

पूर्व मध्य रेल

कार्यालय
महाप्रबंधक/कार्मिक
हाजीपुर

सं. ईसीआर/एचआरडी/एसएंडटी/ट्रेनिंग स्कूल, दानापुर

दि 10.07.2015

मुख्य संकेत एवं दूर संचार इंजीनियर/पूमरे/हाजीपुर
मुख्य संकेत एवं दूर संचार इंजीनियर(निर्माण)/पूमरे/महेन्द्रघाट/पटना
उपमुकाधि(निर्माण)/महेन्द्रघाट/पटना
मंडल रेल प्रबंधक(का0)/पूमरे/धनबाद/दानापुर/मुगलसराय/समस्तीपुर/सोनपुर
वमंसिदूई/पूमरे/धनबाद/दानापुर/मुगलसराय/समस्तीपुर/सोनपुर

विषय :- एसएंडटी ट्रेनिंग सेंटर/दानापुर के लिए अनुदेशको के पद को प्रतिनियुक्ति के आधार पर चयन द्वारा भरे जाने हेतु विकल्प का आमंत्रण।

एसएंडटी ट्रेनिंग सेंटर/दानापुर में अनुदेशक वाह्य संवर्ग (Ex-Cadre) के निम्नलिखित पदों को प्रतिनियुक्ति के आधार पर चयन द्वारा भरे जाने हेतु पात्र एवं इच्छुक अराजपत्रित कर्मचारियों से निर्धारित फार्म (अनुलग्नक- क)में विकल्प आमंत्रित किया जाता है :-

| क्रम सं | पद | वेतनमान एवं ग्रेड वेतन | पदों की सं० | अभियुक्ति |
|---------|--------------------|------------------------|-------------|--|
| 1 | वरीय अनुदेशक(सिग0) | 9300.34800 +4600 | 05 | समान ग्रेड पे0 या एक ग्रेड पे0 नीचे (कम से कम दो वर्ष सेवा अवधि के साथ) के कर्मचारी एम0ए0सी0पी0 के तहत वित्तीय उन्नयन के अंतर्गत मिले ग्रेड पे0 की गणना नहीं की जायेगी |
| 2 | वरीय अनुदेशक(टेली) | 9300.34800 +4600 | 03 | समान ग्रेड पे0 या एक ग्रेड पे0 नीचे(कम से कम दो वर्ष सेवा अवधि के साथ) के कर्मचारी एम0ए0सी0पी0 के तहत वित्तीय उन्नयन के अंतर्गत मिले ग्रेड पे0 की गणना नहीं की जायेगी |
| 3 | अनुदेशक(सिग0) | 9300.34800 +4200 | 01 | समान ग्रेड पे0 या एक ग्रेड पे0 नीचे(कम से कम दो वर्ष सेवा अवधि के साथ) के कर्मचारी एम0ए0सी0पी0 के तहत वित्तीय उन्नयन के अंतर्गत मिले ग्रेड पे0 की गणना नहीं की जायेगी |
| कुल | | | 09 | |

10-7-15

लगातार पेज 02 पर

पात्रता :- संकेत एवं दूर संचार विभाग (कम सं० 01 एवं 03 के लिए सिग्नल विंग तथा कम सं० 02 के लिए टेली विंग) के तकनीकी अराजपत्रित कर्मचारी अधिसूचना जारी होने की तिथि को ग्रेड वेतन 4600/- एवं 4200/- के पद पर नियमित रूप से कम से कम दो वर्षों की सेवा पूर्ण किये हों और रेलवे में उनकी कुल सेवा 05 वर्ष या उससे अधिक की हो तथा आयु 54 वर्ष से अधिक नहीं हो, पात्र होंगे।


