

Turner

Theory Contents

Section-A

Safety and General precautions observed in the industry/shop floor and Training Centre.
Introduction of First Aid, Health & Safety. Response to emergencies e.g. Power failure, fire, and system failure.
Housekeeping as per 5 S Principles. Electrical Hazards & their avoidance. Types, Classification & Use of - Hammer, Prick Punch & Centre Punch, Scriber & Scribing block, Steel rule, Calipers, Vice, Types, Classification & Use of Chisel, Files, Try square, V block, Surface plate. Hacksaw & Hacksaw blades, Power Hacksaw. Vernier Caliper Parts, Principles, Least Count and Reading

Section-B

Lathe Types, Different parts & their Functions, Drivers, Head stock, 3-Jaw & 4-jaw chuck, Combination Set, Bevel Protractor and Vernier Bevel Protractor Uses and reading.
Lathe Cutting Tools- Material, Types, Shapes and different angles (clearances and rake), Digital vernier caliper.
Micrometer Types, Parts, Least Count and Reading. Error & how to avoid them.
Knurling- necessity, types, grade, cutting speed for knurling. Counter sinking and Counter boring. Reamers-types and uses.
Lathe accessories - Types, Construction and uses. Lathe mandrel- different types and their uses. Marking table-Construction and function. Angle plate- Construction and function.
Eccentricity checking. Concept of feed and recommended feed rate in drilling.
Calculation of spindle speed using formula. Inside micrometer Construction, Use etc.

Section-C

Coolant and Cutting Fluid properties of Ideal fluid, selection of coolant for different material.
Taper different methods of expressing tapers, different standard tapers.
Different methods of taper turning, important dimensions of taper and related calculation.
Head stocks with different drives and back gear arrangements.
Lathe centers-types and their uses. Lathe carrier-function, types & uses. Sine bar.
Slip Gauges- uses and selection. Checking of taper with sine bar and roller calculation involved.

Driving plate, Face plate, Fixed & Traveling steadies- construction and use. Templates-its function and construction. Methods of Eccentric turning.

Mechanism in lathe Half Nut Mechanism, Apron Mechanism, Nut & Gear box Mechanism Jig and fixture.

Chip breaker on tool-purpose and type. Effect of Centre height of tool on Tool angle, On job and on machine. Preventive maintenance and Preventive maintenance schedule.

Section-D

Screw thread-definition, purpose & its different elements. Fundamentals of thread cutting on lathe. Different types of screw thread- their forms and elements. Application of each type of thread.

Gear train, Chain gear formula calculation.

Different methods of forming threads, Calculation involved in finding core dia., gear train (simple gearing) calculation. Calculations involving driver-driven, lead screw pitch and thread to be cut. Thread chasing dial function, construction and use. Calculation involving pitch related to ISO profile. Conventional chart for different profiles, metric, B.A., Whitworth, pipe etc. Calculation involving gear ratios and gearing (Simple & compound gearing) Lubricant-function, types. Frequency of Lubrication. Methods of lubrication.

Practical Work

1. Demonstration to:
 - a. Safety equipments and their uses.
 - b. First Aid Box.
 - c. Personal Protective Equipments (PPEs).
 - d. Safety signs.
2.
 - a. Operation of Electrical mains.
 - b. Preventive measures for electrical Accidents & steps to be taken in such accidents.
 - c. Use of Fire extinguishers.
 - d. Disposal procedure of waste materials like cotton waste, metal chips/burrs etc.
3. Use of basic Hand tools e.g. Pliers, Spanners, hammers, etc. & Measuring tools e.g. Steel Rule, Calipers, etc.
4.
 - a. Wire bending exercises to the given shape and dimensions.
 - b. Marking out lines with Prick punch & Centre Punch.
 - c. Gripping in vice jaws.
 - d. Hack Sawing to given dimensions by Hand Deburring
5.
 - a. Use of Pedestal Grinder.
 - b. Use of scale and outside calipers for measurement.
6.
 - a. Use of Try square.
 - b. Hack Sawing to given dimensions by Power Hack saw.
7.
 - a. Marking Practice (Including on Round jobs).
 - b. Use of Scriber & Scribing block.
8. Lathe parts and functions, Lubrication points, Lever positions, Starting/Stopping and safety stoppers.
9.
 - a. Cleaning of Lathe.
 - b. Preventive maintenance of lathe- Demonstration of different Check points.
10. Dismounting & mounting of 3- jaw chuck, 4-jaw chuck.
11. Job holding and Truing of job in 3-jaw and 4-jaw chuck.
12. Truing & turning on 4-jaw chuck.
13. Measurement with Scale, Outside Caliper, Vernier Caliper
14.
 - a. Parallel Turning.
 - b. Step Turning.
 - c. Under Cutting, Grooving and Parting off.
 - d. Step Turning practice within +/- 0.5 mm with SQ. shoulder.
15. Knurling practice in lathe (Diamond, straight, helical & square).
16.
 - a. Drilling on Lathe-step drilling, Reaming

- b. Drill grinding practice.
- 17. a. Boring practice-Plain & step, internal recessing.
- b. Boring and stepped boring (within +/- 0.05 mm).
- c. Reaming in lathe using solid and adjustable reamer.
- d. Measurement with scale and inside caliper.
- e. Measurement with inside micrometer
- 18. a. External and Internal taper turning by compound slide Swiveling method
- b. External and Internal taper turning by taper turning attachment.
- 19. a. Checking of angles with angle gauge / bevel protractor.
- b. Checking alignment of lathe centers.
- c. Mounting job in between centers.
- 20. a. Turning practice-between centers on mandrel (Gear blanks).
- b. Testing of accuracy of alignment.
- c. Procedure of checking accuracy of lathe.
- 21. Taper turning by swiveling tail stock method.
- 22. Use of sine bar & slip gauges.
- 23. a. Morse taper- different number.
- b. Use ring gauge / suitable MT sleeve.
- 24. a. Internal taper turning by taper turning attachment /cross slide.
- b. Taper matching exercise (application of Prussian blue, Plug gauge).
- 25. a. Use of Faceplate, Driving Plate.
- b. Eccentric marking practice.
- c. Eccentric turning.
- 26. a. Use of Vernier height Gauge and V-block.
- b. Practice square block turning using 4-jaw chuck.
- 27. a. Turning and boring practice on CI and cast steel.
- b. Soft jaw boring.
- c. Trepanning operation.
- 28. a. Screw thread cutting (B.S.W) external R/H & L/H, threading tool Grinding, Checking of thread by using thread gauge.
- b. Screw thread cutting (B.S.W) internal R/H & L/H, checking of thread by using thread gauge
- c. Fitting of male & female threaded components (BSW)
- 29. Turning at high speed using tungsten carbide tools including throw-away tips.