मध्यरेलवे/CENTRAL RAILWAY

प्रधानकार्यालय/Headquarters Office
कार्मिकविभाग/Personnel Department
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क्रमांक. CR/HQ/PERS(PBPT)/17/2024 दिनांक: 25-04-2024.

सेवामें : Sr.DPO Pune, Nagpur

विषय: Syllabus for the post of JE/TRD, ML-06 of Electrical Department of Central Railway.

सन्दर्भ:This office letter No. CR-HQ/PERS(PMPC)/14/2022 dated 03.04.2024.

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1. With reference to the above, a common syllabus for selection to the post of JE/TRD Matrix Level-6 of Electrical Department for LDCE(Ranker) and Departmental quota duly approved by Competent Authority is enclosed herewith for your information and record please.

Sd/-(Prem Kumar Sharma)
APO(S&T/EL)
/-PCPO

Copy to: DRM(P)BB, BSL, NGP, SUR, PA – For information please.
Copy to: DY.CPO(HRD) – for information please.

PREM KUMAR SHARMA
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/-PRINCIPAL CHIEF PERSONNEL OFFICER

Syllabus for promotion to the post of JE(TRD) against departmental quota & Ranker Quota

	A.	TECHNICAL
1.	**General Description of Fixed Installations**	a. Power supply arrangements at sub-station- General supply and feeding arrangement, sectioning arrangement, Basic Principles of sectioning, SP/SSP/TSS/Feeder/FP b. Power supply for signaling c. Overhead Equipment, different types of OHE d. Remote control and communication arrangements e. Special Warning Signals f. Knowledge of Basic Electrical Engineering g. Brief history of electric traction in Indian Railways
2.	**Overhead Equipment-1**	a. Duties of ~~SSE and~~ JE (OHE) as per ACTM b. Foundations for OHE Structures c. OHE Structures- Different types of supports, masts, portals & particulars- Head spans multiple structures, loading of mast, Bending moment, foundations, TTCs d. Cantilever Assembly- ABCD dimensions and pertaining calculations e. Regulating Equipment- Un-regulated & Regulated OHE, Mechanical advantages of ATD, X-Y Measurement of ATD, various types of ATD's. f. Section Insulator g. Isolators h. Droppers i. Neutral Section- various types of Neutral sections, 500m, 250m DJ Open/Close Board, Sigma Board, OHE termination board, Unwired section board, Coasting board etc. j. Conductors k. Tension length l. Overlap- Insulated and Un-insulated m. Jumpers- different types of jumpers n. Contact wire height, Gradient of contact wire o. Stagger & factors affecting it p. Encumbrance q. Span Length r. Implantation / Setting Distance s. Type of Turnout and Crossover in OHE t. Clearances, Electrical clearances, long time and short time duration u. Bonding and Earthing v. Sag, Tension in conductors-Temperature-Effects w. Wind pressure, Blow off x. OHE in curved tracks- Versine- Super elevation y. Use of Live Line Monitoring Gauge (LLMG) and USFD checking of contact wire. z. Numbering of OHE Masts aa. Anticreeps bb. OHE terminations cc. Uses of Thermo-vision Camera for detecting the flaw in OHE equimpments

3.	**Over Head Equipment-II**	a. Maintenance schedule for overhead equipment b. Tower wagon operation maintenance and safety while working c. Safety rules for OHE d. Current collection test (OLIVER-G) e. Schedule of Dimensions- Basic principle of checking of OHE layout plan, survey, pre-pegging plan. f. OHE materials- and IS specifications, Wire fittings- Aluminum Bronze fittings, insulators testing, store indenting and inspection g. Latest TI/ MIs and RDSO specifications, Reliability action Plan. h. Live line checking of Cross over, Turnout, overlap by LLMG.
4.	**Power Supply Installations-I**	a. Duties of ~~SSE and~~ JE (PSI) as per ACTM b. Traction Power Transformers c. Circuit breaker Interrupter and Isolator d. Auxiliary Transformer e. Current Transformer f. Potential Transformer g. Lighting Arrestor h. Capacitor Bank i. Bonding and Earthing j. Batteries and Battery chargers k. Gas insulated sub-stations (GIS) l. Numbering of electrical accessories in PSI.
5.	**Power Supply Installations-II**	a. Protective system and Relay setting calculations.- Protective arrangements for feeders- for transformers against lightning, various types of relays, Details of testing and calibration & Fault validation. b. Maintenance Schedule for power supply installations. c. Energy conservation measures for Traction installations. d. Safety during working at power supply installations. e. Uses of Thermo-vision Camera. f. Lay out of grid Sub-station, spacing between two (02) Sub-stations, Buried Rail, Traction transformer details- various types of control post equipment details- Circuit breakers, Interrupters, CT, PT, LA, AT, CR panel, Capacitor Bank and their working, GIS (Gas Insulated Sub-station). g. Maximum demand- Contract demand, Load factor, Diversity factor, tariff, Energy meter and Trivector meter. MFM & ABT meter functioning. h. Cables for AT, Transformer oil filtration, DGA, BDV of Transformer oil.
6.	**2X25 KV ac Traction System**	a. Introduction and description of 2X25kV ac Traction System
7.	**Remote Control and SCADA system**	a. Introduction b. Duties of ~~SSE and~~ JE (RC) c. Salient features of SCADA d. System Description- Different makes of remote control equipments (SCADA) used in Indian Railways. RCC equipments, RTU (remote terminal unit). e. Section arrangement, fault segregation & localization and data analysis

