

Office of the
General Manager(P)
Hajipur

Secy. to GM- for kind information of GM,
Dy.Secy. to AGM – for kind information of AGM.
PS-I to PCPO - for kind information of PCPO.
PCEE/ECR/HJP, SDGM/ECR/HJP, PFA/ECR/HJP.
General Manager (P)/CORE/PRYJ, General Manager/RITES/NDLS, CPD/RE/DNR
CAO/Con/South & North/MHX, CAO/WPO/Patna, CAO/GLP/Patna.
All DRM/ECR-DNR, DDU, DHN, SEE & SPJ.
All Sr. DEEs/DEEs/ECR-DNR, DDU, DHN, SEE & SPJ.
All Sr.DPOs/ECR- DNR, DDU, DHN, SEE & SPJ.
CWM/PD/ECR/DDU, WS/SPJ & CRW/HRT.
Chairman RRB/Patna & MFP. Chairman/RRC/Patna.
CPO/Ad./HJP, Principal/ZRTI/E.C.Rly/Bhuli & MFP.
Dy.CPO/IR&W/HJP, SPO/Con/MHX/Patna.
APO(MPP)/ECR/HJP- for uploading on WEBSITE.
All Extra Divisional Units.
General Secretary/ECROA, ECRPOA & ECRKU.

Sub :-LDCE for the post of Assistant Electrical Engineer (Group-'B') in Level-8 of Pay Matrix as per 7th PC against 30% quota as special drive.

With the approval of General Manager, it has been decided to hold a selection LDCE for forming a **panel of 02 persons** for the post of AEE(Gr.-'B') against 30% quota as a special drive over E.C.Railway, as per details given below:-

LDCE	UR	SC	ST	Total
AEE (Gr.'B') 30%	02	00	00	02

As decided by Railway Board vide L/No. E(GP)2022/2/4 dated 14.03.2024, 14.12.2023, 28.06.2022, 06.09.2022& 04.10.2022, that 30% LDCE for promotion to Group 'B' posts in all Organised departments in the vacancy cycle beginning from 01.01.2023 to 31.12.2024 are to be conducted through the Centralised Computer based Objective type examination by NAIR as a Special Drive.

- (2) (a) **Tentative date of Examination (CBT):- 23.06.2024**
(b) **Venue of Examination (CBT)& Date of Viva Voce :- Will be notified in due course**

(3) **Eligibility:-(As on 01.01.2023)**

- (a) All permanent Group-"C" technical staff & running staff of Electrical Department working/holding lien in Electrical Department of East Central Railway in Pay Band Rs. 9300-34800 (PB-2) with Grade Pay Rs. 4200/- (Level-6 in 7th CPC) and above including Shunter-II of Electrical Department/East Central Railway working in Pay Band Rs. 5200-20200 (PB-1) Grade Pay Rs. 2400/- (equivalent to the stationary post in Pay Band Rs. 9300-34800/- (PB-2) Grade pay Rs. 4200/- & above as per RBE No. 92/2015) including those who are working in other Railway/units and on deputation having lien and seniority on any Division/Unit of East Central Railway and completed a minimum 05 years of non-fortuitous regular service in this grade (s) as on 01.01.2023 are eligible to volunteer for the LDCE.
NB:-However, Those Gr.'C' employees who have been given financial up-gradation in Grade Pay 4200/- or above in PB-2 (9300-34800/-) under ACP/MACP are not eligible to volunteers for the above (LDCE) examination.
- (b) **The cut-off date of eligibility for candidates for 30% LDCE is 01.01.2023, which is same as in the earlier part selection of 70% Quota as a special drive.**