अन्य सेवा शर्तें :-

1. कर्मचारी की एसएंडटी ट्रेनिंग स्कूल/दानापुर में प्रतिनियुक्ति Tenure basis पर कम से कम 3 वर्ष की होगी। कार्य संतोषप्रद नहीं होने पर प्रशासन कर्मचारी को पैतृक इकाई में वापस करने के लिए स्वतंत्र होगा।
2. कर्मचारी का लियन उनके पैतृक इकाई/मंडल में अनुरक्षित रहेगा।
3. उक्त पद पर चयन लिखित एवं मौखिक परीक्षा तथा सेवा अभिलेखों एवं गोपनीय रपट पर आधारित होगा। जो कर्मचारी दोनो ग्रेड वेतन के लिए आयोजित चयनों में शामिल होन के इच्छुक है उन्हें दोनो पदों के लिए अलग-अलग आवेदन देना होगा।
4. आयु सेवा अवधि आदि की गणना हेतु Cut of date अधिसूचना जारी होने की तिथि होगी। चयन हेतु निर्धारित पाठ्यक्रम की प्रति अधिसूचना के साथ संलग्न की जाती है।
5. वर्तमान में एसएंडटी ट्रेनिंग सेंटर के लिए प्रशिक्षण भत्ता की मान्यता रेलवे बोर्ड से प्राप्त नहीं हुई है। अतएव प्रशिक्षण भत्ता देय नहीं होगा।

कृपया इस अधिसूचना का व्यापक प्रचार-प्रसार किया जाये और प्राप्त विकल्पों की एक सूची में कर्मचारी की सेवा विवरण का सत्यापित करते (कार्मिक विभाग द्वारा) हुए इस कार्यालय को दिनांक 03.08.2015 तक प्राप्त कराया जाय। इसके बाद प्राप्त आवेदन पर कोई विचार नहीं किया जायेगा। यदि मंडल में कोई आवेदन प्राप्त नहीं होता है तो निल स्टेटमेंट भेजने की जिम्मेवारी भी मंडल की होगी। शुभ सूचनार्थ एवं आवश्यक कार्यवाही हेतु इस अधिसूचना को वेबसाईट सं० www.ecr.indianrailways.gov.in पर कृपया देखा जाए।


यह मुसिदूई, पूमरे द्वारा आदेशित है।

संलग्नक :- यथोक्त।


(ए०पी०श्रीधरस्तव)
वकाधि/एमएंडई
कृते महाप्रबधक(का०)/हाजीपुर

प्रतिलिपी निम्नलिखित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित:-

1. सचिव मुकाधि / हाजीपुर- मुकाधि/हाजीपुर को सादर सूचनार्थ।
2. सकाधि/एमपीपी/हाजीपुर को वेबसाईट पर upload करने हेतु।
3. प्रचार्य, एसएंडटी ट्रेनिंग सेंटर / दानापुर।


कृते महाप्रबधक(का०)/हाजीपुर

PROFORMA OF APPLICATION TO BE FILLED UP BY THE VOLUNTEER FOR SELECTION TO THE POST OF INSTRUCTOR, S&T TRAINING CENTER, DANAPUR

1. Full Name (in Block Letter) :
2. Present designation and station :
3. Present Pay Band & Grade Pay :
4. Working under :
5. Educational Qualification :
6. Community :
7. Date of Birth :
8. Age on cut of date : Year Month Days
9. Date of appointment to Rly.service :
10. Date of appointment/promotion to the following grade on regular basis:-

| Pay Band & Grade Pay | Days | Months | Years |
|----------------------|------|--------|-------|
| (a) in PB-2 GP 4200 | | | |
| (a) in PB-2 GP 4600 | | | |

11. Length of non-fortuitous service(Regular promotion to the following grade as on cut of date:-

| Pay Band & Grade Pay | Years | Months | Days |
|----------------------|-------|--------|------|
| (a) in PB-2 GP 4200 | | | |
| (a) in PB-2 GP 4600 | | | |

12. Choice of language to answer the questions (English/Hindi). The candidate should indicate his/her choice, either any one of the above two language :-

13. DECLARATION OF THE CANDIDATE :-

I do hereby declare that the above particulars furnished by me are true to the best of my knowledge and belief. I further undertake that if any, above entry is found incorrect or not in order, my candidature shall liable to be cancelled at any stage.

Signature of the candidate

- (A) **Forwarding the application (filled up) submitted by candidate to the cadre controlling (Personnel Branch) by his /her controlling officer:-**

The service particulars/Bio-data on the prescribed proforma filled-up by the Sri/Smt Designation.....received within the target date is hereby forwarded to his/her respective cadre controlling officer (Personnel Branch) for verification with the Service Record and also for onward transmission to the General Manager(P)/ECR/HJP.

