



NORTHERN RAILWAY
(Personnel Department)

P.S. No. 16015/2025

Headquarters Office,
Baroda House,
New Delhi.

NO. 752-E/Mech Policy/EIIC

DATE: 16/07/2025

Divisional Railway Manager/NR: DLI, FZR, MB, UMB, LKO & JAT
Chief Workshop Manager/NR: AMV-LKO, CB-LKO, JUDW, ASR & RCNK-SNP,
CWM/Signal Shop, GZB.
CAO/C: K. Gate DLI & Satyam Complex, Trikuta Ngr/JAT.
MD/NRCH.
Chief Manager (Ptg. & Sty) Punjabi Bagh, Delhi
Dy.CMM: SSB, AMV-LKO & JUDW.
DY.CE/TMC/Line, State Entry Road, New Delhi.
Dy.CE/Bridge, CB-LKO, JUC & TKJ.

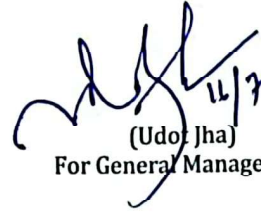
Sub: Syllabus of written examination for the post of Junior Engineer/C&W and Junior Engineer/Mech.
Ref: (i) PCPO/NR's letter no. PCPO/Sel./2025 dated 15/05/2025.
(ii) Dy.CME/HQ's letter no. Confdl.Mech/Group C Selection/266 dated 14/07/2025.

In reference to above subject, the syllabus of written examination for the post of Junior Engineer/C&W and Junior Engineer/Mech in Level-06, is enclosed herewith for your information and necessary action please.

The above PS.No. is available on the website given as under:-<https://nr.indianrailways.gov.in>

Please acknowledge the receipt

DA: As Above


(Udo Jha)
For General Manager (P)

Copy to:

1. All PHODs and All Officers of Personnel Deptt., HQ Office, Baroda House, New Delhi.
2. Genl. Secy./NRMU, 12 Chelmsford Road, New Delhi.
3. Genl. Secy./URMU, 166/2, P.K.Road, New Delhi.
4. Genl. Secy./AIOBC Rly Emp. Asso. 171/A3, Basant Lane, New Delhi.
5. Genl. Secy./ All India SC/ST Rly Emp. Asso. North Zone Office, Baroda House, New Delhi.
6. Genl. Secy./ NRPOA Room No.301, HQ Office, Baroda House, New Delhi.
7. Dy.CPO/IT, HQs Office, Baroda House, NDLS for uploading on the website.
8. Dy.CPO/R&P, HQs Office, Baroda House, NDLS being policy matter.



**Syllabus for TQ/PQ examination for selection to the post of
Junior Engineer (Mech.) /C&W**

Part 1: General Knowledge

- 1.1 Important National & International Events, Authors, Places & Personalities etc.
- 1.2 Sports
- 1.3 "Who's Who"
- 1.4 Facts about Indian Railways & its Organization, Important events in Indian Railways
- 1.5 Current Affairs

Part-2: English

- 2.1 Antonyms and Synonyms
- 2.2 Idioms & Phrases
- 2.3 Tenses, Modals, Determiners, Prepositions
- 2.4 Active and Passive Voice
- 2.5 Direct and Indirect Speech
- 2.6 Unseen Passages

