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JODHPUR

Date.....Experiment No.....P. No.....

Name AKASH PARMAR Faculty No..... Class B.E Ist Batch A2

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INTRODUCTION

Carpentry and Joinery are common terms used with any class or work with wood strictly speaking. Carpentry deals with all works of a Carpentry such as roofs, floors, partitions etc. of a building while joinery deals with the making of doors, windows, cupboards, dressers, stairs, and all the interior fittings for a building.

Timber is the basic material used for any class of wood working. The term 'timber' is applied to the trees which provide us with wood. Wood is one of the most valuable biodegradable raw material of industry and daily uses.

Timber:- Wood obtained from exogenous tree by cutting these trees after their full growth and made suitable for engineering or building purposes by sawing and converting into various suitable commercial sizes.

The timber is the material used for Carpentry and joinery work.



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SAFETY RULES & PRECAUTIONS

- (i) Safety first, work next.
- (ii) Know your job and follow instructions.
- (iii) Avoid wearing clothes that might catch, moving or rotating parts, long sleeves of shirt, long hair, neck tie and jewellery are definite hazards in the shop.
- (iv) Wear Safety shoes. Do not wear Canvas shoes; they give no resistance to hard objects dropped on the feet.
- (v) Keep the area around machine or work clear.
- (vi) Keep away from revolving work.
- (vii) Be sure that all guards are in place.
- (viii) One person only should operate the machine Controls.
- (ix) Use tools correctly and do not use them if they are not in proper working conditions.
- (x) Wear Safety goggles when working in areas, where sparks or chips of metal are flying.
- (xi) Get to know who in charge of first aid is available where boxes are placed and where the first aid can be found in case of emergency.



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Advantages of Timber:—

- (1) It is very easy to be worked with tools to give it desired shape and size.
- (2) Structural Connections and joints Can be easily made.
- (3) it is lighter in weight.
- (4) In framed structure, it suites equally well both load bearing and non load bearing members.
- (5) In timber work, cost of material as well as Construction both are minimized as compared to the other materials of similar use.
- (6) it responds very well to polishing.
- (7) it suites very favorably to doors, windows, cabinet work furniture an decorative designs and fittings.
- (8) it is quit Suitable for making sound proof Construction
- (9) it, being non conductor of heat, is favoured for the Construction of houses; Such houses will remain warm in winter and Cool in Summer.
- (10) it provides Combination of strength, durability, lightness and economy as compared to other materials of Construction.



