INTRODUCTION:

Carpentry may be defined as the process of making wooden components. It starts from a marketable form of wood and ends with a finished product. It deals with the building work, furniture, cabinet marking, etc., joinery, i.e., preparation of joints are one of the important operations in all wood-works. It deals with the specific work of a carpenter like making different types of joints to form a finished product.

Carpentry tools:
The following are the tools that are made use of in all the wood working operations.

1. Marking and Measuring Tools
Accurate marking and measurement is very essential in carpentry work, to produce parts to exact size. To transfer dimensions on to the work; the following are the marking and measurement tools that are required in carpentry shop.

1.1. Steel Rule
It is an important tool for linear measurement. It can also be used as a marking tool (Fig. 1.1).

1.3. Marking Gauge
It is a tool used to mark lines parallel to the edge of a wooden piece. It consists of a square wooden stem with a sliding wooden stop (head) on it. On the stem is fitted a marking pin, made of steel. The stock is set at any desired distance from the marking point and fixed in position by a screw. It must be ensured that the marking pin projects through the stem, about 3mm and the end is sharp enough to make a very fine line (Fig. 1.3a). A mortise Gauge (Fig. 1.3b) consist of two pins. In this it is possible to adjust the distance between the pins, to draw two parallel lines on the stock.
1.4. Try square

It is used for marking and testing the squareness and straightness of planed surfaces. It consists of a steel blade, fitted in a cast iron stock. It is also used for checking the planed surfaces for flatness (Fig. 1.4). Its size varies from 150 to 300 mm, according to the length of the blade. It is less accurate when compared to the try square used in the fitting shop.

Fig. 1.4 Try square

1.5. Compass and Divider

Compass and divider, as shown in Fig. 1.5, are used for marking arcs and circles on the planed surfaces of the wood.

Fig. 1.5 Compass and divider

1.6. Scriber or marking knife

It is used for marking on timber (Fig. 1.6). It is made of steel, having one end pointed and the other end formatted into a sharp cutting edge.
2. Holding Tools

These are the tools used to hold the work piece on operations to be done.

2.1. Carpenter Vice

Figure 1.8 shows the carpenters Bench Vice, used as a work holding device in a carpenter shop. Its one jaw is fixed to the side of the table while the other jaw is movable by means of a screw and a handle. The jaws are lined with hard wooden faces.

2.2. C-Clamp

Figure 1.8a shows C-clamp, it is used for holding small works.

2.3. Bar cramp

Figure 1.9 shows a Bar cramp. It is made of steel bar of T-section, with malleable iron fittings and a steel screw. It is used for holding wide works such as frames or tops.

3. Planning Tools

Planning is the operation used to produce flat surfaces on wood. A plane is hand tool used for the purpose. The cutting blade used in a plane is very similar to chisel. The Blade of a plane is fitted in wooden or metallic block, at an angle.
3.1. Jack plane
It is the most commonly used general purpose plane, it is above 35cm long. The cutting iron (blade) should have a cutting edge of slight curvature. It is used for quick removal of material on rough work and is also used in oblique planning.

3.2. Smoothing plane
It is used for finishing work and hence, the blade should have a straight cutting edge. It is about 20 to 25cm long. Being short, it can follow even though slight depression in the stock, better than the jack plane. It is used after using the jack plane.

3.3. Rebate plane
It is used for making a rebate. A rebate is a recess along the edge of a piece of wood, which is generally used for positioning glass in frames and doors.

3.4. Plough plane
It is used to cut grooves, which are used to fix panels in a door. Figure 1.10 shows the various types of planes mentioned above.

![Figure 1.10 Types of planes](image)

4. Cutting Tools

4.1. Saws
A saw is used to cut wood into pieces. There are different types of saws, designed to suit different purposes. A saw is specified by the length of its toothed edge.

4.2. Cross-cut / Hand saw
It is used to cut across the grains of the stock. The teeth are so set that the saw kerfs will be wider than the blade thickness (Figs.1.11a and b). This allows the blade to move freely in the cut without sticking.

4.3. Rip saw
It is used for cutting the stock along the grains. The cutting edge of the saw makes a steeper angle, i.e., about 60° (Fig.1.11c), where as that of cross cut saw makes an angle of 45° with the surface of stock.
4.4. Tenon saw

It is used for cutting the stock either along or across the grains. It is used for cutting tenons and in fine cabinet work. However, it is used for small and thin cuts. The blade of the saw is very thin and so it is stiffen with a thick back steel strick hence this is some times called as back-saw (Fig.1.12). In this, the teeth are shaped like those of cross-cut saw.

4.5. Compass saw

It has a narrow, longer and stronger tapering blade, which is used for heavy works (Fig.1.13). It is mostly used in radius cutting. The blade of the saw is fitted with an open type wooden handle.

