Annexure-C

PART-I

SYLLABUS FOR SELECTION OF ASSTT. CHEMIST & METALLURGIST CLASS-II IN M&C ORGANISATION AT RCF.

All aspects of metallurgical and chemical fields applicable to Railways & Production units.

1.0 Welding Technology:

1.1 The various welding processes and their applications, different welding equipment, their characteristics, etc.

1.2 Classification of welding consumables, their application, evaluation system for approval.

1.3 Various types of weld geometry, their application, welding technique, precautions to be observed, etc.

1.4 Weld defects, their causes and remedies.

1.5 System of approval for various welding techniques for joining rails, acceptance standards, etc.

1.6 Reclamation of railway components, points and crossings.

1.7 Any other aspect of welding technology applicable to Railways

2.0 Metallurgical Investigation and statistical analysis of component failures, analysis of metal, mechanical testing:

2.1 Various types of failure of component in service, their causes and remedies.

2.2 System of metallurgical investigation of failure to indent the causes of failure, framing the report.

2.3 Methods of chemical and instrumental analysis of metals and alloys.

2.4 Different types of mechanical tests carried out on metals and metallic components and their significance, knowledge of different testing machines used for the purpose.

2.5 Statistical/numerical analysis of the component failures rails.

2.6 Methods for establishing fatigue and wear characteristics; knowledge of different machines used this purpose.

2.7 Any other aspect concerning the above.

3.0 Non-destructive testing

3.1 Different non-destructive testing methods (Ultrasonic, magna-flux, x-ray, gamma-ray, Eddy current, dye-penetrate, fluorescent dye, etc., their application in engineering field particularly Railways, their limitations, etc.

3.2 Nature of defects, attributable to manufacture, as well as those arising in service connected with rolling stock, axles, tyres, wheels, rails, armature shaft, springs, roller bearings, other critical components and non-destructive methods for their detection, system of standardization of the technique, issue of code of procedure, etc.

3.3 Types of Ultrasonic flaw detectors for general testing and for testing rails in track for detection of flaws, acceptable parameters for their efficient operation, system of evaluating the performance of the flaw detectors and probes.

3.4 Any other aspect concerning non-destructive testing.

4.0 Metallurgical-General

4.1 Modern technology in iron and steel making, steel and cast iron (grey/alloy SGCI/Malleable) foundry practices, copper and aluminum alloy foundry practices, white metals, etc.

4.2 Basis for selection of metals and alloy for various railways applications, knowledge of common material specifications for ferrous and non-ferrous metals and alloys and components used on the Railways.

4.3 Modern technology in heat-treatment, forging, manufacture of springs, axles, wheels, tyres, rails, and cast manganese steel, points, and crossings, etc.

4.4 System of metallurgical inspection of components and material supplied to the Railways.

4.5 Any other aspect connected with above.

5.0 Various types of Electro- Platings & Anodizing

5.1 The methods of testing & evaluation of electro-plated & anodized components.

6.0 Paints and allied products and corrosion protection

6.1 Corrosion of metals and alloys, their significance in railway operation, methods adopted for minimizing corrosion, system of evaluation of corrosion resistance of metals and alloys selection Various types of weld geometry, their application, welding technique, precautions to be observed, etc.

6.2 Types of Ultrasonic flaw detectors for general testing and for testing rails in track for detection of flaws, acceptable parameters for their efficient operation, system of evaluating the performance of the flaw detectors and probes.

6.2 Various painting systems adopted on the railways, methods of application of protective coating, various precautions to be observed, etc.

6.2 Any other aspect connected with corrosion and corrosion protection.

7.0 Lubricants & Water Treatment

7.1 Basics of manufacture of various petroleum products.

7.2 Different types of lubricants and other oils used on the railways, their specification, application, characteristics, etc.

7.3 Laboratory evaluation of lubricants, fuel and other oils, physical and chemical characteristics, rig tests, standard engine test, etc.

7.4 Part played by M&C laboratory in Diesel sheds-tests and controls (including spectrographic analysis) on lubricants for various applications.

7.5 Any other aspect connected with the above fields of railways (including workshops) interest.

8.0 Rubber, Plastic & Woods

8.1 Types of rubber including, latest developments, used in modern railway and other industrial applications, their important characteristics.

8.2 Laboratory evaluation tests and methods to assess the quality of rubber components for different applications on Railways.

8.3 Various critical rubber/rubberized components on railways, their functions, working conditions, required characteristics and basis for selection of suitable rubber/rubber composites.

8.4 Basics of manufacture of plastics, methods of molding/ extruding components and selections.

8.5 Different types of plastics, including latest developments used in modern railway and industrial applications, their important characteristics, laboratory test methods to assess quality.

8.6 System of standardization of material for various rubber and plastics components on railways, knowledge of specification, etc.

8.7 System of inspection of rubber and plastic components purchased by the railways, knowledge of specifications, etc.

8.8 Any other aspect connected with use of rubber and plastics on the Indian Railways.

8.9 Fundamentals of FRP technology, various processes of manufacturing FRP products. The methods of testing & evaluation of FRP components used in coach manufacture.

8.10 Methods of testing & evaluation of various types of woods such as hardwood, plywood & compreg plys.

Part-II

ESTABLISHMENT & GENERAL ADMINISTRATION

SYLLABUS

ESTABLISHMENT:

Discipline and Appeal Rule, Railway service conduct Rules, Employment of Allowance Rules, Medical Rules, Pension Rules, Leave Rules, Hours of Employment regulations and Loan & Advances.

GENERAL:

Delegation of powers in RCF in Establishment and non-Establishment, procurement and accountable of Equipment, Stores and Stationary, Chapter I, II & X of the manual of Office Procedure, Official Language Policy and official Language Rules.