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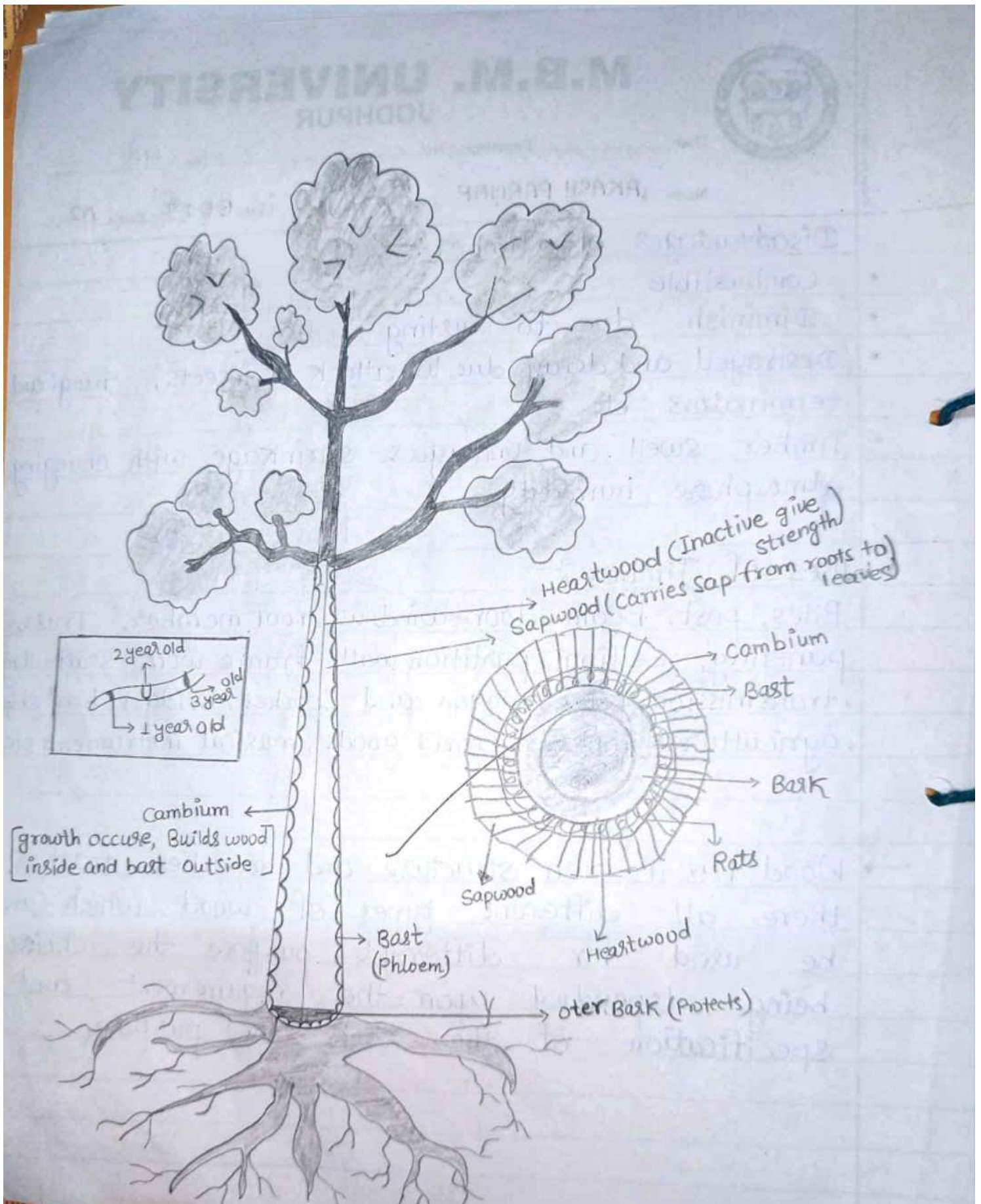
Disadvantages of Timber :-

- Combustible
- Diminish due to rusting
- Destroyed and decay due to attack of insects, fungi and terminators etc.
- Timber swell and undergoes shrinkage with changing atmosphere humidity.

Uses of Timber :-

Piles, post, beam, door, windows, roof member, Truss, paneling, Ceiling, partition wall, frame work, Scaffolding, transmission poles, wagon and Coaches, bridges, boat, ships, agricultural implants, sports goods, musical instruments etc.

→ Wood has its own structure and properties. Further, there are all different types of wood which can be used for different purposes. The choice being depended upon the requirement and specification of the task or purpose.





