LAB MANUAL FOR THE MACHINE SHOP

B.Tech (Mechanical and Automation)

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MACHINE SHOP

LIST OF EXPERIMENT

1. To study and draw the Layout of Machine shop.
2. To Study construction and working of Lathe Machine(Capstan or Turret Lathe).
3. To perform Lathe operation on a Lathe Machine(Capstan or Turret Lathe).
4. To study construction and working of shaper Machine
5. To perform shaping operation on a Shaper Machine.
6. To study construction and working of Drilling Machine.
7. To perform drilling operation on a Drilling Machine.
8. To study construction and working of Milling Machine.
9. To study construction and working of Grinding Machine.

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MACHINE SHOP

Safety Rules

1. Always wear uniform in the workshop. Never wear loose clothes.
2. Never walk bare footed inside the workshop, use of rubber sole closed shoe is recommended.
3. Never operate any machine unless you do not know how to operate it.
4. Never touch moving parts , belts or rotating tools etc.
5. Defective equipments and tools should not be used for any work.
6. Never touch any switch, knob or lever of the machine without knowing it.
7. Silky clothes catch fire soon, never come to the workshop wearing such clothes.
8. Do not touch any live wire inside the workshop.
9. In case of any fire, the electric supply should be disconnected.
10. Always keep in mind about the position of fire Extinguisher and first aid box.
11. Always read the first aid charts carefully while beginning in the workshop.
12. Make sure that your work is not affecting anybody in the workshop.
13. Always try to learn sincerely from the instructors.
14. Always keep your mind on the job.

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MACHINE SHOP

Experiment No. 1

Aim:- . To study and draw the Layout of Machine shop

Material:- Measuring tape

Procedure:- 1.Draw the top view of the machine shop.

2.Locate all the machines on the shop floor and draw the layout of the machines.

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MACHINE SHOP

Experiment No. 2

AIM: - To study construction and working of a lathe machine.

APPARATUS:- Lathe machine

THEORY : - About Lathe machine.
Types of lathe machine
Feed mechanism of lathe machine
Size and specifications of lathe machine
Parts of lathe machine with sketch
Lathe machine accessories with sketch
Operation of lathe machine

PRECAUTIONS:- 1. Before lathe machine switching on , see that the tail stock, tool holder are properly clamped.

2. Use hand power only when putting on or removing chuck or face plate.

3. Do not try to measure work or feed the edge or adjust a cutting tool when lathe Is running.

4. Chuck key should be removed from the chuck after tightening. Never allow the Chuck key to rest in the chuck.

5. Do not shift or change gears while lathe is running.

6. Choose or adjust proper depth of cut.

7. Use brush to clean the chips.

8. While working on a lathe, use goggles.

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MACHINE SHOP

Experiment No. 3

Aim:- To perform Lathe operation on a Lathe machine.

Material:- Mild steel rod.

Tools Required :- Turning tool, Vernier Caliper, Parting tool ,Knurling tool, Drilling chuck, Drill bit.

Procedure:-

1.Hold the work piece in the chuck, face this end. Centering is done with the help of centre drill.

2. Turn to reduce diameter as per the given specification of the job.

3. Make groove of required size with the help of parting tool.

4. After grooving drill a hole of the given diameter and length.

5. Knurl the work piece for a given length .

6. Finish the job with the help of fine emery paper.

7. Check up the accuracy of the job with the help of Vernier Caliper, outside micrometer.

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MACHINE SHOP

Experiment No. 4

AIM:- To study construction and working of a Shaper machine.

APPARATUS:- Shaper machine.

THEORY :- About Shaper machine

Type of Shaper machine

Feed mechanism of Shaper machine

Size and specifications of Shaper machine

Parts of Shaper machine with sketch

Shaper machine accessories with sketch

Operation of Shaper machine

PRECAUTIONS:-

1. Be sure, ram, tool head, tool, work, table support, clamping screws and vice are properly secured in position and that the tool head and tool clear the work before starting the Shaper.
2. Always maintain the parallel clean.
3. Place a metal shield over the tool to catch the chips.
4. After setting the stroke length and position, see that the adjusting nuts are tight.
5. After select a proper tool, proper tool material, proper tool angles, proper speed and feed.
6. Check up all the controls of the machine before starting the operation.
7. Remove all the tools from the table after use.
8. Use brush to clean the chips.
9. Never hammer a piece, having rough surface, against the parallel.
10. Never remove chips while ram is in motion.

