Syllabus for Limited Departmental Competitive Examination for promotion from JTO (Electrical) to SDE (Electrical)

PAPER I (Multiple-choice)

ELECTRICAL ENGINEERING-I

( Maximum Marks = 100 – Time 3 hours )

1. GENERAL: (5 Marks)
   BSNL Mission and Vision, Role of Electrical wing in BSNL, BSNL CDA Rules.

2. ACTS (10 Marks)

3. SPECIFICATIONS (10 Marks)
   CPWD specifications for Electrical Works (Internal and External), Sub station.

4. TENDERING PROCEDURES (10 Marks)

5. ENERGY CONSERVATION & NEW TRENDS (20 Marks)
6. **TELECOM SYSTEM OVERVIEW** (10 Marks)
   Telecommunication system overview, Power system for Telecom Installations, Power Plants- Type and working principle, Battery system types, Environmental requirement in Telecommunication application.

7. **ENERGY AUDIT** (15 Marks)
   Energy Audit (Methodology and instruments used) No Cost Measures, Low cost and High cost measures, Energy Core Group in BSNL, Energy Audit of Telecom Buildings, CDM and carbon trading.

8. **LIGHTING** : (10 Marks)
   Principles of indoor and outdoor lighting design, Units and standards, types, characteristics and application of lamp in fittings and luminaries. Modern trend in Energy efficient lighting installations.. Advantage and disadvantage of CFL & LED Lighting.

9. **OPERATION AND MAINTENANCE** : (10 Marks)
   Preventive and day to day maintenance checks in respect of all the electrical/electro-mechanical services in telecom installations, frequency of various tests prescribed by BSNL/DOT and equipment manufacturers.
Syllabus for Limited Departmental Competitive Examination for promotion from JTO (Electrical) to SDE (Electrical)
PAPER II (Multiple-choice)
ELECTRICAL ENGINEERING-II
(Maximum Marks = 100 – Time 3 hours)

1. MEASUREMENT AND INSTRUMENTATION :- (10 marks)

Units and Standards, measurement of current, Voltage, power, Power-factor and energy. Measurement of resistance, inductance, Capacitance and frequency. Electronic measuring instruments. Digital Voltmeter and frequency counter. Transducers and their applications to the measurement of non-electrical quantities like temperature, pressure, flow-rate displacement, acceleration, noise level etc.

2. POWER ELECTRONICS (10 Marks)

Fundamentals and Principles in case of Power semiconductor devices: diodes, Thyristors, power bipolar and transistors, MOSFETs their characteristics, AC/DC converters, Principles of Single phase and 3-phase inverters.

3. ELECTRICAL MACHINES AND POWER TRANSFORMER:- (10 Marks)

Magnetic Circuits, Power transformers, Losses and efficiency, Regulation, Auto-transformer, 3 phase transformer, Parallel operation. Basic concepts in rotating machines. EMF, Torque, Types of machine, Leakage, losses and efficiency.

4. **POWER SYSTEM**  
   Different types of A.C. Switchgears, H.R.C. fuses and their application, rupturing capacity. Outdoor switchgear. Different type of Bus bars system, connections, current carrying capacity, control board and switchboard.

5. **SUB STATION**  
   Substations, its need, classification, factors governing the location of substation, Space planning, Short circuit calculations for symmetrical and unsymmetrical faults, use of current limiting reactors, determination of the rating of circuit breakers and switchgear. Selection of capacity of Transformer and DG Set. Protection devices and safeties in Sub Station, their testing and calibrations. Power factor improvement capacitors & their selection.

6. **DG Set:**  

7. **AIR CONDITIONING:**  
   General principles of Refrigeration and Air-conditioning, Terminology, Factors affecting A.C.Load, Psycho-metric chart, Evaporative cooling and ventilation, comfort air conditioning, General principles of window / split air conditioners, package units, Maintenance aspects of A.C. System, Environmental requirements for Electronics and BTS. Scheme of air conditioning, redundancy, filtration and efficiency etc. Specifications for installation, Acceptance and Testing of Package A.C Units.

8. **EARTHING :**  
   Design, layout, and installation procedures for Building/ Exchange earth, Lightning protection and Surge protection devices.
9. **PUMPS** : (10 Marks)

Various types of water lifting Pumps, their selection and application, installation procedures and specifications.

10. **FIRE DETECTION AND FIRE FIGHTING:** (10 Marks)

Different type of fire – extinguishers, their use and applications, Various type of Fire – detectors, their selection, Specifications, installation and testing procedures. Dry and wet-riser Fire fighting installations, sprinkler systems, design and installation criterion, acceptance testing.