

**DETAILED SYLLABUS FOR THE POST OF JUNIOR INSTRUCTOR IN  
MACHINIST IN INDUSTRIAL TRAINING DEPARTMENT**

**(Cat. No.: 663/2023)**

**(Total Marks – 100)**

**Module -1. General safety precautions and importance of housekeeping (10 Marks)**

Types of safety precautions -safety signs – first aid – PPE's – Response to emergencies – fire – fire extinguishers types and uses – Housekeeping-good shop floor practices – 5 S concept –waste material disposal and color codes for bins –methods of moving heavy equipments-basic understanding on hot work

**Module -2 Marking and Marking tools, Measuring instruments (10 Marks)**

Linear measurements - Steel rule – Marking media – Calipers – Dividers – Marking punches – Scriber – Hammer – Marking off table – Surface plate –vices – Angle plate – Try square – Combination set – Marking block – Parallel block

**Module-3 Precision measuring instruments (10 Marks)**

Micrometer (different types, parts, graduation, reading) – Vernier caliper – Dial Test Indicator- Bore dial gauge – Vernier height gauge –Vernier bevel protractor – Gear tooth caliper.

**Module -4 Hand tools (08 Marks)**

Hacksaw frame and blade – Saw setting – Files (types, uses, cut, grade, specification) – convexity of file – Pinning of file – Taps and Dies – Die nut – Chisel – Reamer

**Module -5 Drilling , Lubricants and Cutting fluids, Maintenance (08 Marks)**

Drilling machines – types – various operations in drilling machine – Drill – Drill holding devices – work holding devices – tap drill size – Cutting speed, feed and depth of cut in drilling – Drilling defects and causes.

Types of cutting fluids and purpose – Lubricants classification and properties – Lubricating system – Maintenance – Machine tool inspection

### **Module -6 Lathe (12 Marks)**

Parts and functions – Types – Specification – Operations – Lathe accessories and attachments – Cutting speed, feed, RPM – Lathe tools and angles – Driving mechanism – Chip breaker – Taper turning methods – Taper and its types – Taper calculation – Sine bar and slip gauges – Screw thread and elements – Forms of screw threads – Lathe centre's – Mandrel – Thread cutting – Single and multi start threads – Simple gear train and compound gear train – Lathe dogs – Driving plate – Face plate – Rests.

### **Module -7 Milling (12 Marks)**

Milling machine – classification – specification – parts, functions – Application – cutter holding devices – milling cutters – cutter material – types of cutters – Nomenclature of milling cutter – Different milling operations – Up milling and down milling – Straddle milling – Gang milling – Cutting speed, feed and machining time – Dividing head types and uses – Types of indexing and calculations – Types of gears and uses – Elements of spur gear – Spur gear calculation – Selection of gear cutter – Helix and spiral elements, applications – Difference between helix and spiral – Methods of checking gear and its parts – Rack elements, application – Cam types and applications – Jigs and fixtures – Gauges material and purpose – Different types of gauges.

### **Module -8 Grinding (10 Marks)**

Types of grinding machines – parts and functions of each types – Different grinding operations – Construction of grinding wheel – Standard marking system of grinding wheels – Glazing and loading – Dressing and truing – Cutting speed, feed and depth of cut – Shapes of grinding wheel and applications – Selection of grinding wheel – Wheel balancing – Wet grinding and dry grinding – Tool and cutter grinder attachments and their uses.

### **Module -9 CNC Turning (10 Marks)**

Safety in CNC turning centre's – Basic of CNC technology – CNC lathe machine elements and functions – Advantages and disadvantages – Controls, switches – NC co-ordinate system – Bed, chuck, tail stock, turret and spindle drive – slide ways, ball screw – ATC – Feedback encoder – open loop and closed loop control system – Axis's – Absolute and incremental modes – ISO G codes – ISO M codes – Edit and MDI mode functions – Cutting tool materials in CNC turning – Tool holders – Collisions – Process planning – Machining sequence – Cutting parameters – Work and tool offset – Machine operational modes – JOG,

MPG, Edit memory – Entering and editing program – Use of emergency stop – Tool offset adjustments – Find alarm codes and meaning of those codes – Work holding device.

**Module -10 CNC Milling (10 Marks)**

General safety on CNC Vertical machining centre's – CNC-VMC elements and their functions – Machining operations and tool paths – Geometric and axis co-ordinates – Program sequence as codes – G codes and M codes – Part programming – Structure of a part program – Cutting tool materials and their composition – Cutting tool geometry – Tool wear – Tool life – Work holding in VMC – Machine operational modes – Tool offset adjustments in 1<sup>st</sup> part – Effects of sudden machine stoppage due to power shut down – Program transfer – Productivity concepts .

**NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper.**