



Indian Institute of Technology Jodhpur

Department of Metallurgical & Materials Engineering

SYLLABUS FOR THE POST OF JUNIOR TECHNICAL ASSISTANT

(Pay Level 3)

Advt. No. 25

WRITTEN TEST & TRADE TEST

(Total Marks 100)

Syllabus for Written Test:

Mechanical Testing: Tensile, Compression, Hardness, Fatigue, Creep, Impact.

Heat Treatment: Heat treatment of steels and aluminum alloys. Surface hardening treatment.

Metallography: Sample preparation, Micro and Macro etching. Electropolishing. Microstructure of ferrous and non-ferrous metals.

Metal casting: Mould design involving feeding, gating and risering, melting and casting practices, casting defects

Hot, Warm and Cold Working of Metals: Metal forming – basics of metal forming processes of rolling, forging, extrusion, wire drawing and sheet metal forming, defects in forming

Metal Joining: Principles of soldering, brazing and welding, welding metallurgy, defects in welded joints in steels and aluminum alloys

Powder Metallurgy: production of powders, compaction and sintering

Non-destructive Testing (NDT): Dye-penetrant, ultrasonic, radiography, eddy current, acoustic emission and magnetic particle inspection methods

Iron and Steel Making: Operation of blast furnace. primary steel making: basic oxygen furnace, process dynamics, oxidation reactions, electric arc furnace

Basics of Phase Diagram of Steels and Aluminum alloys

Mineral Beneficiation, Size classification, flotation, gravity and other methods of mineral beneficiation; agglomeration: sintering, pelletizing and briquetting.

Electrochemistry and Corrosion: Single electrode potential, electrochemical cells, Nernst equation, potential-pH diagrams. Forms of corrosion.

Basic mathematics

Syllabus for Trade Test:

Mechanical Testing: Tensile, Compression, Hardness, Impact.

Heat Treatment: Heat treatment of steels and aluminum alloys.

Metallography: Sample preparation, Micro and Macro etching, Microstructure of ferrous and non-ferrous metals, Optical microscopy.

Metal casting: Melting and casting practices.