



पूर्व मध्य रेल
EAST CENTRAL RAILWAY

कार्यालय
महाप्रबंधक (का.)
हाजीपुर

No.ECR-HQOPERS (RULE)/0013/2025 (Com.No.353304)

Date: As Signed

1. CAO (Con.)/उत्तर एवं दक्षिण/पटना।
2. सभी PHOD/CHOD/पूमरे/हाजीपुर।
3. DRM/पूमरे/दानापुर, डीडीयू, धनबाद, सोनपुर एवं समस्तीपुर।
4. मुख्य कार्मिक अधिकारी/आई.आर.एण्ड डब्ल्यू/पूमरे/हाजीपुर।
5. मुख्यालय के सभी कार्मिक अधिकारी।
6. CWM/पीडी/डीडीयू, यांत्रिक कारखाना/समस्तीपुर एवं हरनौत।
7. Dy.CPO/पीडी/डीडीयू।
8. Sr.DPO/पूमरे/दानापुर, डीडीयू, धनबाद, सोनपुर एवं समस्तीपुर।
9. उप महाप्रबंधक/विधि/पटना।
10. प्राचार्य/क्षेत्रीय रेल प्रशिक्षण संस्थान/मुजफ्फपुर एवं भूली।
11. सकाधि/यांत्रिक कारखाना/समस्तीपुर एवं हरनौत।
12. सभी मुकार्याधी/कार्याधी/पूमरे/हाजीपुर।

विषय:- Syllabus for Selection to the different Posts of Mechanical Department under PRQ/IAQ/LDCE.

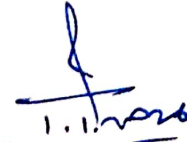
विषयोक्त के संदर्भ में यांत्रिक विभाग के विभिन्न पदों के लिखित परीक्षा हेतु पाठ्यक्रम (Syllabus) सूलभ संदर्भ हेतु संलग्न किया गया है। पदों का विवरण निम्नवत है :-

1. JE/Dsl/Mech.
2. JE/Mech.(Workshop).
3. JE(C&W).
4. JE/Dsl/Elect.
5. Tech-III/C&W.
6. Tech-III/Dsl/Elect.
7. Tech-III/Dsl/Mech.

Note : Optional Question of 10% of total marks on Rajbhasha Policy and Rules.

सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित किया जा रहा है।

उपरोक्त पर PCME महोदय का अनुमोदन प्राप्त है।



(अजित कुमार)

उप मुख्य कार्मिक अधिकारी/आई.आर.एण्ड.डब्ल्यू.
कृते महाप्रबंधक (कार्मिक)/पूमरे/हाजीपुर

प्रतिलिपि/— निम्नलिखित को सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित:-

1. प्रमुकाधि के निजी सचिव - प्रमुकाधि महोदय को सादर सूचनार्थ।
2. महासचिव/ईसीआरईयू/पूमरे/हाजीपुर।
3. महासचिव/एस.सी.एवं एस.टी.एशोसिएशन/ओ.बी.सी.एशोसिएशन/पूमरे/हाजीपुर।
4. सकाधि (एम.पी.पी.)/पूमरे/हाजीपुर-कृपया इसे वेबसाइट पर अपलोड कराने की व्यवस्था करें।



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**Syllabus for TQ/PQ examination for selection to the post of
Junior Engineer DSL/MECH**

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 Questions

3.2 Arithmetic

- 3.2.1 Problems based on age, time work money profit and loss and interest

3.3 Geometry

- 3.3.1 Lines
- 3.3.2 Triangles; Pythagoras' Theorem, Midpoint Theorem Area Congruence of Triangles, Angle Sum property Exterior Angle Property Similar Figures, Similarity of Triangles
- 3.3.3 Properties and area of Parallelogram
- 3.3.4 Circles Area and Perimeter of Circle, Angle subtended by a Chord at a point, Perpendicular from the Centre to a Chord Equal Chord 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
- 3.3.5 Surface Areas and Volumes of cuboid, cone, cylinder, and sphere, and Combination of Solids

3.4 Coordinate Geometry

- 3.4.1 Basics of the Cartesian system

3.4.2 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

3.6.1 Mean Mode Median of Grouped Data

3.6.2 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, Compound.
- 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 Index, Refraction through a Rectangular Glass Slab & Prism, Atmospheric Refraction, Refraction by Spherical Lenses, Image

