

Experiment - 03 (A)

Aim:- Study the carpentry shop and its tools.

Introduction :- The useful work on wood is being generally carried out in a most common shop known as carpentry shop. The work performed in carpentry shops comprises of cutting, shaping and fastening wood and other materials together to produce the products of woods. Therefore, carpentry shop deals with the timber, various types of tools and the art of joinery. The Carpentry curriculum is designed to train students to construct residential structural using standard building material and hand and power tools.

Classification:- There is a fairly large number of hand tools used in woodworking. A broad classification of these tools, according to their use, is given below:-

Marking & measuring of these tools.

Holding & supporting tools.

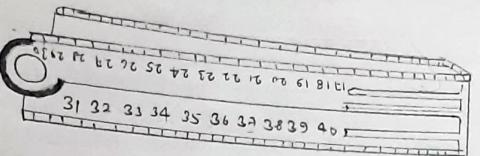
Cutting tools.

Planning tools (Paring)

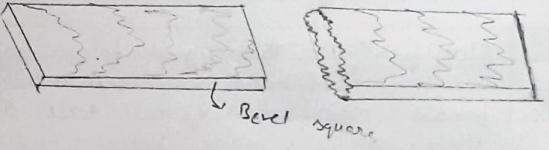
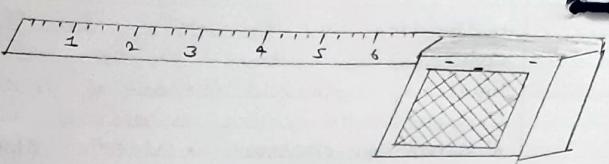
Boring tools

Striking tools.

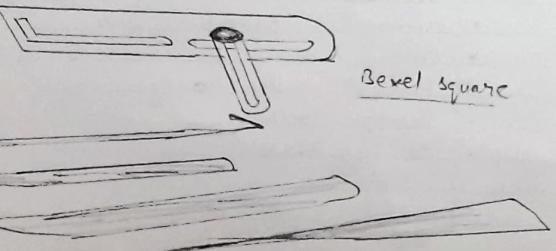
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Folding rule



Bevel square



Bevel square

Miscellaneous tools :-

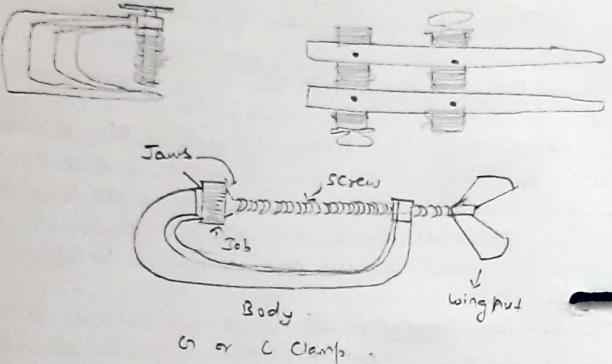
* Marking and Measuring Tools The common operations performed by these tools include marking, measuring, setting out angles & parallel lines and testing. The tools included in this group are described below:-

(1) Try Square :- It is for measuring and setting out dimension, testing the finish if a plane surface, draw parallel lines at right angles to a plane surface draw mutually perpendicular lines over a plan surface & test the squareness of two adjacent surfaces.

(2) Bevel square :- It is used for setting, duplicating, testing and bevel. It consists of a wooden or metallic stock fitted with a slotted blade. A common type of level of bevel square is shown in fig

(3) Scriber or marking knife :- It is a steel rod having a sharp point at end and a flat flat blade at the other, as shown in fig. It is mainly used for locating & marking points and scribing lines on wood surface.

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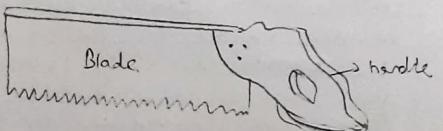
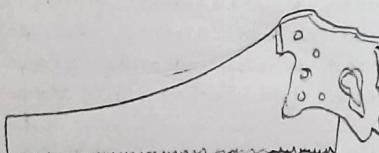
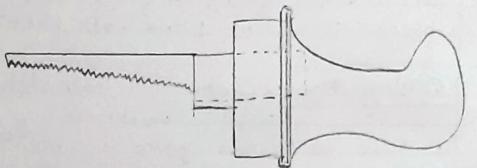
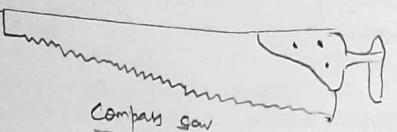
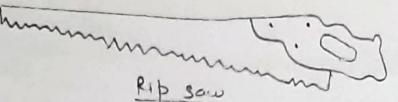


(4) Clamps and screws:— Various types of clamps & screws are used by carpenters for holding supporting wood pieces in positions for carrying out different operations. Two common types, a "C" clamp & hand screw is shown in figure. Another type of clamp in common use is a column clamp, consisting of chain & a screw having right hand threads on one end & left hand threads on the other. It is very useful when gluing together different wood in pieces to form polygonal shapes.