Contd.... P/2

- (c) As per Railway Board's letter No. E(GP)2005/2/74 dt.13.03.08(RBE 40/2008) in case of persons transferred at his own request to a new unit in the same category of post and assigned bottom seniority therein, the service rendered by them in the previous unit may be reckoned for determining their eligibility wherever a minimum length of service is prescribed as a condition for promotion in the new unit, subject to the condition that the length of service which is so allowed to be counted does not exceed the length of service of their immediate senior in the new unit.
- (d) Those Railway employees who have come own request transfer/mutual transfer and joined E. C. Railway after the cut off date i.e. 01.01.2023 will not be eligible to appear in this (LDCE) examination.
- (4) Eligible staff who desire to volunteer for the above LDCE may submit their application through proper channel to their respective Personnel Branch officer where they hold their lien.
- (5) Eligible staff working in the Construction/Project Organization on deputation, training and any Ex-cadre Organization and having lien and seniority in any Division/Unit of ECR, who desire to volunteer for the above LDCE may also submit their application through proper channel i.e. their respective Personnel Branch officer, where they hold lien. The concerned Divisions/Units should send copy of notice to the staff who are on deputation after being released from that Divisions/Units.
- (6) When an employee is holding an ex-cadre post, details of his/her post in regular cadre with the grade and date of entry as a regular measure should be furnished. This may also be brought to the notice of all concerned. It may be ensured that wide publicity is given to this notification amongst all the eligible staff. It is the personal responsibility of the personnel Officers/Controlling Officers of the Units to ensure that the notification reaches to all the eligible employee well in time.
- (7) All the volunteers who fulfill the above mentioned conditions of eligibility will get the chance to compete in the said LDCE, without any restrictions to the number of eligible candidates to be allowed for appearing in the examination.
- (8) The above LDCE will be based on the candidate's performance in Written examination, viva-voce & record of service. Only the candidates, who qualify in the examination and found medically fit for Safety category of AEE (Gr.B) as prescribed in Indian Railway Medical Manual will be called for Viva-voce test. The placement of the candidates in the panel will be based on their performance in Written examination, Viva-voce test and Record of service as per extant instructions of Railway Board and will be strictly as per merit.

(9) Pattern of Examination :-

(i) The Examination will be conducted as per guidelines/instructions contained in Railway Board letter No. E(GP)2018/2/31 dated 19.03.2019 (RBE No. 53/2019), E(GP)2022/2/4, dt. 28.06.2022, 06.09.2022 & 11.11.2022.

(ii) The CBT/Written examination shall comprise of only one paper which shall have 100% objective type multiple choice question only. The paper will be of 150 marks and the distribution will be as under :-

- | | |
|--|----------|
| a) Technical (Professional) subject: | 80 marks |
| b) General knowledge including optional questions of 15 marks on official language Policy & Rules: | 40 marks |
| c) Establishment and Financial rules:- | 30 marks |
| d) Qualifying marks:- | 90 marks |
| e) Duration of examination:- | 03 Hours |

All Objective type questions will carry equal marks. There shall be negative marking for incorrect answers. One-third of the marks allotted for each question will be deducted for every wrong answer.

(iii) Total marks and qualifying marks under the heading “Viva-Voce and Record of service” are as under:-

<u>Head</u>	<u>Maximum Marks</u>	<u>Qualifying Marks</u>
Record of Service -	25	Total 30 in which 15 marks for Record of service will be essential.
Viva-voce test -	25	

(10) **Syllabus: In terms of Rly. Bd's Letter No. E(GP)2022/2/4 dated : 07.11.2022, copy of syllabus for above selection is attached as Annexure-‘B’.**

(a) The Controlling Officers should give the wide publicity of this notification amongst the eligible staff under their control and ensure submission of applications by the candidates in the prescribed Proforma (Specimen Copy enclosed as **Annexure-“A”**).

(b) **The last date for submission of the application by candidates is 12.04.2024.**

(c) The Controlling officers are also advised that applications submitted by the candidates (in prescribed proforma) must be forwarded to concerned Personnel Branch/Unit office by 15.04.2024.

(d) The applications should be scrutinized properly in Personnel Branch with the Service Record to avoid any factual errors and further complications. The applications should also be signed by the Controlling Officer with official seal and should have the counter signature of the concerned ‘Personnel’ Branch Officer to avoid any factual errors.