- 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, and 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 Compensations Act
- 5.7 Factory Act
- 5.8 Basic knowledge about HRMS, RESS, HIMS, NPS/UPS, and UMID web portals/App

Part-6 Stores

- 6.1 System of receiving and issuing goods from store, local purchase, and inventory control
- 6.2 Stock and Non Stocks Items PL number
- 6.3 Basics 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 संसोधन नियम 1976
- 7.4 राजभाषा संकल्प 1968
- 7.5 राजभाषा से संबंधित वार्षिक पाठ्यक्रम एवम् प्रचलित शब्दावली

Part -8 Professional knowledge

8.1 ALCO Locomotive

- 8.1.1 Design and construction of Diesel engine of ALCO Locomotive
- 8.1.2 Tri mounted fabricated bogie and all its components
- 8.1.3 Basic systems Fuel oil Lube oil Water cooling system and their components
- 8.1.4 Turbo supercharging in ALCO Locomotive
- 8.1.5 Testing load box test, self load Auto test Dry run test, ETS
- 8.1.6 IRAB brake system sanding system
- 8.1.7 Basic design and features of CBC and its components
- 8.1.8 Various schedule maintenance T1,T2, M1, M6 M18 M24 M72

8.2 HHP Locomotive

- 8.2.1 Various types and features and nomenclature of GM locomotives
- 8.2.2. Design and construction of Engine Block used in GM locomotives
- 8.2.3 Basic knowledge of Design Features and maintenance of HTSC bogie
- 8.2.4 Basic Systems of GM Loco Fuel oil Lube oil and water cooling system
- 8.2.5 Design and overhauling of Cylinder liner, cylinder head and valve mechanism
- 8.2.6 Design and features of CBC and its components
- 8.2.7 Under gear components and their maintenance in GM Locomotives
- 8.2.8 CCB brake system and its components
- 8.2.9 Various schedules 30 Days, 90 Days, 180 Days, Yearly 3 yearly and 6 yearly

8.3 Electric Locomotive

- 8.3.1 Design and construction of Electric Locomotive
- 8.3.2 Bogie used in electric locomotive and its components
- 8.3.3 Design construction and maintenance of Pantograph
- 8.3.4 Design construction and maintenance of Transformer and its auxiliaries
- 8.3.5 Design, working and maintenance of Tap changer
- 8.3.6 Under gear maintenance of electric locomotive
- 8.3.7 CBC and its components
- 8.3.8 Various maintenance schedules IA, IB, IC and TOH

8.4 T-18 (Vande Bharat)

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- 8.4.1 Basic knowledge of T-18 Formation of T-18
- 8.4.2 Bogie used in T-18 & its components
- 8.4.3 Pantograph System maintenance
- 8.4.4 Main transformer and Auxiliary systems
- 8.4.5 Brake systems and its components
- 8.4.6 Basic idea of equipment fitted in different coaches of Train-18
- 8.4.7 Fire and Smoke Detection system (FSDS) Fire Detection and suppression System (FDSS), VESDA
- 8.4.8 Wheels and Axles
- 8.4.9 Various schedule checks of Train-18 Trip, Monthly, Quarterly and 9 monthly

8.5 DEMU

- 8.5.1 Configuration of DEMU
- 8.5.2 Bogie use in DEMU
- 8.5.3 Design and constructions of diesel engine of Driving Power Car
- 8.5.4 Passenger Amenities & safety items
- 8.5.5 Basic knowledge of various under frame equipment of Driving Power Car
- 8.5.6 Various schedule checks of DPC: A check, B check, C check and D check

8.6 MEMU/EMU

- 8.6.1 Basic idea of configuration and purpose of EMU/MEMU
- 8.6.2 Basic knowledge of bogie, coupler and other under frame equipment
- 8.6.3 Passengers Amenities & safety items
- 8.6.4 Basic idea of schedule maintenance IA and IC EMU/MEMU

8.7 General

- 8.7.1 Types of bolts and nuts Lock bolts Hex bolts Carriage bolts and Eye bolts
- 8.7.2 Common Nut types including hex nuts, lock nuts and wing nuts
- 8.7.3 Different types of Rivets Snap head and Counter sunk
- 8.7.4 Basic knowledge & advantages of CNC machines and their major applications
- 8.7.5 Industrial safety fire safety housekeeping and First Aid.

