SYLLABUS FOR SELECTION TO THE POST OF JUNIOR ENGINEER(JE) IN MECHANICAL DEPT CRS/TIRUPATI AGAINST 25% LDCE

Section – A

- Organization at various levels and Organization of Mechanical Dept. on Indian Railway, SCR, TPTY workshop.
- Duties and responsibility of supervisors in a workshop, cannons of financial propriety.
- Stores matters - Procedure for indenting, drawl, accountable and issue of materials, both stocked and non-stocked items, stock verification.
- Establishment matters – Railway service conduct rules, Discipline and Appeal Rules, Leave, Pass, Pay andvarious allowances etc.
- IMS,5S, ISO3834, Green Co, Factory Act 1948, Safety & Fire Fighting, PPEs.
- Questions on official language policy.
- Algebra, Statistics, time and work, Time and distance, simple interest, ratio and proportion, areas of triangles rectangular, squares, circles and volumes of cylinders etc.
- English grammar, latest news and General knowledge of railway.
- E-office, WISE, HRMS, RESS, GeM, IREPS, IMMS, DSC, basic knowledge of computer and Microsoft Office.

Section – B

GENERAL FITTER

- Salient features and difference in construction of ICF and LHB coach bodies, & bogies. Dismantling, overhauling and assembling of ICF & LHB - work instructions, inspection and repair of main components, common defects.
- 'Must change components' during IOH/POH/SSI/SSII/SSIII repairs and why they are required.
- Different important dimensions and clearances to be maintained in the bogie after POH/SSI/SSII/SSIII.
- Working of Air Brake system in the coaching stock. Over hauling and testing of distributor valves and other components of air brake. Reasons for brake binding in air brake system.
- WSP system, FIBA, hand brake in SLR/Power car.
- Overhauling and testing of various sub-assemblies, shock absorber, dampers.
- The need and methods of adjustment of buffer/CBC heights on coaching stock (LHB and ICF).
- Draw and buffing gear, their repair practices during POH.
- Assembly of wheel sets, overhauling of roller bearings, fitment of axle boxes and allowed variations in dimensions / clearances. Roller bearing defects - causes and prevention. CTRB bearings maintenance, bearing fitment, brake disk.
- Inspection and repair practices of corrosion coaches as stipulated by RDSO. corrosion preventive methods to be adopted in workshop for minimizing corrosion. Difference between various steels used in coach.
- IRCA-IV, MEMU maintenance, schaku coupler, BDG.
- Bio toilet, pressurized flushing system, automatic door, water tank testing/repairing.
- Engineering drawing, limits fits, tolerances, magnaflux test, DPT, ultrasonic test, Innovation.

WELDER

- Various types of welding and cutting techniques.
- Application of (Mag) CO2 Semi-automatic welding to different types of works on coaches i.e., Welding of Body/side panels, trough floor, buffer seats and sole bars, Advantages over arc welding.
- Various types of welded joints. Interpretation of drawings for undertaking welding, choosing electrode size for a job.
- Knowledge of various kinds of electrodes and their usage. Types of coatings. Typical current settings. Types of welding sets.
- Safety rules while handling gas cylinders, electric arc welding equipment and self-safety.
- Surface preparation for welding, welding distortion and steps to be taken to control distortion.
- Defects in arc welding. Identification, prevention.

CARPENTER/MASON

- Types of wood, alternatives to wood, their treatment, storing and utilization in General.
- Types of woods used in different locations in carriage building.
- Various types of joints and their use in carriage building.
- Hand tools and special machines / tools used in a Carriage Body Repair Shop.
- Flooring arrangement in ICF / LHB coaches and repair practices. Current designs and their advantages.
- Ply woods - method of manufacture, I.S. specification, - advantages and relative costs.
- Adhesives - types, specifications, application and costs.

BLACKSMITHY

- ICF springs, their inspection testing and condemnation. Preventive measures.
- Draw gear assembly, repair practice, testing and documentation.
- Testing of chains and ropes.
- LHB spring(coil/air)-Types, inspection, testing, pairing, condemnation

PAINTER/TRIMMER

- Painting and its uses.
- Manufacture of paints and ingredients.
- Selection of paints for different purposes. Basic IS specification of (paints used in coaches)
- Various specifications for anti-corrosive paints their applications and advantages *vis-à-vis* disadvantages.
- Difference between brush painting, spray painting, paint booth and airless spray painting – their advantages and disadvantages.
- Types of painting brushes and their selection for different works.
- Different painting schedules for coaching stock during POH.
- Preparation of 'upholstery' and estimation of material requirement. Fire retardant material property -PU foam, DTPB, upholstery, compreg.
- PU Painting method.
- Lettering on different types of coaches as per drawings

MILLWRIGHT FITTER

- Basic construction of EOT, Forklift, road vehicles.
- Maintenance schedules for machines, cranes, material handling equipment's like fork lift sand heavy / light road vehicle. Types and construction of compressors, filters coolers.
- Care and maintenance of air compressors, blowers.
- Foundation, Erection and dismantling of machinery and heavy loads - Precautions to be observed while doing so.
- Working care and maintenance of road cranes of different capacities, their special features.
- Testing of wire ropes, chains etc and their periodicity.
- Basic structure of a centre lathe, alignments required and test methods.
- Maintenance practices for roller bearing, gear boxes, belt drives, hydraulic equipment, ETP, Codal life of M & P

MACHINIST

- Types of machines available in Carriage Repair Shop,Tirupati and their application .
- Important specifications (capacity, length of the job can be done, accuracy, repeatability, resolution & different operations/processes can be done on the machine) of each capacity.
- Safety precautions to be taken while a) starting b) working Shutting down/stopping of machine
- Preventive maintenance schedules (daily and weekly/fortnightly) to be attended on various machines
- Coolants & consumables used in/on various machines. Tolerance, allowance, fit, surface finish, least count, resolution, accuracy, repeatedly, various symbols/schematic representation for representing tolerance and surface finish on the drawing
- Gauges, calibration, jigs & fixtures
- Down time of the machine, mean time between failure (MTBF), reliability, availability, maintainability of the machines.
- Various types of cutting tools their composition and use.
- Speeds and feeds for cutting different types of materials and drills to be used on different machines
- Description and illusion of jigs and fixtures, Details of preparation of GO-NO gauges and profile gauges
- Knowledge of assessment of workload and requirement of machinery