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MACHINE SHOP

Experiment No. 5

AIM:- To study construction and working of a drilling machine.

APPARATUS:- Drilling machine.

THEORY :- About drilling machine

Type of drilling machine

Feed mechanism of drilling machine

Size and specifications of drilling machine

Parts of drilling machine with sketch

Drilling machine accessories with sketch

Operation of Drilling machine

PRECAUTIONS:-Always use a correct size drill.

1. Select a proper drill material to suit the hardness of the work material.
2. Ensure that the work piece is properly supported and clamped before starting the operation.
3. Always stop the machine before engaging the power feed on a geared head machine.
4. Ensure that the chips continue to flow out of the drilled hole in order to avoid drill clogging.
5. Use correct speed, correct feed and sufficient coolant to prevent excessive heating.
6. Keep your fingers away from the drill.
7. While fitting the shank of a taper shank drill in a sleeve or a socket always tap the end of a sleeve or socket with a soft face hammer or against a wooden surface.
8. Use correct drill geometry.
9. Do not wear loose clothing.
10. Always use protective eye shields.

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MACHINE SHOP

Experiment No. 6

AIM:- To study construction and working of a milling machine.

APPARATUS:- Milling machine.

THEORY :- About milling machine

Type of milling machine

Feed mechanism of milling machine

Size and specifications of milling machine

Parts of milling machine with sketch

Milling machine accessories with sketch

Operation of milling machine

PRECAUTIONS:-

1. Make sure that the cutter and arbor are secure.
2. See that the cutter and arbor support clear the work.
3. Use cutter that are correctly ground and in good conditions.
4. Do not try to tighten to take off arbor nut by applying power to machine.
5. To avoid striking hands on cutters while setting up, move table with work as for away from cutter as possible.
6. When using cutters in vertical milling machine, do not take an excessively heavy cut or feed.
7. Check speed and feeds. These should be proper.
8. Keep hands away from the work while machining.
9. Never reach over a revolving cutter.
10. Do not strike over the milling cutter.
11. Use wire brush/nylon brush to remove the chips.
12. Use of coolants prolongs cutter life and produces smooth surface finish.

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MACHINE SHOP

Experiment No. 7

AIM:- To study construction and working of a Grinding machine.

APPARATUS:- Grinding machine.

THEORY :- About Grinding machine

Type of Grinding machine

Size and specifications of Grinding machine

Parts of Grinding machine with sketch

Selection of Grinding wheel

Operation of Grinding machine

PPRECAUTIONS

1. Clean the machine , fixture or device. Align the job and check its trueness with the wheel.
2. Select wheel according to the job and mount it properly on the machine spindle.
3. See the wheel guards are in positions and the wheel is moving freely in between them.
4. True the wheel and mount the job on the machine.
5. On a universal grinder, set the table parallel for straight work swivel the table, head stock and wheel as may be required for tapered or conical work.
6. Set the table with its stops to have the fixed longitudinal feed.
7. Proceed with rough grinding and check the accuracy of the work.
8. Change the wheel and feed for finishing.
9. When commencing the work the wheel is brought slowly in to contact with the work or the work is moved slowly against the wheel.
10. When the machine is first started, it should be allowed to run free for a couple of minutes.

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MACHINE SHOP

Experiment No. 8

Aim:- To perform Shaping operation on a Shaper machine.

Material:- Mild steel rod.

Tools Required :-Shaper tool, Vernier Caliper.

Procedure:-

1. Marking the work piece.
2. Hold the workpiece in the vice.
3. Adjust the stroke of the ram as per the given drawing.
4. Adjust the speed of the ram as per the required operation in the job.
5. Give feed to the job by the tool and move the table horizontally .
6. Check up the accuracy of the job with the help of Vernier Caliper.

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MACHINE SHOP

Experiment No. 9

Aim:- To perform drilling operation on a Drilling machine.

Material:- Mild steel

Tools Required :Drilling tool, Vernier Caliper.

Procedure:-

1. Marking the work piece.
2. Hold the workpiece in the vice.
3. Adjust the speed as per the given drawing.
4. Give feed to the job by the drilling bit.
5. Check up the accuracy of the job with the help of Vernier Caliper, Depth gauge.