		f. IE rules, IE Act and Open access in Traction energy
8.	**Traction Power control**	a Operation b. Duties of CTPC and TPC c. Power blocks and PTW procedure - Types of Power & traffic blocks-Emergency, local, Shadow integrated Pre arranged, longitudinal Protection, Cross protection-Dead section entry of Locomotives. Permit to work procedure. d. Joint procedure order, Traction working rules, Working of TPC control room.
9.	**Breakdown and electrical accidents**	a. Sub-station and switching station breakdown b. OHE breakdown- Accidents/Breakdowns — Thefts, Restoration, and Register to be maintained. Special checks, joint investigation, Analysis of failures, Anti-theft charging, Tower car & wiring train working c. Breakdown of RC equipment d. Electrical accidents e. Emergency stores and breakdown equipment
10.	**Railway Electrification**	a. Introduction b. Survey Team & its work c. Abstract Estimate and Cost Benefit Analysis d. Format of the project report e. Commissioning of electrical Installations and EIG Sanction- Testing procedure and certificates required for commissioning of TRD assets, procedures of obtaining EIG sanction and different proformas for taking EIG sanction.
11.	**Safety precautions on electrified sections**	a. Station working rules- movements of Tower car, Caution orders, Safe working rules in 25kV & 2x25 kV AC territory. G&SR relating to Tower Car and Motor trolley movements. b. Induction effects of 25kV ac 50Hz Single Phase Traction c. Working of steam and diesel locomotives in electrified section d. Loading and unloading of petroleum products e. Rules applicable to Permanent Way Staff f. Rules for S&T Installations g. Over-dimensioned consignments, Precautions pertaining to movement of ODCs. h. Competency certificates i. Others precautions j. Regulations for Power Line Crossings of railway Tracks. Maintenance schedule and items attended in transmission line.
12.	**Safety & Electrical accidents**	a. General safety rules, importance of safety belts, helmets, ladders b. Preventive measures to avoid electrical accident c. Measures to be taken in case of electrical accident d. case studies and discussion
13.	**Safety in electrified sections**	a. Induction effect on the nearby LT lines and yard lighting mains b. Safety precautions to be taken for PF shelters, fencing, FOBs while working of cranes in the vicinity of OHE etc. c. Operation and importance of locking of isolating

		switches of OHE d. Importance of permit to work, earthing & bonding. temporary jumpering of rails in case of rail fracture e. Case studies and discussion
14.	**First Aid and Fire Fighting**	a. Types of Fire extinguishers, their application, methods of firefighting b. Electrical shock treatment measures c. first aid for injury and burns d. Audio/Visual/Live demonstration of firefighting and first aid.
15.	**Introduction to disaster management**	a. Organizational infrastructure to effectively combat disaster (medical accessories relief trains, essential materials. b. Breakdown management preventive steps c. Analysis of breakdowns, case studies and discussion. d. Knowledge of materials, tools & its testing and vehicles required to attend OHE/PSI breakdown and maintenance. Material/Tools/Tackles kept in Tower Car & wiring train.
	B.	**GENERAL**
1.	**Establishment**	Organization of Railways: Railway Board to zonal level, zonal Railway's and their Headquarters, Divisions, Leave Rule, Pass Rule, PNM, DAR, Workmen's Compensation Act, HOER Incentive Scheme.
2.	**Store**	Imprest, Type of Stores, Stock verification, Tenders, types of tenders, stock and non-stock Items, Price variation clause (PVC) and Contracts
3.	**General Knowledge**	Current Affairs, who's Abbreviations, General Knowledge questions concern to Indian Railways. Latest who is who
4.	**Rajbhasha**	Important articles of Rajbhasha Act, Various awards, Motivations for Raj bhasha, progress made in using of Hindi different between Rajbhasha, Promotion of Rajbhasha in Railway working