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WOOD TECHNOLOGY. I

How a tree grows :-

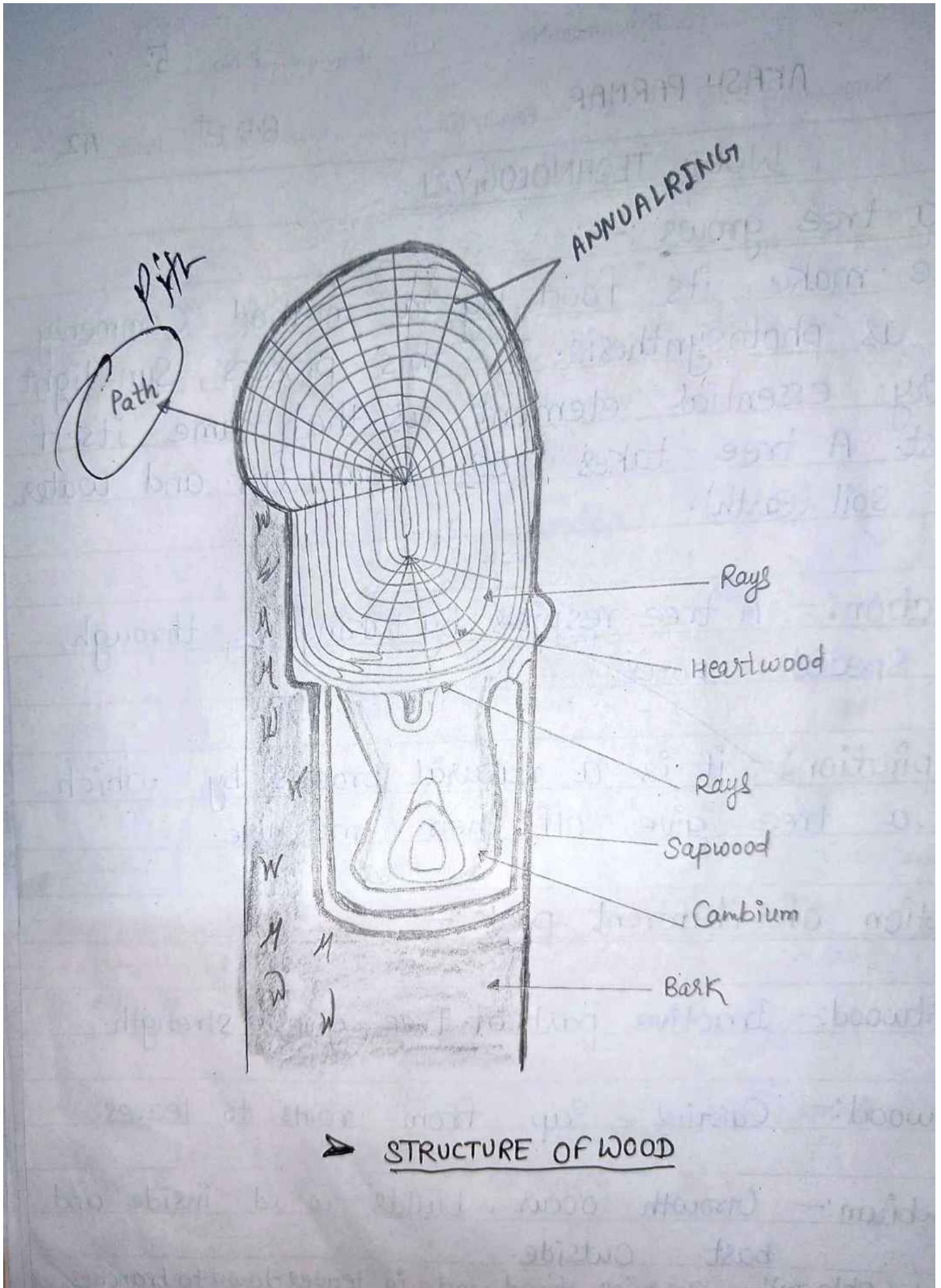
A tree make its food by a method Commonly known as photosynthesis. In this process, Sun-light is very essential element as the name itself suggest. A tree takes CO_2 from air and water from soil (earth).

Respiration:- A tree respire by taking O_2 through special pores.

Transpiration:- it is a natural process by which of a tree give off their moisture.

Function of different parts:-

- ① Heartwood:- Inactive part of tree, gives strength.
- ② Sapwood:- Carries Sap from roots to leaves.
- ③ Cambium:- Growth occur, builds wood inside and bast outside.
- ④ Bast (Phloem):- Carries food made in leaves down to branches, roots.
- ⑤ Outer Bark:- protects the tree.