Cutting tools:— There are three types of cutting tools used in wood work.

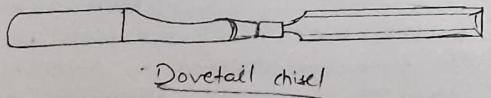
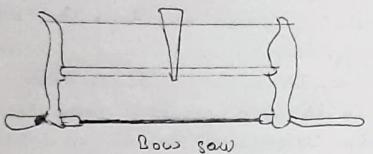
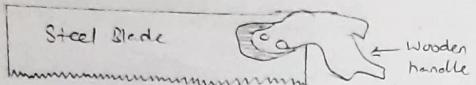
- (1) Those which are given a reciprocating motion by hand to carry teeth for cutting the wood—saws
- (2) Those which are driven into the wood by the application of the blows—chisel.
- (3) Those which are given a swinging action by one hand or both hands to one struck against the wood for cutting the same adze & axe.

(1) Saws:— The entire source used in wood work essentially consists of two main parts—the blade, which carries teeth to the other, a wooden handle for holding the same during the operation to apply pressure. This saw cut the wood to desire to shape & size either by pushing forward or by pulling backward.



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- (2) Rip saw:- Its size is determined by its length, which is about 70cm. The blade is about 12-20cm wide near the handle & about 6-10cm near the tips. It cuts the wood near the grain.
- (3) Panel saw:- It is the most commonly used hand saw. It is used for the many size of style but the commonly length is 50 cm & carries 5-8 teeth per cm of blade.
- (4) Compass saw:- It carries varies from 25-40 cm width from 2.5cm at tip to 5cm near handle. The blade is quite flexible & thus it can be used easily for taking straight or curved cuts on outside or inside of wood.
- (5) key hole saw:- It has a 20-30 long blade which is about 6mm wide near the handle & 2mm wide at the tip. A wooden or metallic handle is fitted to this blade.
- (6) Cross cut saw:- It is primarily designed of cutting across the grain of wood but it is used as a general purpose saw in woodwork. Its blade is 50-70 cm long & carries 3-7 points per cm length.
- (7) Tendon saw or back saw:- It has a parallel blade 25-40 cm long & 6-10cm wide having 5-8 points per cm length. Its teeth are designed as those of a cross cut saw. It is used of finer work than the rip saw.

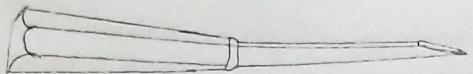


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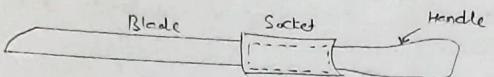
- (8) Dove tail saw:- It is similar to tenon saw except that its blade is thinner & narrower than that of the latter so it carries no reinforcement to its back.
- (9) Bow saw:- It consists of a frame made of wood carrying a connecting bar a string is run between two handles on either side as shown in figure. The blade as shown is fastened at the lower end of the frame & the tension to the same is provided by twisting the string by means of the lever which is then made to rest against the bar to prevent unwinding of the string.
- (10) Chisels:- A fairly large no. of chisels is used in woodwork for cutting in different manners to produce designed shapes & cavities. They essentially consist of following parts:-
1. A wooden handle
 2. Ferrule
 - A) Blade / body
 - B) Tang
 - C) Tongue
 - D) Cutting edge.

* Types of chisels:- The common types of chisel used in carpentry work are the following:

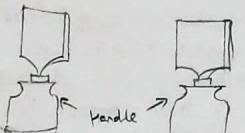
- (1) Dovetail chisel:- It has a long carbon steel blade with a bevelled back as shown. The bevelled shape enables reduction of blade thickness on the side due to which it can enter sharp corner to finish them.