Signature of Controlling Officer

- (B) **Certificate to be furnished by the cadre controlling officer (Personnel Branch):-**

It is certify that the service particulars/Bio-data furnished by Sri/Smt..... Designation.....on the above proforma have been verified with his/her Service Record and found correct and the same is hereby forwarded to General Manager(P)/ECR/HJP for further necessary action.

Signature of the cadre ('P' Branch) Officer

EAST CENTRAL RAILWAY

(Syllabus for

Selection of
Sr. Instructor / Instructor
(Signal) in
STTB / ECR/DNR.

MEASURING INSTRUMENTS AND USE OF HAND AND PORTABLE TOOLS.

1. VOLTMETER
2. AMMETER
3. ANALOG & DIGITAL MULTIMETER
4. MEGGER
5. OSCILLOSCOPE
6. FREQUENCY METER
7. EARTH LEAKAGE DETECTOR
8. EARTH MEASURING METER

POWER EQUIPMENTS CELLS AND BATTERY

1. Types of primary and secondary cells
2. Construction of primary and secondary cells.
3. Testing and maintenance of primary and secondary cells.
4. Initial charging and installation of secondary cells.
5. Initial/Float/Boost/Trickle charging of secondary cells.
6. Various defects in secondary cells and their prevention.
7. Manual and automatic chargers – Installation, Adjustment, Capacity – Trouble shooting.
8. Different types of transformer – working principle, parameters, capacity, usage, trouble shooting.
9. Study of different types of inverter, stabilizer – working principle, parameters, capacity, usages, trouble shooting
10. Uninterrupted power supply – working principle, parameters, capacity, usage, trouble shooting.
11. Integrated power supply – working principle, parameters, capacity, usages, and trouble shooting.
12. DC – DC Converter, AC – DC Converter – working principle, parameters, capacity, usages, troubleshooting.
13. Typical power plant arrangement at Panel Interlocking station (ESM/MSM)

BASIC ELECTRICITY AND MAGNETISM

1. Idea about EMF, current, power resistance, inductance, capacitance, power factor etc. and their measurements.
2. Study of ohms law and its application, series and parallel connection.
3. Importance of insulation resistance.
4. Idea about magnetism and magnetic induction
5. Transformers-- working principle, rectifier-- working principle
6. fuses and lightning arrestors
7. Measurement of loop and insulation resistance of cable and overhead line and measurement of earth resistance.
8. AC & DC principles
9. Brief introduction to various electrical equipment like chargers, stabilizers, transformers, UPS, DC-DC converter.

SAFETY IN TRAIN OPERATION, DISASTER MANAGEMENT & SCHEDULE OF DIMENSION

1. Knowledge and importance of S&T MR & S&T DN, Maintenance of Signaling Equipment.
 - a) Situations where consent of ASM not necessary.
 - b) Situations where consent of ASM necessary.
 - c) Situation where disconnection memo is required.
2. Duties of Maintainer – SIM as per SEM.
3. Use of detonators, hand signals and banner flags.
4. Provision of speed restriction indicators.
5. Knowledge about keeping distant / Warner signal at 'ON' during disconnection of points & signals.
6. Working under integrated / individual blocks
7. Safety registers to be maintained (ex. Route cancellation, Axle counter Resetting etc.)
8. Responsibility of S&T staff in case of disaster.
9. Sealing of block instruments and other equipment's as required.
10. Assisting the public when warranted.
11. Protection of work site.
12. Duties of maintainer during maintenance/failures.
13. Precautions while working in RE area.
14. Safety procedure, accident management role of S&T staff.
15. Safety circulars and instructions pertaining to S&T staff.
16. Case study of accidents where S&T is involved.
17. Need of Schedule of dimensions.
18. Schedule of Dimensions part I, II & III.

EAST CENTRAL RAILWAY

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19. Schedule of dimensions applicable to S&T gears.