- 8.7.6 Knowledge of the Time office, Progress, Procedure for the Gate Pass etc.
- 8.7.7 Basic knowledge of computers (MS word, MS Excel MS Power Point working of computers and applications)
- 8.7.8 Procedure of Ferrous and Non Ferrous scrap disposal
- 8.7.9 Knowledge of hazardous work and its disposal
- 8.7.10 Procedure of condemnation of locomotives
- 8.7.11 Basic knowledge of e-Office and SLAM portal
- 8.7.12 Duties responsibilities and role of Junior Engineer: To motivate the staff working under him for punctuality developing a positive attitude and increasing production

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Syllabus for TQ/PQ examination for selection to the post of Junior Engineer (Mech)/Workshop

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
 - 3.3.1 Lines
 - 3.3.2 Triangles: Pythagoras' Theorem, Midpoint Theorem, Area, Congruence of Triangles, Angle Sum Property, Exterior Angle Property; Similar Figures, Similarity of Triangles
 - 3.3.3 Properties and area of Parallelogram

3.3.4 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

3.3.5 Surface Areas and Volumes of cuboid, cone, cylinder, and sphere; and Combination of Solids

3.4 Coordinate Geometry

3.4.1 Basics of the Cartesian system

3.4.2 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

3.6.1 Mean, Mode, Median of Grouped Data

3.6.2 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, Compound

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, HIMS, 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

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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 संबन्धित 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 Transportation codes for ICF coaches and coach numbering system.
8.1.3 IOH and POH Schedules of ICF coaches
8.1.4 Knowledge of safety and furnishing items
8.1.5 Draw and Buffing gear
8.1.6 Bogie components, load transmission, tractive/braking force transmission.
8.1.7 Air brake system & its components, Bogie Mounted Brake System (BMBC)
8.1.8 Must change items during IOH and POH of ICF coaches

8.2 LHB Coach Maintenance

- 8.2.1 Introduction and salient features of LHB coaches and comparison with ICF coaches
8.2.2 Transportation codes for LHB coaches
8.2.3 Design features of FIAT bogie, major sub-assemblies and components, LHB shell, tractive/braking force transmission, Load transmission, safety features
8.2.4 Air brake system & its components
8.2.5 Working principle of WSP system & its various components, WSP fault codes, and corrective action
8.2.6 Air Spring bogies and various components of the Air Spring system, FIBA maintenance and troubleshooting
8.2.7 Basic knowledge of H-type CBC and its components

- 8.2.8 Basic knowledge of Bio-toilets: Maintenance, bacteria used, and sample testing parameters
- 8.2.9 SS2 and SS3 Schedules
- 8.2.10 Must change Items during Shop Schedules
- 8.2.11 Safety & security items like CCTV, Public Information System (PIS), Fire and Smoke Detection System (FSDS), Fire Detection and Suppression System (FDSS), VESDA

8.3 Wagon

- 8.3.1 Different types of Wagons and codes
- 8.3.2 New Wagons numbering system
- 8.3.3 Salient features of various types of Freight stock i.e., Open wagon, Covered Wagon, Tank wagon, Flat wagon, Hopper wagon, Well wagon, Brake van, etc
- 8.3.4 Salient features of CASNUB bogie and its under-gear components
- 8.3.5 Single pipe and twin pipe Air Brake System
- 8.3.6 Various types of side bearers, Coupler & draft gear
- 8.3.7 Types of Nut & Bolts used in wagons, riveting & welding in wagon body
- 8.3.8 ROH and POH schedules of different types of Wagons

8.4 T-18 (Vande Bharat)

- 8.4.1 Basic Knowledge of T-18, Formation of T-18
- 8.4.2 Bogie used in T-18 & its components
- 8.4.3 Pantograph System
- 8.4.4 Circuit Breakers and Electrical Systems
- 8.4.5 Traction System and Motors
- 8.4.6 Main transformer and Auxiliary Systems
- 8.4.7 HVAC and Comfort Systems
- 8.4.8 Brake Systems
- 8.2.9 Emergency Systems and Communication Safety & security items like CCTV, Public Information System (PIS), Fire and Smoke Detection System (FSDS), Fire Detection and Suppression System (FDSS), VESDA
- 8.4.10 Wheels and Axles
- 8.4.11 SS1 SS2 Schedule in Workshop