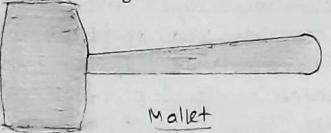
Mortise chisel



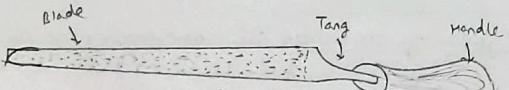
Socket chisel



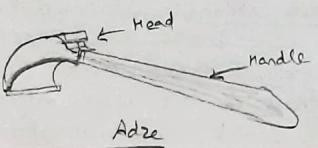
Gauge chisel



Mallet



Rasp

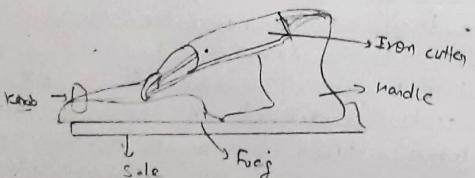
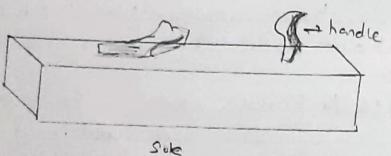
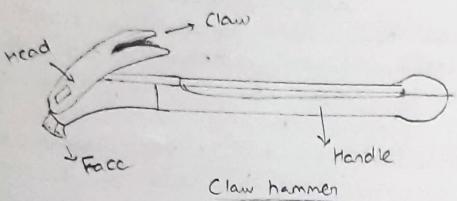


Adze

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- (2) Mortise chisel: - It is used for taking heavy & deep cut resulting in more stock removal as in case of making mortise. It is available in various assorted size, the maximum width of blade in commonly used chisel being up to 15mm.
- (3) Socket chisel: - When a very heavy stock removed is to be done by the chisel it is found to result in splitting of the wooden handle due to heavy blows on its top.
- (4) Gauge chisel: - It carries a hollow curved blade for finishing curved surfaces.
- (5) Mallet: - It is used to strike the chisels, which have wooden handles. It is made up of a hard wood & is round & rectangular in shape.
- (6) Files & Raips: - Files & Raips are shown in Fig. They are used for maintaining other wood working tools & equipment. They are made of hardened tool steel which is tempered so they should never be dropped as they are very brittle to break. They are of various types depending upon their size, shapes, cuts & degree of their coarseness.
- (7) Adze: - Used for rough cutting, squaring, to chop intide curves & to produce concave surface. Its outer face is convex, inner face concave to edge is beveled to form a cutting edge made of carbon steel.

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Pew Hammer: - The pew hammer is used for striking nails where the use of the face is impracticable. The pew hammer is very light & is used for driving the panel pins & fine nails.

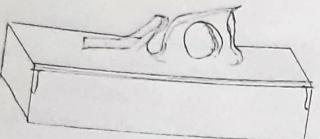
Claw hammers:- The claw hammer is shown in fig.

One of its ends possesses curved claws which is used for extracting nails in order to provide the extra strength needed for this levering action. The other end is used for light striking work. A strong handle on claw hammer is always necessary for carrying out the task.

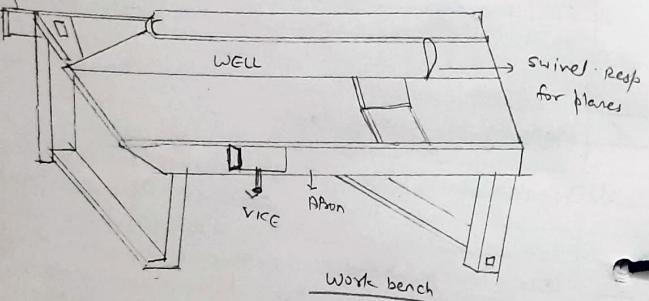
Planning or planing tools-

(1) Wooden Jack plane:- It is the most commonly used plane in carpentry. Its main part as shown in figure include a wooden body or stock & a wooden handle for holding the plane during the operation. The bottom face of the stock, called sole is made perfectly smooth & level. The main cutting part known as blade or iron cutter is fitted in the stock such that it remains inclined at an angle of 45° with the sole.

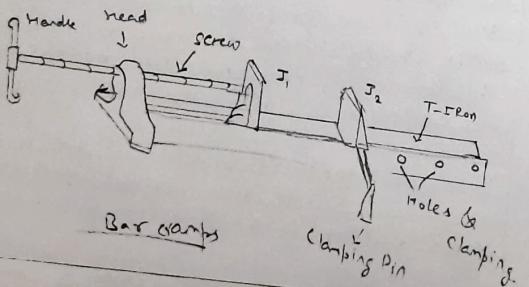
(2) Iron jackplane:- It is also used for the same purpose as a wooden jack plane, but it gives a better finish than the latter. Its whole



Try square



Work bench



Bar clamp

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body is made up of cast iron, provided with the wooden handle at the back & a wooden knob at the front from handling holding it by both hands both these wooden parts are fastened to the body of the plane by means of long screw passing through them. They are also available in different sizes.

(3) Try square :- It is nothing but a longer wooden Jack plane. The length of these stocks varies from 50-75 cm the cross section is equal of Jack Plane body. The iron cutter used in this plane is about 6 cm in width.

