

भारत सरकार(GOVERNMENT OF INDIA)  
रेल मंत्रालय(MINISTRY OF RAILWAYS)  
रेलवे बोर्ड (RAILWAY BOARD)

No. 2020/Sig/Gaz/13-CDR/5/Estb. Matters

Dated: 11.12.2020

PCSTEs  
All Zonal Railways  
CORE, Paryagraj

DG/IRISET  
Secundrabad

PED/Q&A/S&T  
RDSO,Lucknow

Sub: Holding of Computer based examination for 70% Selections and 30% LDCE for promotion to Group 'B' posts.

Ref.:- Railway board letter no. E(GP)2018/2/31 dated 30.9.2020

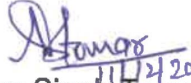
Vide above referred letter, it is proposed to hold a computer based objective type examination for selection of 70% promotional and 30% LDCE, in the 07 departments (except Account) having Organized services w.e.f vacancy cycles commencing from 01.01.2021.

To implement the proposed examination scheme in S&T, syllabus for 70% Selections and 30% LDCE for promotion to Group 'B' posts is being issued (Copy enclosed) to have uniformity over Zonal Railways.

Zonal Railways are requested that syllabus may be circulated to all Divisions, Extra Division units and all Zonal Training Centers.

DA- As above.

Email: edsignal@rb.railnet.gov.in

  
(Arjun Singh Tomar)  
ED/Signal  
11/12/2020

Copy :- PCSTE, ~~IRISET~~, KRCL.

## Syllabus for ASTE Selection (70%)

### 1) Various aspects of working of the S&T department covering

- a. Estimates & Tenders
- b. Works program
- c. Office procedures
- d. Drawing office practices etc.
- e. Accident investigation

### 2) Knowledge of various Manuals and practices

- a. General and subsidiary rules
- b. Signal Engineering Manual
- c. Telecommunication Manual
- d. Schedule of dimension
- e. Rules of opening of Railways
- f. General condition of contracts
- g. Engineering Code
- h. Procedure for obtaining CRS sanction and documents required to be submitted
- i. Operating Manual
- j. Block Working Manual
- k. Accident Manual
- l. Rajbhasha

### 3) Signalling System

- a. Mechanical Signalling practices for single and double wire, lower quadrant & upper quadrant signalling.
- b. Essential of signalling, procedure for commissioning of Signalling installation.
- c. All aspect of electric signalling practices including Electric Interlocking circuits for MACLS panel interlocking- RRI System. Axle counters, Automatic Block Signalling systems etc. including installation, maintenance and overhauling practices. Power supply system for signalling installation.
- d. Electronic interlocking and its sub systems, FAT, SAT, Block diagrams, Application commands, concept of logic diagrams, various types of software modules used in EI etc., Data loggers & its concept of logic of various alarms, IPS and its working, DAC (MSDAC & SSDAC ) & BPAC (HADAC), UFSBI Block Panel, all type of Block instruments & AFTC. Remote Diagnostic and Predictive Maintenance.
- e. Installation & Maintenance of S&T Equipments in 25KV AC traction areas, instructions and policies

- f. Modern signalling system like ATP, CTC, TMS and IB working
- g. The operation, installation, maintenance and overhauling practices for MLB & ELB.

#### 4. Communication system

- a. IP exchanges, Optic fibre systems, Quad cable based communication, communication at accident site. Various types of exchange, trunk exchange, PA systems etc. covering the thereof operations, installations, maintenance, repairs and overhauling practices. Power supply system for Telecom installation.
- b. Wireless communication system like MTRC, HF, VHF, UHF and MW including detailed study of various systems used on the Railway and principles, installations, maintenance and repairs, study of Electric train indicators etc.
- c. Data Network, Rail net, UTS, PRS, Video conferencing equipment, CCTV surveillance systems, Switches, Routers.
- d. Modern telecom system like Wi-Fi, PIS, Satellite communication, Tunnel communication, internet protocol IPv4/IPv6, GPS & Ethernet radio.

#### 5. Workshop practices

- a. Work shop practices with special reference to the requirement of mechanical and Electrical signalling and specification of raw materials, therefore, various process followed in workshop like casting, planning, grinding etc.
- b. Workshop practices pertaining electric materials and the specification of raw materials, including the process of Fabrications, printed circuit board, transformer, CNC Machine, Axle counter etc.

#### 6. Drawing office practice:

- a. Various aspect of drawing office practices pertaining to mechanical signalling including preparation of IP's, locking table and dog charts, scale plans, maintenance of records, CRS sanction etc.
- b. Drawing office practices pertaining to electric signalling, including design of interlocking circuitry preparation of route section plans, scale plans, selection table etc.

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**7. Accounts & Finance Section. (General applicable for all departments)**

- a. Railway- Budget, August Review, Revised estimate, Final modification, various budget terms.
- b. Various types of tenders and their scope. Guide lines for negotiations with the tenders.
- c. Procedures adopted for working out financial justification for any new scheme and also purchase of new machinery vis-a-vis reconditioning of the old machinery.
- d. Board's orders regarding creation of new posts and engagement of casual Labour.
- e. Salient features of the Revised Accounting Classification.
- f. Performance Budget, Draft Paras, Public Accounts Committee, Operating ratio, integrated Budget, Exchequer control, Stock Verification, preparation of Indents

**8. Establishment subjects applicable to all Class (Except for selection of APO).**

- a. Establishment code and manual
- b. Leave rules
- c. Casual labour and substitutes.
- d. Workmen Compensation Act.
- e. Industrial Disputes Act.
- f. Hours of Employment Regulations.
- g. Factories Act.
- h. Discipline & Appeal Rules.
- i. Reservation for Schedule Caste and Schedule Tribes.
- j. Retirement benefits.
- k. Pass rules
- l. Various regulations regarding Casual labours

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**Syllabus (Revised) for 30% LDCE for Promotion  
Group 'B' ASTE in Signal & Telecommunication Department**

**I. General Knowledge**

- This section would contain questions of general interest and importance, which is acquired by general observation or reading without specific text book study. Subjects of national importance as well as achievements of Railways are also to be covered. The standard of General knowledge shall not be more rigorous than matriculate level.
- Official Language.