COMPUTER APPRECIATION

1. Operating system-function (window 7)
Starting of windows, creating files & folders, running programs, copying files, using My computer icon, window explorer, Control panel & setting using floppies, formatting of floppies, finding files, taking printouts, configuring modem adding / removing programs etc.
2. Software package – Ms Word, MS Excel and MS Outlook

BASIC CONCEPTS OF SIGNALLING

1. Knowledge and necessity of signals-Fail safe feature of signaling system.
2. Definition of signaling terms as given in G&SR.
3. Concept of LQ, UQ signaling, CLS.
4. Location of Signals.
5. Subsidiary signals.
6. Markers, Boards, Signs etc.
7. Overlaps, braking distance, sighting distance.
8. Isolation, slip siding, catch siding.
9. Simultaneous reception and dispatch of train.
10. Classification of station- Minimum signaling equipment required at each class of station.
11. standards of signaling – Minimum signaling equipment required at each standard of signaling.
12. Level crossing gates.
13. Inter cabin control.
14. Block instruments, methods of block working control of outlying sidings.
15. Signaling plan.
16. Station working rules.
17. System of train working(Block working)

SIGNAL REVERSER, LEVER LOCK & CIRCUIT CONTROLLER, ARM & LIGHT REPEATER

LEVER LOCK AND CIRCUIT CONTROLLERS

1. Principle and application of lever locks.
2. Various types of lever locks.
3. Force drop arrangements
4. Contact adjustments.
5. Circuit controller various types.
6. Various bands, cutting/ adjustments.

SIGNAL SLOTTING, ELECTRICAL KEY TRANSMITTER, ELECTRICAL DETECTORS

INTER SLOTTING

1. Explanation of inter slot – one slot one train.
2. Purpose, various methods, circuitry explanation.
3. Cross protection, double cutting.
4. Testing of inter slot and fault localization.

ELECTRICAL KEY TRANSMITTER

1. Explanation of EKT and use.
2. Construction.
3. Mode of connection.
4. Coil used, voltage, resistance, current,
5. Parts and function.
6. Mode of connecting to a pair in RE/Non RE area.
7. Maintenance, testing, troubleshooting and rectification of electrical and mechanical parts.

ELECTRICAL DETECTORS

1. IRS type ED
2. Combined lock and detectors, different slides.
3. Adjustment of detection and cross protection contacts.
4. Wiring – 2 wire, 3 wire 4 wire detection.

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5. Adjustment of electrical detectors
6. Fixing of EDS.

TRACK CIRCUIT

1. DC single rail/double rail track circuit.
2. Track circuit – parameters.
3. Various components of track circuits.
4. Fail safe and failure free adjustment.
5. Length of track circuit in wooden and PSC sleepers, insulation fittings for PSC sleepers.
6. Sleepers, testing of PSC sleepers.
7. Measurement of rail resistance, ballast resistance, train shunt resistance.
8. Checking of glued joints.
9. Bonding diagram, (series & parallel) cut section track circuit impedance, bonding.
10. Maintenance of block joints.
11. Track drilling, bonding and connecting feed and relay ends.
12. Audio frequency track circuit – working principle, components.
13. Common types of failure – trouble shooting.
14. AC Track circuits – parameters, adjustment, and trouble shooting.

RELAYS

1. DC neutral relays. Plug in and shelf type – Principle of working, usage.
2. Track & line relays.
3. AC relays – principle of working usage.
4. Parameters/characteristics of all type of relays.
5. Polarized relays- Principles of working.
6. Plug in type relays – Types of relays in use
7. Metal to carbon, Metal to Metal Relays.
8. Identification of relays, their contacts and functions
9. AC Immunized DC neutral relays.
10. Electronic timer
11. Flasher relay
12. Heavy duty contact relays (QBCA, Siemens point contractor relays, Bhartiya Culture & Hammer)
13. Periodicity of overhauling, sealing.

SIGNAL MACHINE AND SOLAR PANEL

SIGNAL MACHINE

1. Parts of signal machine.
2. Low voltage/high voltage machines
3. LQ type/UQ type
4. General circuit
5. Holding mechanism, snubbing, normal lock clutch
6. Measurement of angles, contact adjustments.
7. Measurement of time, voltage, current.
8. Testing proper operation and return to normal maintenance.

SOLAR PANEL

1. Explanation about solar power
2. Construction of solar photo voltaic panel uses
3. Types of silicon used – advantages comparison with other sources of supply
4. Solar panel – signal lighting – twilight switching, solar panel – for other signaling circuits.
5. Choice of batteries and capacity.
6. Installation, maintenance, precautions of solar panel.

