DETAILED SYLLABUS FOR THE POST OF JUNIOR INSTRUCTOR (TURNER) IN INDUSTRIAL TRAINING DEPARTMENT

(CATEGORY NO. 661/2023)

Module 1 (marks 5)

Measurement, lines standard, end standard and steel rule .
Steel rule - Different types
Hammer & Chisel - Materials, types and uses
Angles of chisels
Selection of metals
Files - Different type, uses, grade, shape, hacksaw cutting
Hacksaw frame
Use of try square, bench vice and other types and its uses
Try square
Types fo vices
Types of calipers
Blocks, scribing block, straight edge
Surface gauges (or) Scribing block

Module 2 (marks 5)

Drill machines - Different parts, use of punches
Types of punches
Nomenclature of drill
Tap - Types, Die & die stock, care while taping, tap extraction
Die and die stock
Tap extractor
Methods of removing broken studs
Calculation involved in finding out drill size (metric and inch)

Module 3 (marks 10)

Getting to know the lathe - Main components, lever position & lubrication points
Definition of machine and machine tool, history & gradual development of lathe
Classification of lathe, lathe specification
Lathe function, construction of different parts of lathe
Different parts of lathe, tailstock, carriage, saddle and compound rest
The carriage
Type of Lathe drive - Merits and de-merits, cone pulley/gear type
Reducing speed, necessity, back gear & use
Tumbler gear

Lathe cutting tools - Different types, shapes, specification of lathe tools, good cutting tool material & material properties
Types and specifications of carbide tools
Specification of lathe cutting tools, different type, shapes
Properties of good cutting tool materials
Different tool materials
Lathe accessories, independent chuck, self chuck, collet etc,
Lathe accessories - work - holding devices : 3 Jaw chuck
Lathe accessories - work - holding devices : 4 Jaw chuck
Chucks other than 3 Jaw and 4 Jaw types and their uses

Module 4 (marks 10)

Vernier caliper - Its construction, principle, graduation
Graduations and reading of vernier calipers
Digital vernier caliper
Outside Micrometers, parts, principle and digital Micrometer
Graduations of metric outside micrometer
Reading dimensions with an outside micrometers
Error in micrometer
Digital micrometers

Module 5 (marks 10)

Cutting speed and feed & depth of cut, recommended speed
Calculation involving cutting speed, feeds
Different types of micrometer, outside/inside and sources of error
Inside micrometer - metric
Three-point internal micrometer
Sources of measuring errors
Drills - different parts, types and sizes
Drill cutting angle, cutting speed
Cutting speed and RPM
Feed in drilling
Boring tools, counter sinking
Counter sinking
Counterboring and spot facing
Letter and number drills
Reamers types and uses
Hand reamers
Drill size for reaming

Module 6 (marks 5)

Lubricant and coolant - types its necessity, system of lubrication, selection of coolant, handling & care

Methods of applying lubricant
Knurling, meaning, necessity, types, grades & cutting speed for knurling
Lathe mandrels - different types and their uses

Module 7 (marks 10)

Concept of interchangeability, limits & fits
Symbols for holes, shaft, hole basis & shaft basis system, representation of tolerance in drawings
Driving plate and face plate
Fixed, travelling steadies, transfer caliper & its construction, uses
Lathe centre and types & their uses
Lathe carrier - Function, types of carrier and uses
Magnetic stand dial indicator its uses and care
Tool posts - Types and tool setting

Module 8 (marks 15)

Taper – different methods of expressing tapers, different standard tapers. Method of taper turning, important dimensions of taper. Taper turning by swiveling compound slide, its calculation.

Module 9 (marks 15)

Different types of screw thread- their forms and elements. Application of each type of thread. Drive train. Chain gear formula calculation. Different methods of forming threads. Calculation involved in finding core dia., gear train (simple gearing) calculation.

Module 10 (marks 15)

Introduction to CNC , CNC Technology basics ,Machine model, control system and specification ,Axis , convention of CNC machine , Importance of feedback system and Concept of co-ordinate geometry , Coordinate Geometry & Machine Axis , CNC Turning ,Preparation of part programming Operational modes , Types of offsets ,Tool path study of machining operation (Straight turning)

,Cutting parameters, cutting speed and feed, depth of cut,CSM, tool wear, tool life ,Tool setting and Data Input. Tool Geometry, Insert Type, Nomenclature of Inserts .Describe tooling system for turning .Setting work and tool offset .Describe tooling system for CNC Turning centres . Cutting tool material for CNC turning .ISO Nomenclature for Turning tool holder, boring tool holder, indexable . Tool holders and inserts for radial grooving, face grooving, threading and Programme and Simulation.

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.