SOUTH EASTERN RAILWAY

Office of the
Workshop Personnel Officer
Kharagpur-7213201

No.SER/P-KGPW/Staff/210/JE/IAM(Mech.)/**03** Dated:02.03.2026

Sub: Syllabus in connection with Selection for formation of a panel to the post of Jr. Engineer (Mechanical) in Pay Level-6(GP-Rs. 4200/-) against 25% LDCE Quota in Mechanical Department of KGP Workshop.

Ref: This office letter No SER/P-KGPW/Staff/210/JE/IAM(Mech.)/01Dtd. 10.02.2026.

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In connection to this Office Notification dtd. 10.02.2026 under reference, a common and comprehensive Syllabus for selection to the post of Jr. Engineer (Mechanical) in Pay Level-6 (GP-Rs. 4200/-) against 25% LDCE Quota in Mechanical Department of KGPW is sent herewith for wide circulation amongst the concerned staff working under your respective control for preparation and readiness to the subject selection.

The same has been uploaded to the official website.

This is for your kind information and wide circulation please.

Encl: As above

02/3/26

Workshop Personnel Officer/KGPW

Dy. CEE(ERS-POH)/KGPW

Dy. CME(Wagon)/KGPW

Dy. CME(Production)/KGPW

Dy. CME(Carriage)/KGPW

Vice-Principal (Mech.)/MDZTI/KGP

AWM(G)/KGPW

ADME/WRD/ADRA

Ch. OS(Con)/WPO's Office. It is advised to upload the syllabus in official website.

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Annexure-A

REVISED SYLLABUS FOR JE (MECHANICAL) IN LEVEL-6 AGAINST 25% LDCE QUOTA IN KGPW PROMOTIONAL QUOTA.

1. **Foundation courses: -**
   - Introduction to Workshop/Railway
   - Organizational Chart.
   - Abbreviations.
   - POH-IOH concept & Out-turn.
   - Knowledge of PCO, Estimate, Works, M&P Program, & RSP.
   - Estimation/Costing of work,
   - Incentive systems- Group incentive & CLW Pattern
   - Understanding of Mechanical Engineering Drawing.
   - Basic knowledge of Computers.
   - Simple Mensuration, Conversion of measurements, Work, Power, Energy.
   - Current Affairs,
   - Pressure, Force, Velocity, Acceleration, Volume, Density, General Mathematics.
2. **Workshop Activity: -**
   - Rolling Stock
     - Different PCV & OCV-ICF, LHB, Trainsets EMU,MEMU, DEMU & Vande Bharat etc.
     - Different Freight Stocks-open (BOXN, BOXNHL), covered (BCN, BCNHL), flat (BRN, BLC), tank (BTPN), and hopper (BOBRN) etc.
   - Power Stock - WAP Series, WAG Series (Goods) etc.
   - Shell/ Body repair, Corrosion, Causes of Corrosion & prevention.
   - Bogies – ICF, EMU,MEMU, FIAT, Vande Bharat, CASNUB
   - Riding Index.
   - Transmission of Tractive force, Draw & Buff Forces, Vertical Loads.
   - Suspension system, Dampers, Air Spring & FIBA.
   - Couplers: Draw Gear, Screw Coupling, ICF Buffer, AAR-E/F & AAR-H Centre Buffer Coupler, BDG, Transition Coupler, Schaku Coupler/Semi permanent coupler, Slack less Drawbar For BLC Wagon.
   - Replacement of Head Stock Assembly & Sole Bar, Fitment and Maintenance of Bio Toilet, Lavatory maintenance.
   - LHB Coach: LHB coach salient features, Difference between ICF and LHB coach.
   - Wheel: Assembly, Types, Defects. Standard and worn out wheel profiles. Vital dimensions.
   - ICF bearing, CTRB LHB & Freight, Defects of bearing and its remedial measures
   - Brake System: ICF & Disc Brake system.
   - Tools and Equipment's used for paint application, surface preparation before painting.
   - Description of Paint component - Definition, Constituents, and their functions.
   - Types of Paints (Emulsion Paint, Alkyd/Enamel Paint, PU Paint)