COLOR LIGHT SIGNALS & DG SET

COLOR LIGHT SIGNALS

1. Advantages of CLS over semaphore.

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2. Parts of 2 aspect / 3 aspect / 4 aspect CLS
3. Aspect control and repeating circuits in RE/Non RE area
4. Cutting in arrangement.
5. Repeating of Color Light Signals.
 - a) NA transformer, "H" type & "L" type transformers
 - b) ECR method
6. Signal transformers
7. Focusing of color light signal
8. Cleaning of lenses
9. Second distant – aspects controlling circuits
10. Fault tracing methods in circuits
11. LED – color light signal lamps

DIESEL GENERATOR SET

1. Types of dg set
2. Working of DIESEL ENGINE
3. Types of ignition and working of fuel Injection system
4. Starting procedures & remote starting
5. Recommended maintenance schedule/ procedure
6. Engine trouble shooting, air filtering fuel system.
7. Alternator, excitation voltage control
8. Precautions / procedure for storing HSD and lubricating oil
9. Portable generators.

POINT MACHINE

1. Combined type point machines IRS & Siemens'
2. Different types of ground connections, mounting sleeper spacing etc.
3. Parts of each point machine – Internal diagrams
4. Point control circuits
 - a) Using Siemens point group
 - b) Using QBCA, relays
5. Precautions while working on point machines, clamping – when & how
6. Adjustment of points, maintenance skills.

AXLE COUNTER AND INTERMEDIATE BLOCK SIGNALLING

AXLE COUNTER (SSDAC & HASSDAC)

1. Where used.
2. Principle of working components of the system
3. Power supply for axle counters, precautions for resetting.
4. Working circuit of axle counter.
5. Adjustment of axle counter.
6. Typical failures and troubleshooting – Isolation of defective cards in axle counter and their replacement to restore the system.

INTERMEDIATE BLOCK SIGNAL

1. Role of IBS in increasing line capacity
2. Block working rules for IBS
3. Use of axle counters for IBS
4. Signaling circuits and equipment's connected with IBS
5. Resetting arrangements in IBS
6. Telephone circuit for IBS
7. Types of failures occurring in IBS
8. Fault localization and restoration.

SINGLE LINE TOKEN BLOCK INSTRUMENTS

1. Constructional feature, types – requirements of S/L token block instrument
2. Various parts of instruments and their use
3. Ball & tablet type – polarity
4. Circuitry explanation.
Non – RE RE area Modification
5. DO's, Don'ts

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6. Class of tokens, tablets, token . tablet pouches, hoops
7. First stop signal proving arrangements.
8. Metallic/earth return
9. Testing the instrument
10. Force drop feature of locks
11. Token balancing
12. Measuring – Block earth resistance
13. Measuring of outgoing / Incoming voltage / currents

SINGLE LINE TOKEN LESS BLOCK INSTRUMENT

1. Requirements of token less block working
2. Push button less instrument (PTJ make) DAIDO block instrument for RE area.
3. Constructional features and type.
4. Parts of instruments uses of each part.
5. Types of relay used and functions of each relay.
6. Circuitry explanation Internal and external circuit.
7. Comparison, Advantages over token instrument.
8. Power supply arrangements.
9. Do's & Don'ts from operation & maintenance angle.
10. Testing of instrument.
11. Trouble shooting.
12. Records regarding cancellation

DOUBLE LINE BLOCK INSTRUMENT

1. Requirements of double line block instrument.
2. Types of instruments used in double line.
3. Constructional features, TOL lock, half notch, contacts, indicators, PR relay
4. Circuitry explanation for the instrument in RE area.
5. Power supply arrangements.
6. Provision of double locking arrangements.
7. Overhauling periodicity.
8. Testing of TOL lock, contacts & instrument.
9. Wiring and installation of instrument including PR relay.
10. DO's & Don'ts.
11. Trouble shooting

ELECTRO MECHANICAL SIGNALING

1. Selection circuits.
 - i) Signal aspect control circuits.
 - ii) Route holding, approach locking, back locking sectional route release
 - iii) Induction locking on signal and point levers, track locking on point lever.
2. Power operated lifting barrier gates.
3. Auto warning of LC gates.