8.5 DEMU

- 8.5.1 Basic knowledge of various sub-assemblies & components

8.5.2 IOH and POH schedule

8.5.3 Passenger Amenities & safety items

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8.6 MEMU/EMU

8.6.1 Basic knowledge of various sub-assemblies & components

8.6.2 IOH and POH Schedule

8.6.3 Passenger Amenities & safety items

8.7 Diesel & Electric Loco

8.7.1 Basic knowledge of various sub-assemblies & components

8.7.2 IOH and POH Schedule

8.8 General

8.8.1 Basic Professional knowledge of Machinist, Welding, Black smithy, Fittings, Painting, Foundry, Millwright, Diesel Fitter Theory, Tool & Template, Hand tools, general purpose tools, special purpose tools, jig and fixtures, Heat Treatment, etc

8.8.2 Basic knowledge of ferrous & non-ferrous metals

8.8.3 Engineering Drawing

8.8.4 Integrated management System of ISO 9001,14001,45001,50001 & Management tool 5S, ISO-3834-2 and Green Building rating

8.8.5 Organizational chart, PCO organization, and functioning of its various sections

8.8.6 Incentive scheme

8.8.7 Industrial Safety, Fire Safety, Housekeeping, and First Aid

8.8.8 Basic knowledge & advantages of CNC machines and their major applications

8.8.9 Basic knowledge of computers: MS Word, MS Excel, MS PowerPoint, working of computers and peripherals

8.8.10 Working of Time office, Progress, Procedure for the Gate Pass, etc

8.8.11 Procedure of Ferrous and Non-Ferrous scrap disposal

8.8.12 Knowledge of hazardous waste and its disposal

8.8.13 Procedure of condemnation of various rolling stock

8.8.14 Basic knowledge of e Office CMM, FMM, and WISE

8.8.15 Duties, responsibilities, and role of Junior Engineer: To motivate the staff working under him for punctuality, developing a positive attitude, and increasing production

--END--

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 off Parallelogram

- 3.4.4. Circles: Area and Perimeter off 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 off Sector and Segment of a Circle

4.5

3.4.5. Surface Areas and Volumes of cuboid, cone, cylinder, and sphere; and combination off 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

3.8.2 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 off 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 off Carbon, Chemical Properties off 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, Reverberations, 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 Line, 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 Payments 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, HIMS, 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 संसोधन नियम 1976

7.4 राजभाषा संकल्प 1968

7.5 राजभाषा से संबंधित वार्षिक पाठ्यक्रम एवम् 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)

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8.2 LHB Coach Maintenance

- 8.2.1 Introduction and salient feature of LHB coaches and comparison with ICF coaches
- 8.2.2 Pattern off 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 off 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, 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 Drive 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 (PLS) 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 off 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 off Mechanized Laundry. Linen holding and management of Line for AC coaches. Condemnation of linen
- 8.5.7 Pest and Rodent control in Trains and Railway Premises
- 8.5.8 Concept of ODC its classification for movement
- 8.5.9 Duties off 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 wheel distance gauge and dimension
- 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 use in coaches
- 8.6.12 Attention of Hot Axle box, Tran 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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**Syllabus for TQ/PQ examination for selection to the post of
Junior Engineer DSL/Elect**

Part 1: General Knowledge

- 1.1 Important National & International Events, Authors, Placed & 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

- 3.3.1 Lines
- 3.3.2 Triangles: Pythagoras' Theorem, Midpoint Theorem, Area, Congruence of Triangles, Angle Sum Property, Exterior Angle Property; Similar Figures, Similarity of Triangles
- 3.3.3 Properties and area of Parallelogram
- 3.3.4 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
- 3.3.5 Surface Areas and Volumes of cuboid, cone, cylinder, and sphere; and Combination of Solids

3.4 Coordinate Geometry

- 3.4.1 Basics of the Cartesian system
- 3.4.2 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

3.6.1 Mean, Mode, Median of Grouped Data

3.6.2 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, Compound
- 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, HIMS, 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 ALCO Locomotive**

- 8.1.1 Design and construction of ALCO Locomotive
- 8.1.2 Basic knowledge of Battery charging and cranking system
- 8.1.3 Basic idea of electrical control system of ALCO loco
- 8.1.4 Basic knowledge of power transmission system
- 8.1.5 Relays and power contractors of ALCO Locomotive
- 8.1.6 Electrical Sub assembly of ALCO locomotive: Traction Alternator, Traction Motor, Auxiliary Generator, Exciter, Rectifier, Radiator Fan Motor, Dynamic Brake Fan Motor, Fuel Pump Motor, Dust Bin Blower Motor
- 8.1.7 Maintenance and overhauling of electrical equipment
- 8.1.8 Basic idea of REMMLOT
- 8.1.9 Testing of Engines: Load Box testing, self load, ETS test
- 8.1.10 Idea of maintenance schedules T1, M1, M2 M12, M18, M24 & M72