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- Characteristics of good paint and its application, Primary, Secondary colours, and their application.
- Knowledge about Anticorrosive Paint Application,
- Primers, Undercoating, Finishing. Materials used as Putty & Fillers and their application.
- Painting schedules for ICF and LHB coaches during POH.
- Defects in paints and painting operation - Causes and Remedies.
- Introduction to latest modification in paint application surface finish by Sand blasting, Airless Spray Guns, Paint booths, Paint drying ovens, Poly Vinyl Coating, JIS Paint for Bogies, Single Pack Paint for Springs, DFT Checking.
- Stencil cutting, Letter writing, screen printing.
- Coach body Interior work.
- Carpenter hand tools and Measuring instruments including precession Measurement.
- Plywood & L. P. Sheets.
- Screws Types of Screws. Nails - Types of Nails.
- Wood Based Resin -Impregnated Compressed Laminated (Compreg Board)
  a) Types, Material, Structure.
  b) Colour, Sizes Advantages and Testing.
- Vestibule.
- Procedure of flooring in the coach.
- FRP panelling and honeycomb partitions
- Trimmer's hand tools and measuring instruments including precession measurement.
- Knowledge of all trimming tools. Use and maintenance of Sewing machine.
- Types of material used in Trimming Shop
- Procedures of repairs and manufacturing of Seats & Berths.
- PVC laying and welding.
- Types of coaches and their seating/berthing capacity.
- Overhead Crane Safety: Safe Hoisting Practices and safety gears of EOT Cranes.
- Types of Over Head Crane and its complete parts terminology with function.
- Over Head crane Lifting accessories (Sling, wire rope, cable etc)
- 100 Days Failure, En-route detachments.

3. **Safety at Work: -**
   - Personal protective Equipment (PPE) .
   - First Aid, Fire Fighting, Electrical Shock prevention, CPR
   - Hazard Identification & Risk Assessment
   - Machine & Tools safety
   - Material safety
   - Work Place Safety.

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4. **Certifications: -**
   - IMS ISO 9001, ISO 14000, ISO 18000,
   - ISO 50000, ISO 3834
   - Green Co
   - 5S.

5. **Establishment & HOER**
   - Rajbhasha.
   - General Knowledge & Trivia related to Railways.
   - Factory Act.
   - HOER Rules.
   - Payment of Wages Act.
   - Workmen Compensation Act.
   - Pass Rules.
   - Leave Rules.
   - DAR - Major Penalty, Minor Penalty.
   - Annual Confidential Reports.
   - Railway Service Conduct Rules.

6. **Preliminary knowledge about the HRMS.**
   - How to apply Leave through HRMS Module.
   - How to apply Privilege Pass & PTO through HRMS Module.
   - How to apply transfer through HRMS Module.
   - How to fill self-appraisal of CR through HRMS Module.

7. **Stores: -**
   - Schedule of Power
   - Procurement of Material (Stock Items, Standardization of materials, P.L. No. and Non-stock material).
   - LM-32, Custody Store.
   - Tender, Types of Tenders.
   - Purchase Orders.
   - Knowledge about IMMS, UDM etc.
   - Advice Note.
   - Requisition cum R/Note.
   - Challan, Gate Pass.
   - Issue Note.
   - Work Order.

8. **Accounts & Finance: -**
   - Vetting.
   - Cash Impress.
   - TA Bills.

9. **Budget: -**
   - Fund Allocation,
   - Grant
   - Demand Head.

10. **Properties, testing and inspection of metals:**
    - Stress and strain,
    - Material properties,
    - testing of metals, Destructive testing,

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- Tensile testing,
- Compression test.
- Hardness tests, impact testing.
- Fatigue testing,
- Creep and stress rupture testing.
- Non-destructive testing.
- Mechanical properties such as tensile strength, Compressive Strength, ultimate tensile strength, Hardness, Toughness, Fatigue etc.

11. **Basic Knowledge of metals and alloys (Both ferrous & Non-ferrous) & their use:**
    - Ferrous metal: Pig Iron, Wrought Iron, M.S. Alloyed Steel,
    - Non-ferrous metal such as Brass, Bronze, Aluminium and its alloys, Copper and its alloys, bearing metals etc.
12. **Mechanical working of metals:**
    - Hot working,
    - hot rolling,
    - Extrusion,
    - Cold-working,
    - Cold-rolling,
    - Cold-drawing,
    - Cold- bending,
    - Hobbing.
13. **Smiting and forging:**
    - Smith forging operations.
    - Hand forging,
    - Power forging,
    - Forging materials,
    - Heating devices,
    - Forging temperatures,
    - Hand tools and appliances,
    - impression die forging,
    - Drop hammers,
    - Grain-flow,
    - Effects of forging,
    - forged parts VS cast parts,
    - Defects in forging,
    - Heat treatment of forged parts,
    - Advantages and limitations.
14. **Metal cutting and cutting tools:**
    - Orthogonal and oblique cutting,
    - cutting speeds,
    - feeds and depth of cut,
    - Machinability,
    - Cutting tool-materials.
15. **Welding and related processes:**
    - Weldability,
    - Types of Welding Metallurgy of weld,

