

Syllabus for the post of Foreman Gr.-II

Notification Sl. No. 4

Qualification- Diploma in Mechanical / Tool & Die Making &
Post diploma in Tool Design.

Production Technology:

Hand tools, Drills & Drilling machines, marking & layout tools, Threads, Measuring instruments, Engineering Materials, basic manufacturing processes, basic metal castings, Shaping Machines, Lathe Machines, types of lathes, different operations performed, power transmissions and lathe accessories and attachments Turning operation, Thread Cutting, Work holding devices, Cutting speeds & feeds, Calculation of machining time, Classifications of Milling, types of milling machines, Milling cutters, different types of Milling operations performed, Dividing Head and Rotary table, Indexing methods, Milling attachment, Problems and Machining time calculations, types of grinding machines, Grinding methods, grinding accessories grinding wheels and its applications and part description, specification, Wheel mounting, Wheel balancing, Wheel dresser, Surface grinding operations, Profile grinding operations, Cutting speed, rpm, feed, depth of cut, machining time calculations and problems, Jig grinding machine, Tool and cutter grinding machine, EDM, Wire EDM Principle of working, accessories, Electrode- metallic and non-metallic materials, Dielectric fluid, Spark gap.

Engineering Drawing:

Drawing Sheet sizes, Drawing Tools, Types of Lines and its representation and Lettering, font sizes, Dimensioning and scales, Projections, Sectional views, Auxiliary Views, Developments of Solids, Development of surfaces, conversion of pictorial views into orthographic views, Conversion of orthographic views into isometric View.

Engg. Mechanics and Strength of Materials:

Introduction to Engineering Mechanics and Strength of Materials: Introduction to Engineering Mechanics & SOM, Scalar & Vector quantities, Force Analysis: Composition & Resolution of forces. Force, examples of force, effect, characteristics of a force, system of forces, Resultant force, methods for the resultant force and simple problems, Parallelogram law of forces and simple problems, Triangle law of forces, Polygon law of forces, Equilibrium of forces — Introduction, principles of equilibrium, lami's theorem, (with proof) Types of equilibrium, Centre of Gravity, Simple Stresses & Strains, Strain energy & impact loading, thick and thin cylinders: Introduction to thin cylinders, stresses in thin cylindrical shells, Expression for circumferential stress & longitudinal stresses (without proof), Simple problems, Design of thin cylinders with simple problems,

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Simple problems, torsion: Torsion stress and strain ,Theory of pure torsion, Angle of twist and shear strain formulas, Equation for the strength of a shaft, Polar moment of inertia, Power transmitted by a shaft, Simple problems

Engineering Metrology:

Measuring Instruments, Standards of Measurement, Limits, Types of Fits and its representation, applications and Tolerances, Comparators, Angular Measurements, Surface Roughness, Measuring Machines, Total Quality Management [TQM], Leadership, Statistical Process Control, Reliability and Life Testing Quality circles, gauges and its types, Heat treatment related to gauges.

Jigs and Fixtures:

Definition of jigs, fixtures, and its applications in industry, Difference between jigs and fixtures, Design considerations for jigs and fixtures, Elements of jigs & fixture, Materials, Advantages and disadvantages, Types of jigs, Types of fixtures ,Applications, Location: Definition and choice of location, Degrees of freedom, 3-2-1 principle, Types of locators, Redundant location, Diamond pin calculation, Locating methods and chip control. Fool proofing, Clamping: Definition and need, Requirements of a good clamping system, Types of clamping, Guiding Elements: Introduction, Classification of bushes, Materials and hardness requirements,.

6. Press Tool: Introduction to Tooling, Types Of Press Tools, Elements Of A Press Tool, Theory Of Shearing, clearance between punch and die, shut height and daylight, press tonnage calculation. Cutting Force, Strip Layout, Punch And Die, Stripper, and types of stripper, Stopper, Pilot, Centre Of Pressure, Die Sets, Progressive Dies, Compound Dies, Non- Cutting Operation, fine Blanking, Combination Die, Bending, Lubrication, Forming Operations, Drawing, Theory of Drawing, Calculation of blank size, draw force and number of draws, Types of Presses.

Moulding:

Introduction, types Of Mould, Mould box Construction, Feed System, calculations, Ejection and its types, Temperature Control System, Parting Surface, Shrinkage, Split molds, Three Plate Moulds, Hot Runner Moulds, preheating of moulds and temperature measuring methods Terminologies Associated With Injection Moulding, Injection Moulding Machines, working principles , tonnage calculations, Polishing of Moulds, Trouble Shooting In Injection Moulding, Thermo Set Plastics Moulding Methods, Process Parameters And Heating Of Compression Mould,

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Transfer Moulding and Its Types, Die Casting: Introduction To Die Casting & Methods of Casting, mold box materials , Pressure Die Casting, Die Casting Alloys.

Press Tools:

Introduction To Tooling, Types Of Press Tools, Elements Of A Press Tool, Theory Of Shearing, clearance between punch and die, shut height and daylight, Press tonnage calculation. Cutting Force, Strip Layout, Punch And Die, Stripper, and types of stripper, Stopper, Pilot, Centre Of Pressure, Die Sets, Progressive Dies, Compound Dies, Non-Cutting Operation, fine Blanking, Combination Die , Bending, Lubrication, Forming Operations, Drawing, Theory of Drawing, Calculation of blank size, draw force and number of draws, Types of Presses.

Engineering Materials and Heat Treatment:

Introduction to Metal Properties & Application, Definition of Material Technology, Classes of Engineering Materials — Metals & Alloys, Ceramics, Organic Substances, Metals — Ferrous and Non-Ferrous Metals, Different Properties & Behaviour of Materials, Mechanical Properties of Materials-Strength, Elasticity, Plasticity, Ductility, Malleability, Brittleness, Hardness, Toughness, Resilience, Stiffness, Fatigue, Crystalline Structure of Metal. Meaning of Structure, Crystal And Crystallization, Space Lattice And Unit Cell, Crystalline Structure Of Metals- BCC, FCC, And HCP, Ferrous Metal & Its Manufacturing Process, Steel And It's Manufacturing Process, Classification And Structure Of Steel, Alloying Elements, I.C. Diagrams, Heat Treatment Of Steels: Definition, Purpose, Stages , Heat Treatment Of Process, Hardening, Tempering, Normalizing Annealing, Austempering, Martempering, TTT Curves And Quenching, Defects In Heat Treatment, Surface Hardening Of Steel, Hardness Testing Methods,