(e) All the scrutinized applications should be sent in a bunch through special messenger to **Dy.CPO/Gaz. /ECR/ HJP on or before 19.04.2024 positively. Applications forwarded after the target date will not be entertained under any circumstances.**

It may also be noted that application other than in prescribed proforma, having incomplete information or without signed by controlling officer and countersigned by Personnel branch officer will not be entertained.

(11) In case the service particulars furnished by the volunteers and certified to be in order by the concerned authority are found incorrect/false subsequently, the candidature of the volunteer will be liable to be cancelled at any stage and suitable departmental action will be initiated against him/her.

(12) **ACTION TO BE TAKEN ON RECEIPT OF APPLICATION BY CONCERNED PERSONNEL OFFICERS/CADRE CONTROLLING OFFICERS:-**

(a) The Personnel Officer/Cadre Controlling Officer will check the correctness of all the particulars of the applications with the Service Records and other relevant records and certify the correctness of each column of the application. Without such certification, application received will summarily be rejected and the responsibility will be fixed for incorrect or incomplete certification against the Officer who will certify/verify. The Personnel Officer/Cadre Controlling Officer should invariably write “Checked and verified” in each and every application after checking and verifying the details duly attesting their signature and date of certification (the date of certification should invariably put in the application).

In case, the Personnel/Cadre Controlling Officers do not put the date after certification or merely forward the application without checking and verifying the details, the matter would be brought to the notice of PCPO and concerned PHOD for taking action against him.

(b) It may please be noted that Controlling Officers/heads of the Units have no discretion to entertain any application beyond the last date. **The applications of the employees who are eligible, should only be forwarded after verifying the other relevant particulars and ineligible application should not be forwarded.**

(C) The Personnel Officer/Cadre Controlling Officer should forward the scrutinized and checked applications in one bunch together under one covering letter furnishing **the details in the following proforma addressed to Dy.CPO/Gaz./HQ by 19.04.2024** indicating therein the total number of applications forwarded. (The details should be sent in soft copy in (MS Excel format also as in the form given in item-D below). The applications rejected may be intimated to the individuals giving reasons thereof by the concerned Unit/Divn where lien and seniority of concerned staff held.

Contd.... P/4

Proforma:-

Sl. No.	Particular/details of candidates	To be filled											
1.	Name of applicant												
2.	IPASS Number												
3.	HRMS ID												
4.	Designation												
5.	Mobile No.												
6.	Email.ID (clearly)												
7.	Place of posting												
8.	Division/workshop/unit												
9.	Controlling officer												
10.	DOB (DD/MM/YYYY)												
11.	DOA (DD/MM/YYYY)												
12.	Community (UR/SC/ST)												
13.	Date of regular promotion to Grade pay (4200/- & 4600/-)												
14.	Total service in (GP) Rs. 4200/- (Rs. 2400/- in case of L.P.S.-II) & above in Electrical Deptt. as on 01.01.2023												
15.	Belongs to PwBD (40% or more), if yes mention category and attach certificate.												
16.	If yes, PwBD, whether entitled to Scribe (Yes/No)												
17.	Whether came in present unit on own request transfer basis or Mutual transfer basis ? (mention 'Yes' or 'No')	Own request transfer :- Mutual transfer :-											
18.	If, came in present unit on own request basis or Mutual transfer basis, following details must be mentioned:-												
	Name of the the Railway/Division/unit came from	Pay level and date of seniority fixed in present unit on own request transfer basis						Pay level and date of seniority fixed in present unit on mutual transfer basis					

(13) TRAINING OF SC/ST CANDIDATES :-

As there is no reserved vacancy available, Pre-selection training is not required as per para 2 (ii) of RB's letter no. E(GP)2010/2/39 dated : 28.08.2019 (RBE No. 142/2019).