Part-3: Mathematics

- 3.1 Algebra
 - 3.1.1. Real Numbers
 - 3.1.2. Polynomials
 - 3.1.3. Pair of Linear Equations in Two Variables
 - 3.1.4. Quadratic Equations
- 3.2 Arithmetic
 - 3.2.1. Problems based on age, time, work, money, Profit and Loss, and Interest
- 3.3 Geometry
 - 3.4.1. Lines
 - 3.4.2. Triangles: Pythagoras' Theorem, Midpoint Theorem, Area, Congruence of Triangles, Angle Sum Property, Exterior Angle Property; Similar Figures, Similarity of Triangles
 - 3.4.3. Properties and area of Parallelogram
 - 3.4.4. Circles: Area and Perimeter of Circle, Angle Subtended by a Chord at a point, Perpendicular from the Centre to a Chord, Equal Chords and their distances from the Centre, Angle subtended by an Arc of a Circle, Cyclic Quadrilaterals, Tangent to a Circle, number of Tangents from a point on a Circle, Area of Sector and Segment of a Circle
 - 3.4.5. Surface Areas and Volumes of cuboid, cone, cylinder, and sphere; and Combination of Solids
- 3.4 Coordinate Geometry
 - 3.5.1 Basics of the Cartesian system
 - 3.5.2 Distance Formula



- 3.5 Introduction to Trigonometry
 - 3.5.1. Trigonometric Ratios
 - 3.5.2. Trigonometric Ratios of Specific Angles
 - 3.5.3. Trigonometric Identities
 - 3.5.4. Applications of Trigonometry: Heights and Distances
- 3.6 Statistics
 - 3.8.1. Mean, Mode, Median of Grouped Data
 - 3.8.1. Mean Deviation & Standard Deviation

Part-4: General Science

- 4.1 Matter in Our Surroundings: Physical Nature of Matter, Characteristics of Particles of Matter, States of Matter, Mixture, Solution, Concentration of a Solution, Compounds
- 4.2 Atoms, Molecules and Chemical Reactions, Structure of the Atom, Valency, Atomic Number, Mass Number, Isotopes, Isobars, Laws of Chemical Combination, Chemical Equations, Types of Chemical Reactions, Oxidation and Reduction, Acids, Bases and Salts, Name of salts and compounds, Types of Oxides, Properties and Laboratory Preparation of Oxygen, Hydrogen, and Nitrogen
- 4.3 Metals and Non-metals (Physical Properties, Chemical Properties), Ores of Metals, Corrosion and its prevention
- 4.4 Carbon and Its Compounds: Bonding in Carbon, Versatile Nature of Carbon, Chemical Properties of Carbon Compounds, Important Carbon Compounds – Ethanol and Ethanoic Acid, Soaps and Detergents
- 4.5 Force and Laws of Motion: Motion Along a Straight Line, Uniform Motion and Non-Uniform Motion, Speed with Direction, Acceleration, Equations of Motion, Uniform Circular Motion, Balanced and Unbalanced Forces, Laws of Motion, Inertia and Mass
- 4.6 Gravitation: Universal Law of Gravitation, Free Fall, Mass & Weight, Thrust and Pressure, Buoyancy, Archimedes' Principle
- 4.7 Work and Energy: Scientific Conception of Work, Forms of Energy, Potential Energy, Potential Energy of an Object at a Height, Law of Conservation of Energy, Power, Method of Heat Transfer
- 4.8 Sound: Propagation of Sound, Characteristics of a Sound Wave, Reflection of Sound, Echo, Reverberation, Range of Hearing, Applications of Ultrasound
- 4.9 Light: Reflection and Refraction, Spherical Mirrors, Sign Convention for Reflection by Spherical Mirrors, Refractive Index, Refraction through a Rectangular Glass Slab & prism, Atmospheric Refraction, Refraction by Spherical Lenses, Image Formation by Lenses, The Human Eye, Dispersion of White Light by a Glass Prism
- 4.10 Electricity: Electric Current and Circuit, Electric Potential and Potential Difference, Symbols of some commonly used components in circuit diagrams, Ohm's Law, Factors affecting the Resistance, Resistance of a System of Resistors, Heating Effect of Electric Current, Electric Power, Domestic Electric Circuits
- 4.11 Magnetic Effects of Electric Current: Magnetic Field and Field Lines, Magnetic Field due to a Current-Carrying Conductor, Force on a Current-Carrying Conductor in a Magnetic Field