BLOCK PROVING BY AXLE COUNTERS

1. Necessity of block providing by Axle Counter.
2. Details of equipment
3. Operation of the system
4. Block diagram
5. Circuit description
6. Status of relay during working
7. Installation
8. Earthing
9. Commissioning
10. Do's & Don'ts
11. Trouble shooting

PANEL INTERLOCKING

CONVENTIONAL TYPE (Metal to carbon)

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EAST CENTRAL RAILWAY

1. Knowledge, concept of panel interlocking
2. Types of buttons, knobs, indications.
3. Various controls
4. Basic principle of electrical interlocking
5. Basic control circuits
6. Knob control, siding control, crank handle control, LC gate control
7. Indication and route release signal circuits
8. Typical failures and trouble shooting
9. Centralized operation with SM's control
10. Route cancellation

Siemens Type(Metal to Metal Type)

1. Knowledge, concept of panel interlocking
2. Types of buttons, indications and various controls
3. Basic control circuits
4. Button control, siding, crank handle, LC gate counter.
5. Signal control circuits, route release circuits
6. Different groups (relay) used in panel
7. Typical failure trouble shooting
8. LSS control circuit
9. Sub route, full route and emergency cancellation.

ELECTRONIC INTERLOCKING & DATA LOGGER

1. Need for EI.
2. Comparison between EI & PI
3. Block diagram of SSI principle of working.
4. Function of CPU – inputs & outputs.
5. Circuit conversion to Machine language
6. Programming E proms, testing & installation / Entry of interlocking into the SSI
7. Function of micro processor – Fail safe principles.
8. Normal operation, diagnostic error codes.
9. Different voltages for equipment
10. Grounding of equipment, cleanliness.
11. How to restore the failures and trace the failure.
12. Data logger
 - a) Principle of working and equipment description and application.
 - b) Power supply of data logger.
 - c) Networking of data logger

SIGNALLING IN 25 KV TRACTION AREA

1. Effects of 25 KV electromagnetic induction and static induction, parallelism.
2. Screened, unshielded cables, earthing.
3. Control & repeating circuit in RE area for CLS. Lamp proving circuit.
4. Track circuit in RE area, DC single rail, impedance bonds.
5. AC immunity on point machines control circuits.
6. Block bell and filter unit in RE area.
7. EKT, Slot circuits in RE.
8. Insulation in lead out and in point ridding in RE.
9. Traction bonding staggering & cross bonding
10. DC power supply in RE area.
11. Power supply through AT
12. Use of insulated tools
13. Safety precautions to staff in RE area.
14. Implementation of the OHE masts and signal clearance.

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**Syllabus of selection test for the post of Sr. Instructor/Instructor (Tele) in
STTC, E.C.Railway, Danapur**

1) ELECTRONIC COMPONENTS

Passive Devices, Resistors, Capacitors, Inductors. Semiconductor diodes, its working principle, parameters, uses etc. Zener Diode and its applications. Special types of diodes used in Microwave and Wireless. Transistors- Bipolar, working principle and application. SCR, UJTS, Diacs, Triacs Working principle and uses. Regulated Power supplies. DC-DC converters and filter circuits.

2) BASIC ELECTRICITY AND MAGNETISM

EMF, current, power, resistance, inductance, capacitance, powerfactor. Ohms law, Kirchoff laws, Thevenin theorem, Norton theorem etc. Magnetism, Magnetic induction and Faraday's laws. Transformer working principle, losses and their reduction techniques. Basic Electrical equipments like chargers, stabilizers, UPS, DC-DC converters etc.

3) AMPLIFIERS, OSCILLATORS MODULATION AND DEMODULATION

Amplifiers, Class A, B, & C., Push pull and Complementary symmetry amplifiers. Coupling of amplifier stages. Oscillators – Colpitts, Hartley, Crystal and Phaseshift., Operational Amplifiers., Modulation and Demodulation Principles AM, FM & PM., Pulse Code Modulation in detail.

4) DIGITAL FUNDAMENTALS AND APPLICATION

Number Codes and conversion. Boolean algebra, Gates and Flip flops. Arithmetic Circuits, Registers and counters, Encoders, Decoders, Multiplexers & Demultiplexers, Memory circuits (RAM & ROM), Principle of digital switching, Introduction to Microprocessors & Personal Computer.