- (14) The eligible staff should also be advised that no absentee written examination would be held for the absentees under any circumstances. As per rule, there is no provision of absentee exam in LDCE.
- (15) The concerned Personnel Branch Officer & Controlling Officers should ensure the submission of service records and ACRs/APARs of last 05 years and DAR/SPE/Vigilance clearance in respect of staff declared qualified for the viva-voce in due course/immediately after publication of the result of written examination through special messenger to Dy. CPO/Gaz/ECR/HJP.
- (16) The above selection will be held as per procedure laid down in Master Circular No. 68, governing promotion from Gr. 'C' to Gr. 'B' issued by Railway Board and the instructions issued time to time. The said Master Circular is available on website www.indianrailways.gov.in....>ministry of railway...>railway board>Railway Board Directorates... >Establishment...>E(GP)circular → Master Circular. The department/division/unit should ensure the compliance of instructions of item 15 of Master Circular- 68.
- (17) Application received after the target date should not be entertained and the same should be disposed off at the Division/Extra Divisional level by rejecting them on account of late receipt under advice to this office.

Please acknowledge receipt.

DA:- (i) Proforma of application (Annexure 'A').
(ii) Syllabus (Annexure 'B')

Digitally Signed by Alok
Srivastava

Date: 21-03-2024 17:12:12

Reason: Approved SPO/GAZ

For General Manager(P)/HJP

PROFORMA OF APPLICATION AGAINST NOTIFICATION FOR THE POST OF AEE(Gr.'B') 30% QUOTA.

1. Information regarding candidate:

Sl. No.	Particular	Filled by candidates
1	Name of applicant (In Block letter)	
2	IPASS Number	
3	HRMS ID	
4	Designation	
5	Mobile No.	
6	Email.ID	
7	Place of posting	
8	Division/workshop/unit	
9	Lien at	
10	Controlling officer	
11	DOB (DD/MM/YYYY)	
12	DOA (DD/MM/YYYY)	
13	Educational Qualification	
14	Community (UR/SC/ST) (if SC/ST, a copy of caste/Tribe Certificate duly attested by a Gazetted officer should be enclosed with application)	
15	Belongs to PwBD (40% or more), if yes mention category and attach certificate.	
16	If a PwBD, whether entitled to Scribe (Yes/No)	
17	Whether came in present unit on own request transfer basis or Mutual transfer basis ? (mention 'Yes' or 'No')	Own request transfer :- Mutual transfer :-
18	If, came in present unit on own request basis or Mutual transfer basis, following details must be mentioned :-	
	Name of the the Railway/Division/unit came from	Pay level and date of seniority fixed in present unit on own request transfer basis
		Pay level and date of seniority fixed in present unit on mutual transfer basis

2. Date of appointment/promotion (on regular basis) and Length of non-fortuitous service (on regular basis) as on 01.01.2023.

Grade	Date of appointment/ promotion (on regular basis) [in DD/MM/YYYY]	Length of non-fortuitous service (on regular basis)			
		As on	Year(s)	Month(s)	Day(s)
(a) Level-4 in 7 th CPC (PB-I GP-2400 in 6 th CPC) (For Loco Pilot Shunting-II only)					
(b) In PB-II GP-4200					
(c) In PB-II GP-4600					

3. Present pay & level (GP) & Date of promotion to present scale/grade. :-

4. **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 in the event of any entry above is found incorrect or improper, my candidature shall liable to be cancelled at any stage during pendency of the above selection.

SIGNATURE OF THE CANDIDATE (in HINDI)

SIGNATURE OF THE CANDIDATE (in ENGLISH)

(A) Forwarding of application (filled-up) furnished by the candidate to the Personnel Branch Officer by his/her controlling officer:-

The application is in prescribed proforma duly filled-up by the candidate, Shri/Smt. _____

Designation _____ received within the target date is hereby forwarded to his/her Personnel Branch Officer for verification with the service record available and for onward transmission to the General Manager (P)/ECR/HJP.

SIGNATURE OF CONTROLLING OFFICER (With office seal & date)

(B) Certificate to be furnished by the Personnel Branch Officer:- If the volunteer comes under the circumstances mentioned in Para 2 (c) of the notification the service rendered by immediate senior employee as on 01.01.2023 should be indicated invariably in the following format.