8.2 HHP Locomotive

- 8.2.1 Basic knowledge of Electric equipment in GM locos
- 8.2.2 Basic knowledge of Electric control system
- 8.2.3 Starting circuit and components
- 8.2.4 Running maintenance of Electric rotating machines and rectifiers
- 8.2.5 Overhauling of Electric rotating machines
- 8.2.6 Basic knowledge of Power transmission in GM loco
- 8.2.7 Working of VCD, Auto flasher light and sanding system
- 8.2.8 Various types of GM Locomotives: WDG4, WDP4, WDP4D
- 8.2.9 Testing of Loco: Load box test, self load, Auto test
- 8.2.10 Various schedule: 30 Days, 90 Days, 180 Days, Yearly, 3 Yearly and 6 Yearly

8.3 Electric Locomotive

- 8.3.1 Basic knowledge of General construction of Electric Locomotive
- 8.3.2 Basic knowledge of Traction equipment: Bridge rectifier block, Traction motor, Smoothing reactor
- 8.3.3 Safety relays and their working
- 8.3.4 Running maintenance of all rotating machines and static devices.
- 8.3.5 Basic knowledge of Auxiliary electric machines: MVMT, MVSI, MVRH, MVSL, MCP, MCPA and MPH
- 8.3.6 Overhauling of all electric equipment
- 8.3.7 Testing of VCD, Sanding and Auto flasher
- 8.3.8 Testing of Locomotive: Tripping via different faults, Notch progression and Regression

8.4 T-18 (Vande Bharat)

- 8.4.1 Basic knowledge of T-18, Formation of T-18
- 8.4.2 Basic knowledge various equipment fitted in different coaches
- 8.4.3 Safety and passenger amenity items
- 8.4.4 Circuit Breakers and Electrical Systems

- 8.4.5 Traction System and Motors
- 8.4.6 Main transformer and Auxiliary Systems
- 8.4.7 HVAC and Comfort Systems
- 8.4.8 Emergency Systems and Communication Safety & security items like CCTV, Public Information System (PIS)
- 8.4.9 Various maintenance schedule: Trip, Monthly, Quarterly and 9 Monthly

8.5 DEMU

- 8.5.1 Configuration of DEMU trains
- 8.5.2 Electrical control system of driving power car
- 8.5.3 Basic knowledge of Rectifier, Relays, Power contactors and Battery box
- 8.5.4 Passenger Amenities & safety items
- 8.5.5 Maintenance checks of DPC: A check, B check, C check and D check

8.6 MEMU/EMU

- 8.6.1 Basic knowledge of working of EMU/MEMU trains
- 8.6.2 Basic configuration of EMU/MEMU trains
- 8.6.3 Battery charging and Auxiliary System
- 8.6.4 Passenger Amenities & safety items
- 8.6.5 Various maintenance schedules: IA and IC

8.7 General

- 8.7.1 Basic knowledge of Voltage, Current, Resistance and Electrical Power
- 8.7.2 Various types of Batteries used in different locomotive and its charging
- 8.7.3 Industrial Safety, Fire Safety, Housekeeping and First Aid
- 8.7.4 Basic knowledge & advantages of CNC machines and their major applications
- 8.7.5 Basic knowledge of e-office and SLAM portal
- 8.7.6 Basic knowledge of computer: MS Word, MS Excel, MS PowerPoint, working of computers and peripherals
- 8.7.7 Knowledge of the Time office, Progress, Procedure for the Gate Pass etc.
- 8.7.8 Procedure of Ferrous and Non-Ferrous scrap disposal
- 8.7.9 Knowledge of hazardous work and its disposal
- 8.7.10 Procedure of condemnation of various rolling stock
- 8.7.11 Duties, responsibilities, and role of Junior Engineer: To motivate the staff working under him for punctuality, developing a positive attitude and increasing production

Syllabus for examination for selection to the post of Tech Gr III /C&W

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- 2.1 Antonyms and Synonyms
- 2.2 Tenses, Modals, Determiners, Prepositions
- 2.3 Active and Passive Voice
- 2.4 Direct and Indirect Speech

Part-3: Mathematics

- 3.1 Algebra
 - 3.1.1. Number System
 - 3.1.2. Basic Algebra
 - 3.1.3. Quadratic Equations
- 3.2 Arithmetic
 - 3.2.1. Problems based on age, time, work, and money
 - 3.2.2. Profit & Loss
 - 3.2.3. Simple and Compound Interest
 - 3.2.4. Ratio and Proportion
- 3.3 Triangles
 - 3.3.1. Area
 - 3.3.2. Pythagoras' Theorem
 - 3.3.3. Angle Sum Property, Exterior Angle Property
- 3.4 Area and Volume
 - 3.4.1. Areas Related to Square, Rectangle, Triangle, Circles, Parallelogram, and Areas of Sector
 - 3.4.2. Volume of Cylinder, Cube, Cuboid, Cone, etc.