**II. General Mathematics**

- Arithmetic and statistical operations, graphs, fractions, percentage, sampling & averages
- Geometry- area & volume up to Higher Secondary/12<sup>th</sup> Standard level
- Algebra, simultaneous equation etc up to Higher Secondary/12<sup>th</sup> Standard level
- Mechanics – Velocity & acceleration, work done, horse power etc up to Higher Secondary / 12<sup>th</sup> Standard level

**III. Strength of Material**

- Various Engineering materials and their properties, bearing, stress & strain, fatigue, hardness, corrosion & surface finish

**IV. Physics & Basic Electricity**

- Temperature & measurement
- Mechanics- Newton's law of motion, Velocity & Acceleration, Work, Energy, Power, Archimedes's Principle etc
- Heat & work, expansion of solids, liquids & gases
- IC Engines, gas turbine heat recovery & thermal efficiency, Super charging & inter cooling
- Ohm's law, Coulomb's law, Faraday's Law, voltage, Current & Resistance, Wet & Dry Batteries, Power Factor
- Simple motors & Dynamos- Principle of Working of Transformer, Relay, Fuse, Circuit Breaker
- Power Supply, AC&DC, Rectifiers

Rules for Opening of a Railways, Signal Engineering Manual, Telecommunication Engineering Manual, Store Procedure and Practices, AC Traction Manual, Block Working Manual, Schedule of Dimensions, Operation Manual, Disaster Management, Accident manual-Accident classification, Causes of Accidents and their prevention, Duties of first Official reaching the Accident Site, Enquiries, Failure Analysis & Investigations. Tenders, Work contracts, Store procurement.

Fundamental Engineering & Applied Technology, Simple Structure, Dynamics, Simple Machinery, Magnetism, Electricity, Sound, Electrical Machinery and Circuits, Fundamental Electronics & Electronic Circuits, Power Supply Equipment and Systems, protection System against Lightning & Surges, Principles of Optics & Optical Fibre Cable, Principles of Digital Electronics- Boolean Algebra, Digital Devices and their Applications, Data Communication Principles & Information Technology – Familiarity with PC Specifications, Operating Systems- Windows, Operating and Application software, Basic LAN/WAN & Networking, Intranet/Internet.

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## Establishment and Financial Rules

### I. Establishment Rules

- General conditions of services of Railways servants including rules regarding leave, joining time, passes etc
- Railway service D&A Rules-1968 & amendments
- Railway service Conduct Rules-1966 & amendment
- Retirement benefits
- Payment of wages, allowance & overtime
- Labour laws including Payment of Wages Act, Workmen's Compensation Act, Hours of Employment Regulations, Factory Act, Contract Labour Act
- Manpower Planning & Training
- Welfare measures in Railways
- PNM,JCM,PREM

### II. FINANCIAL RULES

- Parliamentary control over Railway Finance- public accountability, canons of financial propriety
- Railway Budget, Budgetary terms, Types of Budgets, Budget cycle, Demand of Grants, Expenditure Classification
- Rule of allocation- Classification of Expenditure, Control over expenditure- Responsibility of accounting performance budgeting, Exchequer, General Financial results of working
- Work Programme- Financial justification of works, Survey, preparation of estimate, capital budget- Control over expenditure, capital expenditure, re-appropriation
- Financial Control over store expenditure, Purchas and stores keeping procedure- inventory control
- Financial and cost control in Railway Workshop
- Rules and Procedure relating to tenders and contracts for execution of works and procurement of stores, M&P Programme
- Procedure for processing and finalizing the audit objections and draft paras
- Delegation of Powers

### Signaling

Essential of signalling, procedure for commissioning of Signalling installation, Mechanical & Electrical Interlocking, Interlocking plans and locking tables, Block Signaling, Electro- mechanical and Electrical Signaling, Automatic Signaling, Panel Interlocking, Route Relay Interlocking, IBS, LC interlocking, Axle Counters, Track Circuits, ATP, Centralized Traffic Control (CTC), Electronic Interlocking (EI), Data Loggers & Networking, LED Signals, Block Proving by Axle Counters (BPAC), Train Management system (TMS), ELD, S&T cables, Integrated Power Supply(IPS), Earthing, Lightening & Surge Protection.

  
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**Telecommunication**

Overhead and underground cable system, control office and way station and emergency control communication equipment, Telephone exchange- automatic, specialized communication and allied equipment like STM, DWDM etc in Railways, comprising HF, VHF and Microwaves, GSM-R and/or Tetra for Mobile Train Radio, OFC and Quad cable, Communication in RE area, Data communication & IP Networks, Digital Electronic Exchange, ISDN, Network Management Systems, networks for PRS, FOIS, TMS, UTS etc, Concept of GPS. PIS, Wi-Fi, Ethernet radio, CCTV, Satellite communication, Tunnel communication, internet protocol IPv4/IPv6, GPS.

**Workshop Practice-** Raw Materials, Processing, Workshop machines and their utilization, Overhauling procedure and Practices, Inspection and Testing of components, Testing procedure, commissioning and measurement, Integration, Testing & Certification of IPS/SMPS, DC-DC Converters, Invertors & Battery Chargers/ Float Rectifiers, Block Instruments & Relays, Relay Technology- Different Type of Relays & their working, Block Instruments and point Machines, Quality control and Safety Practices.

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