Sl. No.	Name(S/Shri) of immediate senior	Designation	Pay leves(GP)	Year(s)	Month(s)	Day(s)
			Level-4 in 7 th CPC (PB-I GP-2400 in 6 th CPC) (For Loco Pilot Shunting-II only)			
			In PB-II GP 4200/-			
			In PB-II GP 4600/-			

It is certify that the Service Particulars/Bio-Data furnished by Shri/Smt. _____, Designation _____ in the prescribed proforma (Bio-data) have been checked and verified with his/her service record and found correct.

Digitally Signed by the mentioned candidate is eligible to appear in the said selection as per Notification and his/her application is hereby forwarded to GM (P)/Hajipur for further necessary action.

Date: 21-03-2024 17:13:05

Reason: Approved

SIGNATURE OF THE CADRE ('P' BRANCH) OFFICER (With office seal & date)

Note:- The application with any column unfilled will be summarily rejected

**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
(RAILWAY BOARD)**

No. E(GP)2022/2/4

New Delhi, dt:07/11/2022

The General Managers,
All Indian Railways/PUs.

(Kind Attn.:All PCPOs/PFAs/Dy.CPO(G) & Dy.CAO(G))

**Sub.: Promotions to Group 'B' posts on Indian Railways - Introduction of
Centralized Computer Based Multiple Choice Objective type
examination (CBT) in all departments having Organised Services**

Board has prescribed syllabus for written examinations held as part of 30% LDCEs for promotion to Group 'B' posts in all Organised Services. Besides this, syllabus for 70% Selection for promotion to Group 'B' post of APO has also been prescribed by Board. Now, in the context of introduction of Centralised CBT for 70% Selections and 30% LDCEs for promotion to Group 'B' posts, Board has prescribed syllabus of 70% Selections and have also modified the syllabus for 30% LDCEs for all Group 'B' posts in Organised Departments. Similarly, syllabus for Establishment & Financial Rules has also been prescribed.

2. A copy each of the Syllabus for professional subjects prescribed by Board for 70% Selections and 30% LDCEs for promotion to Group 'B' posts in all Departments having Organised services along with the syllabus for Establishment & Financial Rules is enclosed for information. These syllabi are applicable for Selections & LDCEs to be conducted w.e.f.1.1.2023.

DA:As above


(Meenakshi Saluja)
Dy. Director, Estt.(GP)-III
Railway Board
Ph. No. 233047250
E.mail ID- meena.1964@gov.in

Syllabus for promotion to Group- B posts - 70% selection and 30% LDCE.**Syllabus for Establishment Rules:**

1. Organization of the Personnel Department in Railways objectives functions and policies of Personnel Department.
2. Recruitment and Training, Classification of Services, Recruitment in Different services, Railway Recruitment Boards & Railway Recruitment Cells Compassionate Ground Appointments, Initial & In Service Training, Refresher Courses, Central Training Institutes, Training Centers in Zones, Divisions & Workshops, Training Modules for different posts, Training under Apprentices Act, Online Training, APARs.
3. General conditions of service in Railways, Seniority, Lien, Inter Railway & Inter Division transfers, Deputation, Promotion Policy & methods. Selection, Suitability, Trade Tests, Leave Rules, Pass Rules, Joining Time Reservation policy, HOER, Overtime, Payment of wages, current CPC Pay Rules, Advances in Railways.
4. Manpower planning, Rightsizing & Benchmarking, creation, extension and surrender of posts, creation of posts against new assets, different types of posts including workcharged posts.
5. The Railway Servants (Discipline & Appeal) Rules, 1968 and related instructions.
6. The Railway Services (Conduct) Rules, 1966 and related instructions.
7. Retirement benefits, qualifying service, pension, family pension, commutation gratuity, new pension scheme.
8. Staff welfare, SBF, Railway institutes, Railway schools, Ex-gratia payment, Incentive Bouns Scheme, Staff Grievances Redressal Mechanisms.
9. Industrial relations in Railways, recognized trade unions, industrial disputes. The Industrial Disputes Act, 1947. The Industrial Relations Code, 2020. The Trade Unions Act, 1926, PNM, PREM, JCM, Various Associations & Informal Meetings.
10. The Factories Act, 1948. The workmen's Compensation Act, 1923. Functions of Labour Enforcement Officers, Right to Information Act.
11. The scope of Information Technology in Railway e – office. HRMS, IPAS , LIMBS, ARPAN, CPGRAMS, ANUBHAV etc.

