नेपाल नागरिक उड्डयन प्राधिकरण
प्राविधिक सेवा, ईलेक्ट्रोनिक एण्ड टेलिकम्युनिकेशन ईन्जिनियरिङ्ग समूह, सातौं तह, वरिष्ठ अधिकृत पदको खुला/आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

द्वितीय पत्र – सेवा सम्वन्धी
खण्ड (क) - ५० अङ्क

1. **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), resonant circuits, thyristor, controlled rectifier circuits, 7 segment display, amplifier (Untuned, push-pull, feedback amplifiers, Klystron, Magetrons) bode plot analysis, Emitter, clipper, collector, clamper circuits

2. **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, 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

3. **Telecommunication Engineering**
   Radio Communication, frequency band allocation, 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, 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

4. **Optical System**
   Introduction to optical fiber as a transmission media, its advantages over other media, properties of optic fiber, testing, losses, types of fiber optic cables and specifications. Encoding of light, Fiber optic joints, splicing, testing and the related equipments/measuring tools, precautions to be taken laying of cables, safety aspects while handling optical cables

खण्ड (ख) - ५० अङ्क

5. **Information and Communications Technology (ICT)**
   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: ISO/OSI reference model; 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 (DNS, IP, URL, http, ftp, IRQ, Routers); Server (web, email, printer); General concept of cyber security (digital signature, SPAM, VIRUS, WORM, hiking, cracking)

6. **Power Supply System**
   Basic knowledge of Diesel/ Petrol/ Gas/ Thermal Generators, Solar power system, Storage batteries, Electric Motors, Single phase/ Three phase AC power supplies, DC supply, Voltage and Current regulators, Inverters, UPS, SMPS, Isolation and power transformers, surge protectors, Earthing system, Lightening protection

7. **Test Equipment**
   Measurement of AC/DC Voltage, Current and Resistance, Analog and Digital Signal waveforms, Frequency, Audio/Video Signaling, RF Field Strength, Modulation, RF Power output, VSWR, Earth Resistance, Spectrum analyzer, Oscilloscope

8. **Aviation Communication, Navigation and Surveillance System**
   Importance of Communication, Navigation and Surveillance (CNS) in Air Traffic Management. Knowledge on Aviation Communication System, HF communication General knowledge of NDB, DVOR, DME, ILS, MLS, Augmentation System, PSR, SSR, MSSR, ADS-B,. Types of Radar system; Radar range equation; Radar direction indication; Radar Display; Doppler effect; MTI Radar; General concept of Airborne navigation equipment

9. **Solar Power (Renewable Energy System)**
   Solar energy as a renewable resource, Materials used for solar cells, Principles of conversion of solar light into electricity, Basics of photovoltaic's cell, Types of solar cells, Mono crystalline and poly crystalline PV cells., Module, panel and Arrays, Factors that influence the output of a PV module, Difference between SPV and conventional power. Define solar charge controller or regulator and its role, Safety precautions while working with solar systems

10. **UPS**
    Concept of Uninterrupted power supply, Difference between Inverters and UPS, Basic block diagram of UPS and operating principle, Types of UPS: Off line UPS, On line UPS, Line interactive UPS & their comparison UPS specifications. Load power factor & types of indications and protections, Single phase and three phase UPS

11. **Radio Spectrum Management**
    Role of ITU and Spectrum management principles
    National spectrum management policies
    Equipment Authorization/approval and monitoring
    Spectrum measurements, monitoring, and interference resolving
    Aviation radio spectrum management and roles of ICAO, ITU and WRC

12. **ICAO and related Documents**
    ICAO overview, ICAO Annex 10 Volumes 1-6

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द्वितीय पत्रबाट निम्नानुसार प्रश्न सोधिनेछ :

द्वितीय पत्र (विषयगत)				
विषय	**खण्ड**	**अङ्कभार**	**छोटो उत्तर**	**लामो उत्तर**
सेवा सम्वन्धी	**(क)**	५०	२ प्रश्न x ५ अङ्क = १०	४ प्रश्न x १० अङ्क = ४०
	(ख)	५०	२ प्रश्न x ५ अङ्क = १०	४ प्रश्न x १० अङ्क = ४०
जम्मा		**१००**	४ प्रश्न x ५ अङ्क = २०	८ प्रश्न x १० अङ्क = ८०