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WOOD TECHNOLOGY. 2

Structure of Wood:-

The trees are known as outward growers, due to the fact that each year a new layer of tissue is formed on the outside of previous layers. The layers are termed annual ring because most trees produce one ring each year. Each annual ring is composed of an open porous layer known as Springwood, due to the rapid growth in spring and a thinner denser layer called autumnwood due to the slowing down of the growth in late summer and autumn. In summer, the outer rings of the tree known as Sapwood convey the watery sap from the root up to the leaves. Here it undergoes certain chemical changes and on its return journey to the roots in autumn, this perfect sap leaves behind various starchy secretions gums, or resins, a/c to the type of tree. These substances fill up the tissues, feed the tree help to form a denser wood known as Doormen or Heartwood. The Heartwood is dead as far as the growth of tree is concerned. The Cambium layer situated between the Sapwood & the back



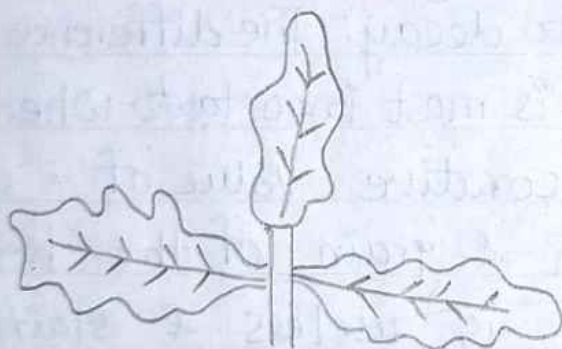
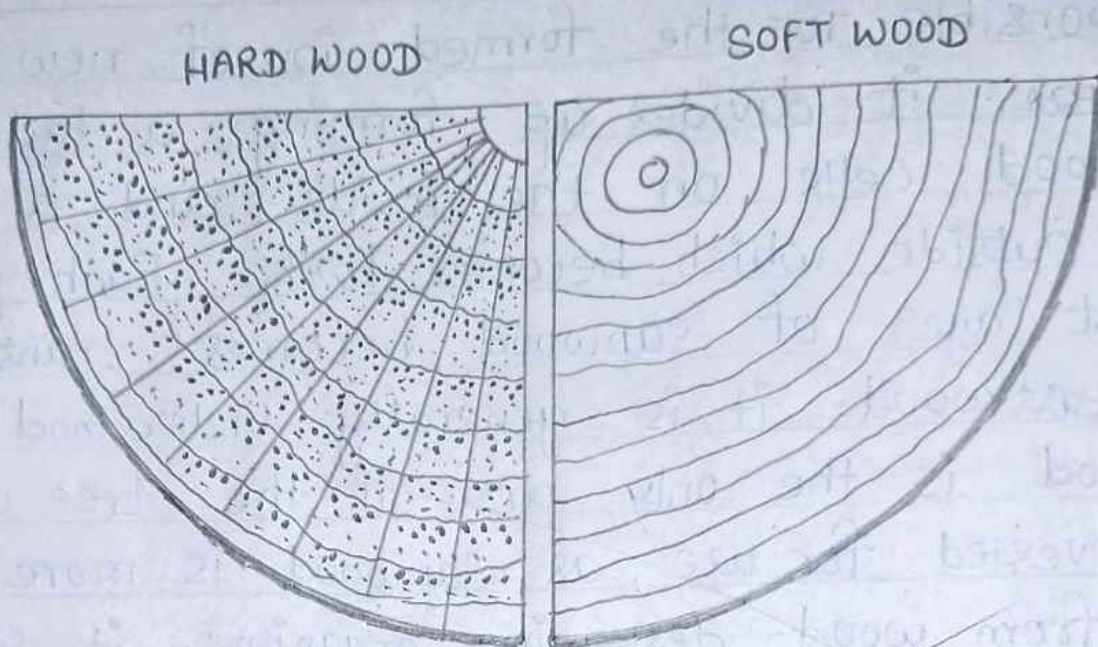
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is responsible for the formation of new wood each year. It divides up forming a layer of new wood cells on the inside and a soft layer on the outside which becomes bark. Each year the innermost layer of sapwood becomes transformed into heartwood. It is generally understood that heartwood is the only part of the tree which should be converted for use, as sapwood is more prone to attack from wood-destroying organisms. If sapwood is properly treated with an effective preservative, it is as durable as heartwood, similarly treated, when used under conditions favourable to decay. The difference in color between sapwood & heartwood, is most important. When choosing wood for joinery, the decorative value of which depends on the bark colour & grain of the heartwood. Treating with preservatives is useless & staining is very difficult, as sapwood absorbs stain more readily than heartwood & takes on a much darker shade. Therefore, for all joinery work it is better that sapwood be eliminated altogether.