1. Parliamentary Control over Railway Finance, Public Accountability, Canons of Financial Propriety.
2. Railway Budget - Budgetary terms, Types of Budgets, Budget cycle, Demand of Grants, Budgetary and Financial Reviews.
3. Rules of Allocation - Classification of expenditure - Control of expenditure - Responsibility Accounting - Performance Budgeting - Exchequer Control - Financial Results of Working lines.
4. Works Programme - Financial justification of Works - Surveys - Preparation of Estimates - Capital Budget - Control over Capital Expenditure - Reappropriation of Funds.
5. Financial control over Stores Expenditure - Purchase and Stores Keeping Procedure - Inventory Control and ABC Analysis.
6. Financial & Cost Control in Railway Workshops/Sheds/Units.
7. Rules and procedure relating to Tenders and contracts for execution of works and Procurement of Stores, M&P Programme and RSP.
8. Procedure for Possessing and finalizing Audit Objections and Draft Paras.
9. Delegation of Powers.
10. Losses, Frauds and Embezzlements.
11. General Financial Rules
12. Government e-Market (GeM)
13. Classification of Railway Revenue (Earnings)
14. Information Technology in general with specific reference to Railway's IT Applications
15. Taxation matters with special focus on GST & Income Tax
16. Organization of CGA and C&AG
17. Any other topic felt necessary from time to time

Syllabus for 30% LDCE for promotion to Group 'B' post of AEE in Electrical Department.

A. Professional Subjects :

Part I : General Electrical Engg.

1. Electrical Circuits: Electrical Circuit Elements (Resistance, Inductance and capacitance), Voltage and Current Sources, Ohm's law, Kirchoff's Voltage and Current Laws, DC & AC circuit analysis, Magnetic circuits and analysis, Poly phase circuit analysis.

2. Electronic Devices & Analog Electronics: Energy Band Theory of Solids, Intrinsic and Extrinsic Semiconductors Doping, Doping Materials, Carrier Mobility, Conductivity, Semiconductor Diodes, Diode Rectifiers, Bipolar Junction Transistor, JFET, MOSFET, Transistor Biasing Circuits. CE, CB and CC modes of transistor. Using transistors as amplifiers and switches. Characteristics of an Operational Amplifier – Applications of Op-Amp as an Inverting and Non-Inverting Amplifier, Integrator, Differentiator, Summing and Subtracting Amplifier and Logarithmic Amplifier. Differential Amplifier - Calculation of common mode rejection ratio, Active & Passive Filters.

3. Digital Electronics: Number Systems, Basic Logic Gates & Boolean Algebra, Digital Logic Gate Characteristics, Minimization Techniques, Combinational Logic Circuits, Flip flops and Sequential Circuits.

4. Power Electronics: Power Semiconductor Devices (Diodes, BJT, MOSFET, SCR, GTO and IGBT) and their characteristics, selection of devices for different power electronics applications, Working of single phase and three phase rectifiers, H-bridge inverter, Three phase voltage source inverter, PWM converters, Harmonic analysis and power factor improvement, AC machine control, VVVF drives.

5. Electrical Engg. Materials: Properties & applications of Electrical insulating materials, Magnetic materials, Conducting materials & Semiconducting materials.

6. Electrical Machines: DC Machines, Induction Machines and Synchronous Machines. Losses in rotating machines. Single phase and three phase transformers. Losses and efficiency of transformers, Machine Drives.

7. Renewable Energy Sources: Climate change, Global warming, Various sources of Renewable energy- Resources and applications, Solar Cells, Rooftop solar and land based solar plants- Concepts of Basic Design, construction and maintenance, Off grid and Grid connected solar plants, Wind turbines, Net Zero carbon emission, ECBC, Round the clock green energy, Energy Storage systems, Policies and regulations , Net and Gross metering, Business model, tendering.

