



# भारतीय प्रौद्योगिकी संस्थान जोधपुर Indian Institute of Technology Jodhpur

## Syllabus for the post of JUNIOR TECHNICAL ASSISTANT (Metallurgical & Material Engineering)

### Written Test

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

**Heat Treatment:** Heat treatment of steels and aluminium 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 aluminium 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 Aluminium 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**

### Trade Test

**Mechanical Testing:** Tensile, Compression, Hardness, Impact.

**Heat Treatment:** Heat treatment of steels and aluminium alloys.

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

**Metal casting:** Melting and casting practices.

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