4.6. Chisels: Chisels are used for cutting and shaping wood accurately. Wood chisels are made in various blade widths, ranging from 3 to 50mm. They are also made into tang type, having a steel shank which fits inside the handle (fig.1.14). These are made of forged steel or tool steel blades.
4.7. **Firmer Chisel**: The word ‘firmer’ means ‘stronger’ and hence firmer chisel is stronger than other chisels. It is a general purpose chisel and is used either by hand pressure or by a mallet. The blade of a firmer chisel is flat, as shown in fig.1.15a.

4.8. **Dovetail Chisel**: It has a blade with a beveled back, as shown in fig.1.15b, due to which it can enter sharp corners for finishing, as in dovetail joints.

4.9: **Mortise Chisel**: It is used for cutting mortises and chipping inside holes, etc. The cross-section of the mortise chisel is proportioned to withstand heavy blows during mortising (fig.1.15c). Further, the cross-section is made stronger near the shank.

5. **Drilling and Boring Tools:**
5.1. Carpenter’s Brace:

It is used for rotating auger bits, twist drills, etc., to produce holes in wood (Fig.1.16). In some designs, braces are made with ratchet device. With this, holes may be made in a corner where complete revolution of the handle cannot be made. The size of a brace is determined by its sweep.

5.2. Auger Bit:

It is the most common tool used for making holes in wood. During drilling, the lead screw of the bit guides into the wood, necessitating only moderate pressure on the brace. The helical flutes on the surface carry the chips to the outer surface (Fig.1.17).

5.3. Hand Drill:

Carpenter’s brace is used to make relatively large size holes; whereas hand drill is used for drilling small holes. A straight shank drill is used with this tool. It is small, light in weight and may be conveniently used than the brace. The drill bit is clamped in the chuck at its end (Fig.1.8) and is rotated by a handle attached to gear and pinion arrangement.

5.4. Gimlet: it has cutting edges like a twisted drill (Fig.1.19). It is used for drilling large diameter holes with the hand pressure.
6. Miscellaneous Tools:

6.1. Mallet: It is used to drive the chisel, when considerable force is to be applied, which may be the case in making deep rough cuts (Fig.1.20). Steel hammer should not be used for the purpose, as it may damage the chisel handle. Further, for better control, it is better to apply a series of light taps with the mallet rather than a heavy single blow.

![Mallet](image1)

Fig. 1.20 Mallet

6.2. Pincer: Figure 1.21 shows the shape of a pincer. It is made of two forged steel arms with a hinged joint and is used for pulling-out small nails from wood. The inner faces of the pincer jaws are beveled and the outer faces are plain. The end of one arm has a ball and the other has a claw. The beveled jaws and the claw are used for pulling out small nails, pins and screws from the wood.

![Pincer](image2)

Fig. 1.21 Pincer

6.3. Claw Hammer: It has a striking flat face at one end and the claw at the other, as shown in Fig.1.22. The face is used to drive nails into wood and for other striking purposes and the claw for extracting relatively large nails out of it wood. It is made of cast steel and weighs from 0.25 kg to 0.75kg.

![Claw hammer](image3)

Fig. 1.22 Claw hammer

6.4. Screw Driver: It is used for driving wood screws into wood or unscrewing them. The screw driver of a carpenter is different from the other common types, as shown in Fig.1.23.

The length of a screw driver is determined by the length of the blade. As the length of the blade increases, the width and thickness of the tip also increase.

![Screw driver](image4)

Fig. 1.23 Screw driver
6.5. **Wood Rasp File:** It is a finishing tool used to make the wood surface smooth; remove sharp edges, finish fillets and other interior surfaces (Fig.1.24). Sharp cutting teeth are provided on its surface for the purpose. This file is exclusively used in wood work.

![Wood rasp file](image1)

![Bradawl](image2)

6.6. **Bradawl:** It is a hand operated tool, used to bore small holes for starting a screw or large nail (Fig.1.25).

**Safe Practices:**

**General:**

1. Tools that are not being used should always be kept at their proper places.
2. Make sure that your hands are not in front of sharp edged tools while you are using them.
3. Use only sharp tools. A dull tool requires excessive pressure, causing the tool to slip.
4. Wooden pieces with nails should never be allowed to remain on the floor.

**Saws**

1. Be Careful when your using your thumb as a guide in cross cutting and ripping.

**Chisels**

1. Test the sharpness of the cutting edge on wood or paper, but not on your hand.
2. Never chisel towards any part of the body.

**Screw Driver**

1. Select the longest screw Driver i.e. appropriate for the job intended. The longer the tool, the greater the effort applied.
2. The tip of the Screw Driver must fit the slot without wobbling. The width of the tip should be equal to the length of the screw slot.
3. Keep the screw Driver properly pointed to prevent injury to hands.