8. Power System and Protection: Basic concepts of electrical power generation and various equipment. Concepts of transmission lines, Models and performance of transmission lines and cables, Series and shunt compensation, Electric field distribution

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and insulators, Distribution systems, Per-unit quantities, Bus admittance matrix, Load flow methods, Power factor correction, Symmetrical components, Symmetrical and Asymmetrical fault analysis, Principles of various protection system, Circuit breakers, Latest research in the field of power system.

Part II : Railways Electrical Engg

1. General Services:

- a. Power Supply arrangement: Radial distribution system, Looped(Ring Main) distribution systems. Layout & Equipment at Distribution sub-station. Operation & Maintenance of sub-station, Various testing at sub-station, overhead & underground distribution, protective devices & their coordination. Construction, erection & commissioning of new sub-station and distribution lines. Basic features of PVC and XLPE cables. Cable rating and derating, Cable laying. Concept of average demand, peak demand, load factor & electrical billing. Power factor improvement, Electrical & fire safety, Safety auditing of sub-station, concept of energy audit, Functions of Electrical Inspector to Government (EIG) in Railways. Power line crossing, Electricity Act-2003, CEA Regulations, SCADA and Substation automation. Earthing arrangement.
- b. Building Electrification: Types of various wiring methods, metering & safety measures. Wire, switchgears & fittings used for wiring, Energy efficient appliances, scale of fittings as per policy in various types of quarters, various types of Tariffs, commercial connection, concept of prepaid and postpaid metering, concept of smart meters. Safety coordination, Electrical accidents and prevention.
- c. Illumination & Lighting: Various parameters related to illumination, Different types of illumination sources, lighting methods, classification of lux levels at various types of stations, yard lighting & street lighting. Passenger amenities at Railway stations.
- d. Water supply: Types of water supply system, Pumping system, Classification of pumps, Comparison of various pumps, fluid theory, discharge calculations. Centrifugal pump, turbine pump, Submersible pumps, characteristic curve of pumps, efficiency. Cavitations & priming of pumps, necessity of multistage pumping, storage capacity and purification of water. Installation, maintenance & troubleshooting of pumps, Starter & drives of pumps, automation of pumps.
- e. Lift & Escalator: Working of Lift & Escalator, Installation of Lift and Escalator. Maintenance, various safety devices, control panels & Safety aspects.
- f. Air Conditioning & Refrigeration: Theory of air conditioning, refrigeration cycles, Various types of refrigerants, window/split/package AC unit. Central air conditioning plant, VRF system, air cooling systems, planning for capacity and drives for refrigeration plant, Maintenance and troubleshooting.

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- g. Energy Conservation: Need of conservation of energy, Various measures being taken by railways to conserve energy in the field of Electrical General Services. Necessity and implementation of Open Access in Indian Railways. Energy conservation Act.

2. Traction distribution:

- a. OHE: Basic design concepts of TRD system of conventional and 2x25kV system. Types of overhead equipment. Sectioning principles of OHE. Various parts of OHE. Foot Patrolling, current collection, Tower wagons, seasonal & cyclic checks, maintenance Schedule, Preventive maintenance Tools, failure investigation of OHE, earthing and bonding. Railway Electrification and process of construction. Power Blocks & Procedure to obtain it.
- b. PSI: Schematics of 1x25kV and 2x25kV traction substation with names/ratings of various equipment, protection scheme for TSS. Fixed and dynamic PF correction, Feeding stations, SSP & SPs, 132 kV transmission lines, PSI equipment. Maintenance and failure investigation of PSI equipment.
- c. SCADA and Miscellaneous items: Operation and maintenance of remote control, traction power control organization, permit to work, emergency arrangements, coordination with operating and other departments. Liaison with supply authorities, maintenance and failure investigation of SCADA equipment.
- d. NDT techniques, Open Access, safety precautions for electrified sections, Latest development in TRD, MSG meetings. Instructions issued by Railway Board, RDSO's TI/MI, TCs, IRSOD & ACTM.