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, Compound
- 4.2 Atoms, Molecules and Chemical Reactions, Structure of the Atom, Valency, Atomic Number, Isotopes, Isobars, Laws of Chemical Combination, Chemical Equations, Types of Chemical Reactions, Oxidation and Reduction, Acids, Bases and Salts, Names of the Salts and Compounds
- 4.3 Metals and Non-metals (Physical Properties, Chemical Properties), Ores of Metals, Corrosion and its prevention

- 4.4 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
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- 6.4 राजभाषा संकल्प 1968
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Part- 7 Professional Knowledge

- 7.1 ICF Coach Maintenance
 - 7.1.1 Salient features of ICF Coaches
 - 7.1.2 Knowledge of safety and furnishing items.
 - 7.1.3 Pattern of Coaching maintenance as per RPC-IV
 - 7.1.4 Transportation codes for ICF coaches and coach numbering system
 - 7.1.5 Maintenance schedules periodicity of ICF coaches (A, B, C, IOH and POH)
- 7.2 LHB Coach Maintenance
 - 7.2.1 Introduction and salient feature of LHB coaches and comparison with ICF coaches
 - 7.2.2 Pattern of Coaching maintenance as per RPC-IV
 - 7.2.3 Examination of Coaching stock: Primary, Terminal and Secondary
 - 7.2.4 Knowledge of safety and furnishing items in coaches
 - 7.2.5 Transportation codes for LHB coaches
 - 7.2.6 Maintenance schedules of LHB coaches. (D1, D2, D3) and tools required for Schedule activities at pit line
 - 7.2.7 Basic knowledge of Bio-toilets: Maintenance, bacteria used and sample testing parameters
 - 7.2.8 Causes of Brake binding and remedial action
 - 7.2.9 CBC maintenance and causes for en-route uncoupling of CBCs with remedial actions to control CBC uncoupling

3 Vande Bharat Maintenance

- 7.3.1 Introduction to Vande Bharat Train
- 7.3.2 Train Composition, Basic Unit (DTC, MC, TC, NDTC etc.)
- 7.3.3 Driver Desk Unit (DDU), TCMS
- 7.3.4 Passenger amenities items i.e. Reclining and rotating chairs, Snack table, Hand dryer, Auto soap dispenser, Foot rest, bottle holder, Pantry etc.
- 7.3.5 Safety and security items i.e. Emergency Talk Back Unit(ETBU), FSDS, CCTV, Automatic Doors, Passenger information system(PIS) etc.

7.4 Wagons Maintenance

- 7.4.1 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.
- 7.4.2 New Wagon Numbering system
- 7.4.3 Examination of Freight stock i.e. End to End, Premium, Close Circuit(CC) and special premium rake
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- 7.5.5 Soft skills for OBHS staff and tools required for en-route attention
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- 7.5.7 Pest and Rodent control in Trains and Railway Premises
- 7.5.8 Duties of C&W staff regarding CTS, OBHS, Linen & Pest Control

7.6 General

- 7.6.1 Testing of air brake for Single coach/wagon by SCTR/SWTR and rake by RTR.
- 7.6.2 Knowledge of minimum prescribed brake Power, brake power calculation, improving brake power and issue of BPC/GDR. Brake continuity test procedure
- 7.6.3 Examination of CBC, Buffer, Draw Bar assembly & Screw coupling in coaching and freight Stock
- 7.6.4 Types of wheel used in Rolling stock, wheel defects & its prescribed limits, Tyre defect gauge
- 7.6.5 Application of wheel distance gauge and dimensions
- 7.6.6 Pairing of Wheels, wheel changing procedure in sick-line and out station
- 7.6.7 Fire types and Firefighting equipment used in coaches
- 7.6.8 Attention of Hot Axle box, Train parting, Primary/Secondary coil failure, Axle Lock
- 7.6.9 Basic knowledge of CMM, FMM, FOIS, ICMS
- 7.6.10 Basic knowledge of Computer (Basic MS Word, MS Excel)
- 7.6.11 Basic knowledge of Industrial safety, fire safety and first aid
- 7.6.12 Duties of Escorting Mechanical staff

