

NEPAL TELECOM

Nepal Doorsanchar Company Ltd.

Syllabus

Syllabus for Free Competition written examination for Assistant Engineer (Telecom)
(Level 6)

Full Marks: 100

Pass Marks: 40

Time: 2 hours

Part:II (Subject for Transmission Group)

Types of Questions	No. of Questions	Marks	Total	Remarks
Objective	30	1	30	1/4 marks will be deducted for each incorrect answer
Short-Answer Questions	10	4	40	
Long-Answer Questions	3	10	30	

Use of non-programmable calculator is permitted in the examination hall.

- 1. Telephone Network (Weightage:5-15%)**
Telephone call setup, Types Telephone Exchanges, Switching Basics: Functions of switching, subscriber line interfaces and function, time and space switches; Conductor sizes and loop resistance and attenuation, Balanced and unbalanced lines, far end and near end cross talks, Traffic theory, Erlang, Use of Erlang B formula.
- 2. Transmission Basics (Weightage:10-20%)**
Transmission Losses (Transmission Plan-Loss allocation), PCM Systems, Sampling, coding, Quantization, decoding, time slots (TS), Frame / Multi-frame alignment, signaling time slot, PCM Line Transmission, ADPCM, PCM cables, terminal / line regenerators, regenerator spacing, PDH, SDH.
- 3. Radio Propagation (Weightage:3-7%)**
Radio Propagation Waves: Sky, Ground and Space waves, Fading, Fading depth, fade Margins, frequency band used in radio transmission.
- 4. Antenna, Feeders & Masts (Weightage:5-15%)**
Dipole, Yagi, Omni & Parabolic antennae, Antenna parameters: Gain Impedance, VSWR, Directivity, F/B ratio, polarization. Different types of Coaxial cable and wave guides, Rectangular & elliptical wave guides; attenuation & VSWR; Dehydrators, Sillicagel, and Types of Connectors: BNC, N, Siemens, F type, Antenna Supporting Structures: Guyed & Self-Supported Masts and Panzer Masts.

5. **Radio Transmission System** (Weightage: 15-25%)
Analogue Modulation : AM, DSBSC, SSB, FM, FDM, Digital Modulation :PSK & Quadrature Amplitude Modulation, Demodulation : Detectors, Frequency Discrimination, PLL, Space and Frequency diversity, Transmitter / Receiver, IF filtering, Oscillators, Amplifiers, automatic gain control (AGC), Equalizers, Typical Receiver signal levels for VHF & Microwave systems, Branching System, RF filtering, Duplexers / Diplexers for VHF/ UHF & Microwave frequencies, Isolators / waveguide filters, Supervisory System, Omnibus / express voice channels, Time division, Multiple access system, Satellite communications system: Geostationary satellite, transponders, Earth station, VSAT
6. **Multiplexing (Digital)** (Weightage:3-7%)
Higher Order Multiplexing: II, III & IV order, Frame & Bit Synchronization, Line coding: AMI, HDB3, ITU-T 703 Interface and hierarchies, Maintenance alarms, AIS, Sync and Frame, Alignment Loss, Bit Error Ratio.
7. **Optical Fiber (OF) system:** (Weightage:5-15%)
OF components: Fiber (Multimode / monomode), transmitters (LED, LASER diodes), wave lengths used in optical communications, receivers (PIN, Avalanche Photo diodes) and their characteristics, Wave Propagation in Optical Fibers, Advantages of optical fiber systems.
9. **Transmission Measurements** (Weightage:5-15%)
Basic working principle & purpose of instruments, accuracy, range, Frequency counter, RF power meters, Spectrum Analyzers, Oscilloscope, BER meter (measurement), Measurement Items, RF Power, AGC, BER, IF levels clock frequencies, spectrum, VSWR, Units in dB, dBm and Watts.
10. **Power System Dimensioning** (Weightage:5-15%)
Rectifier / charge controller and batteries, Solar Power systems, Photovoltaic cells and characteristics, solar panels, Solar Regulators, Maintenance free batteries, AH capacity, Temperature effect on battery capacity.
11. **New Services (Basic Concepts Only)** (Weightage:3-7%)
Internet, e-mail, Packet Switching, HDSL, IN, VOMS, Cellular, WLL, GSM, GPRS, CDMA 2000, WCDMA, EDGE, NGN.