3. Train Lighting and AC Coaches: Systems of Train Lighting and Air conditioning on coaches, Self Generating Coaches, ICF TL/AC Coach Generation system. Circuits and protection in ICF TL/AC coaches, Emergency feed extension in coaches. Air Conditioning in coaches, Heat Load Calculation, Precooling and Pulldown Tests. Dynodrive test. 25 kVA coach inverter, Water raising apparatus. EOG and HOG systems in coaches- Hotel Load converter and Interlocking panel. Power and control circuits and protection systems in LHB TL/AC coaches, Power car, Pantry car, AC Double Decker, AC 3Tier Economy and LSLRD coach. HVAC Microcontroller and Electronic equipment in LHB coaches. LHB pantry car and its equipment. Push pull train operation. Maintenance schedules of ICF and LHB coaches, Pantry cars and Power cars. Manufacturing, POH and IOH activities of coaches. Commissioning tests and Special Repair. Circuits, working and maintenance of Passenger amenities items in ICF/LHB coaches. Coaching depot working, Primary & Secondary maintenance, Sick line attention, Pit occupation chart, Rake links and Coach requirement, Staff yardsticks and benchmarking. Duties of ACCM/ACCA. Pre-cooling of AC Coaches. Features of ICMS. Unit exchange spares. Fire causes and prevention measures in coaches. SMIs, Modification Sheets and Technical circulars issued by RDSO and instructions by Railway Board and RDSO. Reliability Action plan, recent developments in coaches.

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4. Electric Locos: Organizational structure and duties of officers & staff. Conventional AC & 3 phase locomotives on IR. Equipment in locomotives, their functioning / operations, maintenance / overhauling and testing parameters & maintenance schedules. Reliability & safety action plans. Traction Power Circuit, Auxiliary Circuit, Control Circuits and Pneumatic Circuits. Different types of braking arrangements. Locomotive maintenance schedules & various tests to be carried out. Working of Electric Loco Shed & Electric Loco Workshop. Safety items and safety checks involved in safe locomotive operation. Relevant paras of ACTM, Accident Manual, G&SR, IR SOD and Instructions issued by Railway Board, RDSO and CLW. Latest developments in the field of electric locomotives.

5. EMU and MEMU/Metros: Concept of EMU/MEMU/Metro trains, various types of EMU/MEMU stock, Conventional & 3 phase EMUs & their salient features. Different types of brakes used in EMU/MEMU/Metros. Power circuits, auxiliary, control circuits. Mechanical components and its functions. Different electrical equipment and its functions. Inspection/Maintenance/Overhauling schedules of EMUs/MEMU/Metros. Safety precautions and fire prevention in EMU/MEMU/Metros. Train Control Management System(TCMS). Recent developments in EMU/MEMU/Metros.

6. Electric Loco and EMU Operation: Organizational structure and duties of officers & staff. Crew management – Training, Monitoring & Counseling. Crew & loco links. HOER Rules. Loco utilization. SPAD (Signal Passing At Danger). Management of Crew lobby, running room, trips shed & TLC / Power controller office. Working of CMS & FOIS. Safe, punctual & efficient loco / EMU operation with online troubleshooting of locomotive / EMU failures. Relevant paras of ACTM, Accident Manual, G&SR and Instructions issued by Railway Board & RDSO. Latest developments in the field of electric locomotives / EMU operations.

7. Store Matters: Procedure related to procurement of stock items and non-stock items, distribution and accountal of stores. Receipt and custody of stores. Sale of surplus stores. Inventory management, ABC Analysis. Procurement through GeM, IREPS. Schedule of powers under stores matters.

8. Tenders and Contracts: Work proposals, Types of estimates & estimation stages, procedure of survey, Type of tenders, earnest money, Performance guarantee, security deposit, technical & financial eligibility criteria, Merits and demerits of EPC tender. IRPMS. Procedure and stages of e-tendering through IREPS, General Condition of Contract (GCC) for works and service contracts, various provisions in Schedule of Power (SOP) under works matters, Basic principles of Project management, quality control in electrical works.