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**Syllabus for examination for selection to the post of
Tech Gr III / DSL Elect**

Part 1: General Knowledge

- 1.1 Important National & International Events, Authors, Places & Personalities etc.
- 1.2 Sports
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Part-2: English

- 2.1 Antonyms and Synonyms
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- 2.4 Direct and Indirect Speech

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- 3.1 Algebra
 - 3.1.1. Number System
 - 3.1.2. Basic Algebra
 - 3.1.3. Quadratic Equations
- 3.2 Arithmetic
 - 3.2.1. Problems based on age, time, work, and money
 - 3.2.2. Profit & Loss
 - 3.2.3. Simple and Compound Interest
 - 3.2.4. Ratio and Proportion
- 3.3 Triangles
 - 3.3.1. Area
 - 3.3.2. Pythagoras' Theorem
 - 3.3.3. Angle Sum Property, Exterior Angle Property
- 3.4 Area and Volume
 - 3.5.1. Areas Related to Square, Rectangle, Triangle, Circles, Parallelogram, and Areas of Sector
 - 3.5.2. Volume of Cylinder, Cube, Cuboid, Cone, etc.

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, Compound
- 4.2 Atoms, Molecules and Chemical Reactions, Structure of the Atom, Valency, Atomic Number, Isotopes, Isobars, Laws of Chemical Combination, Chemical Equations, Types of Chemical Reactions, Oxidation and Reduction, Acids, Bases and Salts, Names of the Salts and Compounds

- 4.3 Metals and Non-metals (Physical Properties, Chemical Properties), Ores of Metals, Corrosion and its prevention
- 4.4 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
- 4.5 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
- 4.6 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

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, HIMS, and NPS web portals/App

Part-6 राजभाषा

- 6.1 संघ की राजभाषा नीति का सामान्य परिचय
- 6.2 राजभाषा अधिनियम 1963
- 6.3 राजभाषा संशोधन नियम 1976
- 6.4 राजभाषा संकल्प 1968
- 6.5 राजभाषा से संबंधित वार्षिक पाठ्यक्रम एवं प्रचलित शब्दावली

Part-7 Professional Knowledge

- 7.1 ALCO Locomotive
 - 7.1.1 Basic Design and construction of ALCO Locomotive
 - 7.1.2 Basic knowledge of all Electric equipment
 - 7.1.3 Testing of Loco: Load box test, self load, Auto test, ETS
 - 7.1.4 Various maintenance schedules: T1, M1, M2, M6, M12, M24, M72
- 7.2 HHP Locomotive
 - 7.2.1 Basic knowledge of Electric equipment in GM locos
 - 7.2.2 Various types of HHP Locomotives: WDG4, WDP4, WDP4D
 - 7.2.3 Running maintenance of Electric rotating machines and rectifiers
 - 7.2.4 Purpose of VCD, Auto flasher light and sanding system
 - 7.2.5 Various schedule: 30 Days, 90 Days, 180 Days, Yearly, 3 yearly and 6 yearly
- 7.3 Electric Locomotive
 - 7.3.1 Basic knowledge of General construction of Electric Locomotive
 - 7.3.2 Running maintenance of all rotating machines and static devices
 - 7.3.3 Basic knowledge of All electric equipment
 - 7.3.4 Schedule maintenance of Electric loco IA, IB, IC and TOH schedule

7.4 DEMU

- 7.4.1 Configuration of DEMU trains
- 7.4.2 All electrical equipment fitted in DPC
- 7.4.3 Schedule maintenance of DPC: A check, B check, C check and D check

7.5 EMU/MEMU

- 7.5.1 Basic Idea of working of EMU/MEMU trains
- 7.5.2 Basic configuration of EMU/MEMU
- 7.5.3 Schedule maintenance IA and IC

7.6 Train-18 (Vande Bharat)

- 7.6.1 Basic knowledge of configuration of T-18 train
- 7.6.2 End basic unit and Middle basic unit
- 7.6.3 Working in schedules Trip, monthly, quarterly and 9 monthly

7.7 General

- 7.7.1 Various type of Batteries used in different locomotives
- 7.7.2 Working principles of electric rotating machines: Motor and Alternator
- 7.7.3 Basic knowledge of Computer: MS word, MS Excel
- 7.7.4 Industrial safety, Housekeeping, Fire safety and First aid
- 7.7.5 Basic knowledge of CNC machines
- 7.7.6 Basic knowledge of hazardous waste and its disposal

