e-environment, e-agriculture, e-science), Tele-culture (Tele-education, Tele-medicine, tele-centre, Tele-phony, and etc.)

3. Electronics Device, Circuit and Techniques

Use, operation and characteristics of Diode, triode, pentode, Transistors, thyristor; measurement of resistance, capacitance, inductance, current, voltage in different R-C-L circuit, different types of amplifiers and rectifiers' usage and characteristics, Strain gauge and application, SCR (simple, phase control, temperature control, light control), close/open loop control and choppers, Boolean algebra, Logical gates and switching algebra, Memory (statics, volatile), A/D & D/A converter circuits, Sampling theory

4. Navigation, surveillance, Avionics

Radar range equation, Radar direction indication, Radar Display, different between PAR, SSR, Doppler effect, MTI Radar, HF-SSB communication, General concept of Navigation system (MLS, ILS, Radio Beacons and determinations, VOR, DME, GPS) and Airborne equipment (FIS, altimeter.), ICAO Annex 11

5. Power supplies

Single phase and Polyphase AC power supply systems, Electrical motors, AC/DC generators, Rectifiers and filters, Regulator power supply system, Uninterruptible Power Supply Systems.

6. Frequency Management & Monitoring

Radio Frequency band and allocation, Frequency Channel plan (as per separation and system), spurious emissions, system (Simplex, duplex, dual) Type of radio services, Terrestrial line-of-sight communication links (propagation, effects of atmosphere, interference, fading) Broadcasting band, Frequency monitoring systems (techniques and procedures, scanning, location & direction finding), Satellite communication (orbital locations, choice of frequency, modulation techniques) and earth station (antenna, terminal equipment, ground networking, earthing) National Frequency Allocation Plan

7. Management Concepts

Role of Science and technology in development, Parameters of development, Measurement of Development, Targeting Vision, mission, goal and objectives; strategies and work description of organization and its' structures, authority and power delegation, leadership, motivation, group's dynamics, time management, conflict management, use of MIS, decision support system, customer care, out sourcing, use of inventory and training, service port folio

खण्ड (ख)

8. Rules, Regulations & Policy

ITU overview, ICAO Overview, ICT policy, Telecommunication Policy, Radio Act & Regulations, National Broadcasting Act & Regulation, Cyber-law, National Frequency Allocation Plan

9. नेपालको संविधान,
- १० सूचनाको हक सम्बन्धी ऐन २०६४ र नियमावली २०६५ (संसोधन सहित),
- ११ रेडियो प्रसार सेवा विकास समिति, कर्मचारी सेवा शर्त नियमावली, २०७७
- १२ रेडियो प्रसार सेवा विकास समिति, आर्थिक नियमावली, २०४९
- १३ विकास समिति ऐन, २०१३,
- १४ रेडियो प्रसार सेवा विकास समिति, गठन आदेश, २०४१ (संसोधन सहित)
- १५ सूचना तथा संचार क्षेत्रको दीर्घकालिन नीति २०५९
- १६ सूचना तथा सञ्चार प्रविधि नीति २०७२
- १७ राष्ट्रिय आमसंचार नीति २०७३
१८. सूचना तथा सञ्चार प्रविधि नीति २०७२
१९. विज्ञापन रहित (clean feed) नीति २०७३
२०. विज्ञापन (नियमन गर्ने) ऐन २०७६
२१. अनलाइन सञ्चार माध्यम संचालन निर्देशिका २०७३ (संसोधन सहित)
२२. विज्ञापन (नियमन गर्ने) नियमावली, २०७७