Part-5: Establishment Rules

- 5.1 Pass Rules
- 5.2 Leave Rules
- 5.3 Payment of Wages Act
- 5.4 Hours of Employment Regulations
- 5.5 D&AR (Disciplinary & Appeal Rules)
- 5.6 Workmen's Compensation Act
- 5.7 Factory Act
- 5.8 Basic Knowledge about HRMS, RESS, HIMIS, NPS/UPS, and UMID web portals/App

Part-6 Stores

- 6.1 System of receiving and issuing goods from the store, local purchase, and inventory control
- 6.2 Stock and Non-Stock Items, PL Number
- 6.3 Basic Knowledge about UDM, GEM, IMMS, IREPS

Part-7 राजभाषा

- 7.1 संघ की राजभाषा नीति का सामान्य परिचय
- 7.2 राजभाषा अधिनियम 1963
- 7.3 राजभाषा संशोधन नियम 1976
- 7.4 राजभाषा संकल्प 1968
- 7.5 राजभाषा से संबंधित वार्षिक पाठ्यक्रम एवं प्रचलित शब्दावली

Part-8 Professional Knowledge

8.1 ICF Coach Maintenance

- 8.1.1 Salient features of ICF Coaches
- 8.1.2 Knowledge of safety and furnishing items
- 8.1.3 Pattern of Coaching maintenance as per RPC-IV
- 8.1.4 Draw and Buffing gear
- 8.1.5 Bogie components, load transmission, tractive/braking force transmission
- 8.1.6 Air brake system & its components, Bogie Mounted Brake System(BMBC)
- 8.1.7 Transportation codes for ICF coaches and coach numbering system
- 8.1.8 Maintenance schedules periodicity of ICF coaches (A, B, C, IOH and POH)

8.2 LHB Coach Maintenance

- 8.2.1 Introduction and salient feature of LHB coaches and comparison with ICF coaches
- 8.2.2 Pattern of Coaching maintenance as per RPC-IV
- 8.2.3 Examination of Coaching stock: Primary, Terminal and Secondary
- 8.2.4 Knowledge of safety and furnishing items in coaches
- 8.2.5 Transportation codes for LHB coaches
- 8.2.6 Design features of FIAT bogie, major sub-assemblies and components, LHB shell, tractive/braking force transmission, Load transmission, safety features
- 8.2.7 Air Spring bogies and various components of Air spring system. FIBA maintenance and troubleshooting
- 8.2.8 Maintenance schedules of LHB coaches. (D1, D2, D3, SSI, SSII, SSIII) and tools required for Schedule activities at pit line
- 8.2.9 Must change items during Shop schedule of coaches
- 8.2.10 Maintenance and troubleshooting of air brake system, DV, Brake Cylinder, ACP and process for Bypass of coach
- 8.2.11 Working principal of WSP system & its various components, WSP fault codes and corrective action, Wheel shelling
- 8.2.12 Maintenance of CCTV, Public Information system (PIS), Bio-vacuum toilets, Pressurized Flushing system (PFS), Electro-Pneumatic Pressurized Flushing System(EPPFS), Fire and Smoke Detection System(FSDS), Fire Detection and Suppression System(FDSS)
- 8.2.13 Basic knowledge of Bio-toilets: Maintenance, bacteria used and sample testing parameters

- 8.2.14 Causes of Brake binding and remedial action
- 8.2.15 CBC maintenance and causes for en-route uncoupling of CBCs with remedial actions to control CBC uncoupling
- 8.2.16 Basic knowledge of H-type CBC and its components
- 8.2.17 Basic Infrastructure for pit & sick-line maintenance of LHB, ICF and Vande Bharat trains