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**Syllabus for examination for selection to the post of
Tech Gr III/DSL Mech**

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 Tenses, Modals, Determiners, Prepositions
- 2.3 Active and Passive Voice
- 2.4 Direct and Indirect Speech

Part-3: Mathematics

- 3.1 Algebra
 - 3.1.1. Number System
 - 3.1.2. Basic Algebra
 - 3.1.3. Quadratic Equations
- 3.2 Arithmetic
 - 3.2.1. Problems based on age, time, work, and money
 - 3.2.2. Profit & Loss
 - 3.2.3. Simple and Compound Interest
 - 3.2.4. Ratio and Proportion
- 3.3 Triangles
 - 3.3.1. Area
 - 3.3.2. Pythagoras' Theorem
 - 3.3.3. Angle Sum Property, Exterior Angle Property
- 3.4 Area and Volume
 - 3.4.1. Areas Related to Square, Rectangle, Triangle, Circles, Parallelogram, and Areas of Sector
 - 3.4.2. Volume of Cylinder, Cube, Cuboid, Cone, etc.

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, Compound
- 4.2 Atoms, Molecules and Chemical Reactions, Structure of the Atom, Valency, Atomic Number, Isotopes, Isobars, Laws of Chemical Combination, Chemical Equations, Types of Chemical Reactions, Oxidation and Reduction, Acids, Bases and Salts, Names of the Salts and Compounds

- 4.3 Metals and Non-metals (Physical Properties, Chemical Properties), Ores of Metals, Corrosion and its prevention
- 4.4 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
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Part-7 Professional Knowledge

- 7.1 ALCO Locomotive
 - 7.1.1 Design and construction of ALCO Locomotive
 - 7.1.2 Basic knowledge of Components of engine block
 - 7.1.3 Basic idea of Bogie and CBC
 - 7.1.4 Various maintenance schedules of ALCO: T1, M1, M2, M6, M12, M24, M72
- 7.2 HHP Locomotive
 - 7.2.1 Basic design and construction of HHP locomotive
 - 7.2.2 Various types of HHP Locomotives: WDGG4, WDP4 & WDP 4D
 - 7.2.3 Basic knowledge of components of engine block of HHP locomotive
 - 7.2.4 Various maintenance schedules: 30 Days, 90 days, 180 Days, Yearly, 3 yearly and 6 yearly

7.3 Electric Locomotive

- 7.3.1 Design and construction of Electric locomotive
- 7.3.2 Bogies and CBC used in Electric Locomotive
- 7.3.3 Working of earthing switch
- 7.3.4 Basic knowledge of Transformer
- 7.3.5 Basic knowledge of Pantograph
- 7.3.6 Various maintenance schedules: IA, IB, IC and TOH

7.4 T-18 (Vande Bharat)

- 7.4.1 Basic Knowledge of T-18, Formation of T-18
- 7.4.2 Basic Idea of Bogie used in T-18 and its components
- 7.4.3 Various maintenance schedules: Trip, Monthly, Quarterly and 9 Monthly

7.5 DEMU

- 7.5.1 Basic knowledge of various assemblies & components
- 7.5.2 Basic idea of configuration of DEMU trains
- 7.5.3 Passenger Amenities & safety items
- 7.5.4 Various schedule checks: A check, B check, C check and D check

7.6 MEMU/EMU

- 7.6.1 Basic knowledge of various assemblies & components
- 7.6.2 Configuration of coaches in EMU/MEMU trains
- 7.6.3 Passenger Amenities & safety item
- 7.6.4 Various maintenance schedules IA and IC

7.7 General

- 7.7.1 Types of bolts: hex bolts, carriage bolts, and eye bolts
- 7.7.2 Common nut types hex nuts, lock nuts, and wing nuts
- 7.7.3 Basic knowledge of Rivets: Snap head and Counter sunk
- 7.7.4 Material specifications, Properties, Bearings, Lubricants and Drives
- 7.7.5 Arc Welding, Gas Welding & Cutting
- 7.7.6 Industrial safety, Fire Safety, Housekeeping and First Aid
- 7.7.7 Basic knowledge of computers: MS Word, MS Excel
- 7.7.8 Basic knowledge of CNC machines
- 7.7.9 Knowledge of hazardous waste and its disposal

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