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- Gas Welding,
- Oxy-acetylene welding,
- Air acetylene welding,
- Arc Welding methods,
- Resistance Welding methods,
- Oxygen cutting,
- soldering, Brazing,
- Welding of various metals,
- Inspection and testing of Welds,
- Welded joints and edge preparation,
- Welding of Pipes.
- Welder's hand tools and measuring instruments.
- Welding Practices related to Positions, Joints and Procedures required in Carriage Repair, Bogie, Fitting sections.
- Types of Welding Machines.
- Selection of Electrode as per work, Surface Preparation before welding, Care of Electrodes, baking of electrode, welding defects and remedies.
- Gas cutting, Stainless Steel Aluminium welding, Gas welding and its flames.
- Safety precautions for Electric Arc welding & Gas cutting.

16. **Different types machines & machining process:**
    - Description, and function of lathe, such as turning, facing, thread cutting, centering
    - Capstan and turret lathe,
    - Different type of machine such as drilling, boring, shaping, planning, slotting, Grinding, Milling, polishing, reaming
    - General features & application of NC & CNC Machines etc.
17. **Transmission of motion and power:**
    - Different type of gear such as Spur gear, Helical gear, Spiral Gear, Bevel gear, Worm gear,
    - Gear Cutting method, indexing, and Dividing heads, Gear hobbing
    - Belt, Rope and chain drive, Gear drive, clutch,
18. **Sheet metal work:**
    - Metals used in sheet metal work,
    - Sheet metal hand tools,
    - Sheet metal operations,
    - Sheet metal joints,
    - Hems and Seams,
    - Sheet metal allowance,
    - Sheet metal working machine,
    - Laying out a pattern.
19. **Bench work and fitting:**
    - Vices, Hammers Chisels, Chipping, Files, Filling, Scraper, Grinding and polishing, Hacksaw, Sawing, Punch. V-Block, Angle Plate,
    - Marking tools, Surface Plate, Scriber, Reamer, Reaming, Taps, tap drill size, Tapping Dies, and stock, Dieing,
    - Try Square, Marking out.

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- Fitter hand tools and Measuring instruments including Precision measurement.
- Interchangeability Fits, Limits, Tolerance and Allowance.

20. **Limits, Fits, and surface quality:**
    - Symbols of drawings.
    - Fits, Allowances, clearances, and interferences,
    - Types of fits.
    - Hole basis and shaft basis,
    - Limit systems, surface quality,
    - Interchangeability,
    - Elements of interchangeable system,
    - surface characteristics,
    - Evaluation of surface finish.
21. **Surface finishing process:**
    - Lapping
    - Honing
    - Super finishing
    - Polishing
    - Buffing
    - Electroplating
    - Tumbling
    - Pickling.
22. **Millwright, Transport, Machine Maintenance:-**
    - Importance of EOT Cranes and traversers,
    - Capacity and common failures,
    - Diesel Crane (Types of transmission, capacity, POH procedure),
    - Hydraulic pumps and Hydraulic systems.
    - Automobile Engines: - Petrol & Diesel Engines,
        - Advantage and Disadvantage of CI & SI engines,
        - Spark ignition and compressing ignition system,
        - engine components,
        - types of oil and lubricant used in Rly transport vehicle,
        - Lubrication system in fork lift and Pay loaders,
        - rating of battery and charging system,
        - Air pressure limit for different types of types in MHE like road crane and pay loader.
        - Types of tyres used in Railway transport vehicle,
        - DC Motors and its function,
        - Formalities of RTO followed for vehicle movement on Road safety checks for vehicle and MHE,
        - Types of brakes and their overhauling practices.
    - Weekly/Monthly/Yearly schedule checks of different vehicles.

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