5) TELEPHONE INSTRUMENTS

Magneto Telephone, Selective Calling Telephone, Control Telephone, PT set- 2 wire, 4 wire, 2/4 wire, Electronic telephone.

6) PUBLIC ADDRESS SYSTEM

Principles of audio system. Micro phones, general and special types. Loud speakers of different types. Impedance matching and voltage matching. Amplifiers for P/A system and their types. Arrangement of indoor and outdoor P/A system. PC based train announcement system. SMART auto announcement system setup. Plasma based Train Display Board setup.

7) OPTICAL FIBRE COMMUNICATION

Basic principles of optical fibre communication its application and advantages. Construction of optical fiber cable. Important characteristics of the cable. Cable termination and underground joints. Splicing practices. OTDR working principle and usages. Fundamentals of OLTE optical source, line coding unit etc. Various scheduled measurements of cable and equipment's.

8) MICROWAVE AND UHF

Basic principles of microwaves. Need to Digital Microwave and Advantages of Microwaves. Pulse code modulation. Modulation techniques. Primary and higher order mux. Fading, noise and zitters. Space and frequency diversity. Microwave towers. Microwave earthing, importance and measurements. Power supply arrangements. Periodical Measurements. End to End alignments. Digital UHF equipment- Functioning- Measurements-MUX. 18 GHZ Microwave system used for Block working.

9) ELECTRONIC EXCHANGE

Basic principles of electronic exchange. Principles of working of SPC exchange. Various modules of the exchange. ISDN exchange and their main features.

10) CABLE AND OVERHEAD

Different types of overhead wires and where used. Different cables used in S&T and cable laying procedure. Periodical tests on cables, faults, fault localization and rectification. Study of jelly filled cables and

cable jointing procedure.Colour code scheme in telecom cables, Identifying pairs.Parameters of underground cables.

11) SDH & PDH

Multiplexing and frame structure in SDH and PDH.Benefits of SDH over PDH.Hierarchies in SDH and PDH.PDH equipments (Puncom, Webfil) type of cards, alarms, fault finding procedure.SDH equipments (TEJAS) type of cards, alarms, fault finding procedure.

12) DATA COMMUNICATION AND NETWORKING

OSI and TCP/IP layers.IP addressing scheme, sub netting and super netting Various network protocols. Network Security Basics.Datacom equipment's (Modems, switches, Routers, Terminal servers and Servers).Basic configuration of cisco routers, layer3 switches and terminal servers. Data Networks in Indian Railways (UTS, PRS, FOIS and Railnet etc).

13) POWER PLANT

Types of battery used in Railways.Different types of charging of secondary cells.Variou defects of secondary cell, their prevention and rectification.Different types of charger used in Railways.Method of Earthing used in Telecommunication in Railways.Surge protection devices used in Railways.

14) VHF set

Various frequency ranges &Wave propagation, 5W VHF hand set (Wallkie Talkie),25W VHF set and its antenna

15) MTRC

Advantages of MTRC over other communication systems. Working principal of MTRC. CDMA and GSM technology

16) CCTV, FAX and IVRS

Application of CCTV, Block Diagram of CCTV system and its networking, Application of FAX in Railways, Types and working principle of FAX machines, Working principle of IVRS & its uses in Railways

17) Basic Concept of Signaling

Knowledge and necessity of signals-Fail safe feature of signaling system.Definition of signaling terms as given in G&SR.Concept of LQ, UQ signaling, CLS.Location of Signals.Subsidiary signals.Markers, Boards, Signs etc.Overlaps, braking distance, sighting distance.Isolation, slip siding, catch siding.Simultaneous reception and dispatch of train.Classification of station- Minimum signaling equipment required at each class of station.Standards of signaling – Minimum signaling equipment required at each standard of signaling.Level crossing gates.Inter cabin control.Block instruments, methods of block working control of outlying sidings.Signaling plan.Station working rules.System of train working(Block working)

18) COMPUTER APPRECIATION

Computer hardware-functioning of CPU, RAM, ROM, HDD, Interface cards etc., Operating system functions.Software package- MS Word, MS excel, MS PowerPoint.Basics of Database Management software.Sharing resources in a network.

19) OFFICIAL LANGUAGE