HARCOURT BUTLER TECHNICAL UNIVERSITY, KANPUR

Syllabus of the Written Test for Recruitment to the post of "Assistant Workshop Superintendent"

Engineering Materials

Structure and properties of engineering materials, phase diagrams, heattreatment, stress-strain diagrams for engineering materials, tool material, and workpiece material.

Casting, Forming and Joining Processes

Different types of castings, design of patterns, moulds and cores; solidification and cooling; riser and gating design. Plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk (forging,rolling, extrusion, drawing) and sheet (shearing, deep drawing, bending) metal forming processes; principles of powder metallurgy.

Sheet metal forming process, classification and description of different types of tools, equipments used in sheet metal work, different types of metals used in sheet metal shop, different types of joints in sheet metal work, safety precautions. Plate bending, spring back, press brake forming, Introduction to forming, electro-hydraulic forming, magnetic pulse forming.

Introduction to press work – coining, embossing etc., Design of sheet metal dies.

Forging processes done in black-smithy work e.g. upsetting, drawing down, punching, bending, fullering etc., classification and description of different tools, equipment used in black-smithy shop, safety precaution during actual working.

Joining process; Principles of welding, brazing, soldering and adhesive bonding processes, various tools used in these processes. Conventional and Advance welding processes, safety precautions.

Woodworking Processes

Description and demonstration of different woodworking tools, joints along with advanced carpentry joints, classification and definition of timber, wood seasoning, demonstration of woodworking lathe and advanced power tools used in carpentry work, safety precaution during actual working.

Machining and Machine Tool Operations

Mechanics of machining; and basic machine tools and equipment used, explanation and demonstration of various operations on lathe machine, tool geometry of single point cutting tool, cutting speed, feed and depth of cut in turning, safety precaution during actual working. Single and multi-point cutting tools, tool geometry and materials, tool life and wear; economicsof machining; principles of non-traditional machining processes; principles of work holding, design of jigs and fixtures. Safety precautions.

Lathe, types of lathes-special purpose lathes-kinematics arrangement of lathe -work holding devices-types of milling machines-types of milling machine-schematic diagrams,-operations, milling cutters-mounting of cutters-Drilling machines-types-reaming and boring operations. Schematic diagram of the boring machine, shaper, planer, slotting and broaching machine-operations tools. Grinding and allied finishing process.

Advanced Manufacturing process

Advanced computer-aided and interfaced manufacturing process, CNC machines, rapid prototyping, 3D printing.