Holding & supporting tools:-

(1) Work bench :- It is a heavy table of rigid construction made of hard wood about 150-180 cm in length & nearly 90-100 cm in width. Two or four carpenter's vices are fitted on opposite sides to hold the jobs during the operations. One jaw of the vice is secured to the table & other is kept movable. Inside opposite faces of the jaws are fitted with wooden liners so as to prevent damaging of the provided in the table, below the top, to utilize the space for storing tools, instrument or prepared jobs.

(2) Bar Clamp :- It essentially consists of a T-iron body, which carries holes at regular

Intervals as shown in figure. One end of the iron is forged to form a head, which carries screw inside. On the outer end of the screw is provided a handle, whereas the other end is attached to jaw J1 another Jaw J2 is mounted on the body & can be adjusted anywhere on a whole along its length. The specific use of this tool ~~symbol~~ is in holding the glued piece tightly or holding the glued piece tightly or holding or firmly two or more unglued piece for fitting dowels or doing other operations on them in assembled position.

Viva Question

Q.1 Define supporting & holding tools are used in carpentry shop.

Ans In Supporting tools -

1. Sawhorses - Sturdy frames used to support wood while cutting.

2. Work bench - A strong table where wood working task are performed.

3. Bench Hook - Helps hold wood steady while cutting with a hand saw.

4. Miter Box - A guide for making precise angled cuts with a saw.

In Holding Tools -

1. Clamp - C-clamp used to hold workpiece tightly to a work bench.

Ban-clamp - Hold large wooden pieces together for gluing.

Spring clamp - light weight and quick release clamp for small jobs.

- (2) Bench vice - A fixed tool attached to the workbench to hold wood securely.
- (3) Wooden Mallet - Used to tap wood joints without damaging them.
- (4) Hand screws - Adjustable wooden clamps for holding irregularly shaped objects.

Q = 2

Ans Common planning tools -

- (1) Hand Plane - A manual tool with a sharp blade used for shaving thin layers of wood to smooth or reduce thickness.
 - Jack plane - A general purpose plane for rough shaping & leveling.
 - Smoothing plane - Used for fine finishing & smoothing wooden surface.
 - Block plane - A small plane used for trimming & finishing edge.
 - Rabbet plane - Designed for cutting rabbets (grooves) in wood.
- (2) Chisel:- Sharp-edged tools used for shaping wood & refining surface, especially in detailed work.
- (3) Spokeshave:- A tool with a blade used for shaping curved surface, such as chair legs & handles.

- (4) Scraper: - A thin metal blade used to remove fine shavings to create a smooth surface
- (5) Jointer - A machine used for straightening & flattening edges before joining boards together.
- (6) Thickness Planer: A machine that ensures uniform thickness across a wooden board by shaving off layers.

Q=3

Explain types of hammer used in carpentry shop?

Ans Common hammers used in carpentry -

- (i) Claw hammer - Standard hammer with a flat face for driving nails to a claw for removing them.
- (ii) Framing hammer - Heavier than a claw hammer, used for framing & heavy-duty work.
- (iii) Ball peen Hammer - Has a rounded end, mainly used for shaping metal but sometime in carpentry.
- (iv) Mallet - Wooden mallet or plastic head used for tapping joints, without damaging wood.
- (v) Dead Blow hammer - Reduces rebound useful for assembling wooden parts.
- (vi) Sledgehammer - Large, heavy hammer for breaking wood or demolition work.
- (vii) Cross peen Hammer - Has a wedge-shaped end, good for starting nails.

Q4
Ans

Explain the types of cutting tools in carpentry?

Cutting tools in carpentry -

- (i) Hand saws:- Includes crosscut saw (cuts across grain), rip saw (cuts along grain), coping saw (curved cuts), and back saw (precise cuts).
- (ii) Chisels:- Used for carving & shaping wood, such as bevel edge chisel (fine work) & mortise chisel (deep cuts).
- (iii) Planes :- Include jack plane (smoothing rough wood), block plane (trimming edges), and rabbet plane (cutting grooves).
- (iv) Files and Rasps:- Rasps (coarse shaping cuts) & files (fine smoothing).
- (v) Power Saws:- Circular saw, table saw, band saw, miter saw, etc.

Q5 Explain types of measuring tools in carpentry?

Ans Measuring tools -

- (i) Tape measure - Flexible, retractable ruler for general measurements.
- (ii) Steel rule - Rigid ruler for precise straight line measurement.
- (iii) Folding Rule:- A foldable measuring stick for longer distance
- (iv) Combination square: Measure 90° & 45° angle, depth, straight lines.

- (iv) Bench gauge :- (Sliding T Bench) A tool with an adjustable blade used to transfer angles.
- (v) Vernier caliper A more advanced caliper that provides precise reading.
- (vi) Depth gauge - Measure depth of holes, grooves & recesses.
- (vii) Protractor - Measure angles accurately usually from 0° to 180° .