8.3 Vande Bharat Maintenance

- 8.3.1 Introduction to Vande Bharat Train
- 8.3.2 Train Composition, Basic Unit(DTC, MC,TC,NDTC..)
- 8.3.3 Driver Desk Unit (DDU), TCMS
- 8.3.4 Braking System i.e. Electro-Pneumatic brake(EP), Regenerative Braking, Automatic brakes, Parking Brakes
- 8.3.5 Propulsion System, Pantograph, Traction Motors, transformer, Auxiliary Transformer etc.
- 8.3.6 Passenger amenities items i.e. Reclining and rotating chairs, Snack table, Hand dryer, Auto soap dispenser, Foot rest, bottle holder, Pantry etc.
- 8.3.7 Safety and security items i.e. Emergency Talk Back Unit(ETBU), FSDS, CCTV, Automatic Doors, Passenger information system(PIS) etc.

8.4 Wagons Maintenance

- 8.4.1 Salient features of various types of Freight stock i.e. Open wagon, Covered Wagon, Tank wagon, container wagon, Flat wagon, Hopper wagon, Well wagon, Brake van etc.
- 8.4.2 New Wagon Numbering system
- 8.4.3 Examination of Freight stock i.e. End to End, Premium, Close Circuit(CC) and special premium rake
- 8.4.4 Maintenance and troubleshooting of air brake system in wagons
- 8.4.5 Single pipe and twin pipe air brake system
- 8.4.6 Salient features of CASNUB bogie and under gear components
- 8.4.7 Basic knowledge of various types of CASNUB bogies used on Wagons
- 8.4.8 Types of Nut & Bolts, Riveting, & welding in various types of wagons
- 8.4.9 ROH and POH of freight stock

8.5 Operations

- 8.5.1 Rolling in and Rolling Out Examination at nominated stations
- 8.5.2 Watering in trains and basic infrastructure for Quick watering
- 8.5.3 Clean Train Station(CTS), Terminal Rake Cleaning(TRC) & Mechanized Coach Cleaning(MCC) activities at Depot
- 8.5.4 Basic knowledge of OBHS activities & analysis of feedback formats used in OBHS
- 8.5.5 Soft skills for OBHS staff and tools required for en-route attention
- 8.5.6 Details and Working of Mechanized Laundry. Linen holding and management of Linen for AC coaches. Condemnation of linen
- 8.5.7 Pest and Rodent control in Trains and Railway Premises
- 8.5.8 Concept of ODC and its classification for movement
- 8.5.9 Duties of C&W Supervisors regarding CTS, OBHS, Linen & Pest Control

8.6 General

- 8.6.1 Testing of air brake for Single coach/wagon by SCTR/SWTR and rake by RTR
- 8.6.2 Knowledge of minimum prescribed brake Power, brake power calculation, improving brake power and issue of BPC/GDR. Brake continuity test procedure
- 8.6.3 Examination of CBC, Buffer, Draw Bar assembly & Screw coupling in coaching and freight Stock
- 8.6.4 Types of wheel used in Rolling stock, wheel defects & its prescribed limits, Tyre defect gauge
- 8.6.5 Application of wheel distance gauge and dimensions
- 8.6.6 Pairing of Wheels, wheel changing procedure in sick-line and out station
- 8.6.7 General idea about types of bearing used in various C&W stocks
- 8.6.8 Working of Graduated release air brake system
- 8.6.9 Train Accidents and Golden hour
- 8.6.10 Basic knowledge of ART, SPART, ARMV, SPARMV, 140 ton crane & Duties of C&W supervisors on accident site
- 8.6.11 Fire types and Firefighting equipment used in coaches
- 8.6.12 Attention of Hot Axle box, Train parting, Primary/Secondary coil failure, Axle Lock
- 8.6.13 Basic knowledge of CMM, FMM, FOIS, ICMS, e-office
- 8.6.14 Basics of NMG Coaches
- 8.6.15 Basic knowledge of computer (MS Word, MS Excel, MS Power Point, working of computer and its peripherals)
- 8.6.16 Basic knowledge of Industrial Safety, Fire Safety, and First Aid
- 8.6.17 Duties of Escorting Mechanical Supervisors and staff

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