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WOOD TECHNOLOGY-3

Classification of Trees:-

Timber for commercial purposes, all divided into two classes:-

(i) Softwood

(ii) Hardwood

Characteristics of soft and hard woods

S. No.	SOFT WOOD	HARD WOOD
1.	it is a resinous wood having a fragrant smell and regular texture.	it is a non-resinous wood containing a fairly good amount of acid.
2.	it carries straight fibres and fine texture.	its fibres are quite close and compact.
3.	it is light in colour.	it is dark in colour.
4.	it is light in weight.	it is heavier.
5.	The annual rings are quite distinct in it.	The annual rings are not distinct in it.
6.	it has a good tensile resistance but is weak across the fibres.	it has both good tensile as well as shear resistance.
7.	it gets splitted quickly.	it does not split quickly.
8.	it is relatively weaker and less durable.	it is stronger and more durable.
9.	it may catch fire soon and cannot withstand high temperatures.	it has an added advantage in its refractoriness.
10.	it is easy to be worked.	it is difficult to be worked.



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SOFT WOOD:— The average soft wood contains about 42% Cellulose, 25% hemicellulose, 30% lignin & 3% miscellaneous items. Lignin also known as 'wood glue' holds the other items together in the wood.

HARD WOOD:— An average hard-wood consists about 45% Cellulose, 25% hemicellulose, 23% lignin and 7% miscellaneous items. Hard wood belong to broad-leaved trees.

COMMON VARIETIES OF INDIAN TIMBERS:

BABUL:— Red to brown in colour, close-grained, hard & tough but elastic and takes a good polish.

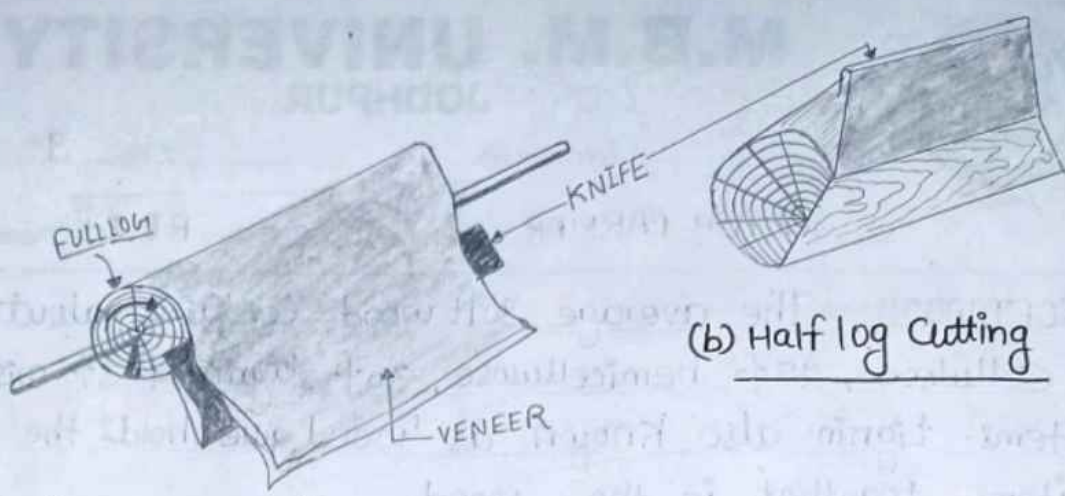
MAHOGANY:— Red brown colour, very durable when kept dry. usually it has fine, wavy grains and uniform colour.

MANGO:— The wood is of inferior quality, coarse and open grained and of deep gray colour.

SAL:— Dark brown colour, hard, close-grained heavy, resistant to white ants and durable.

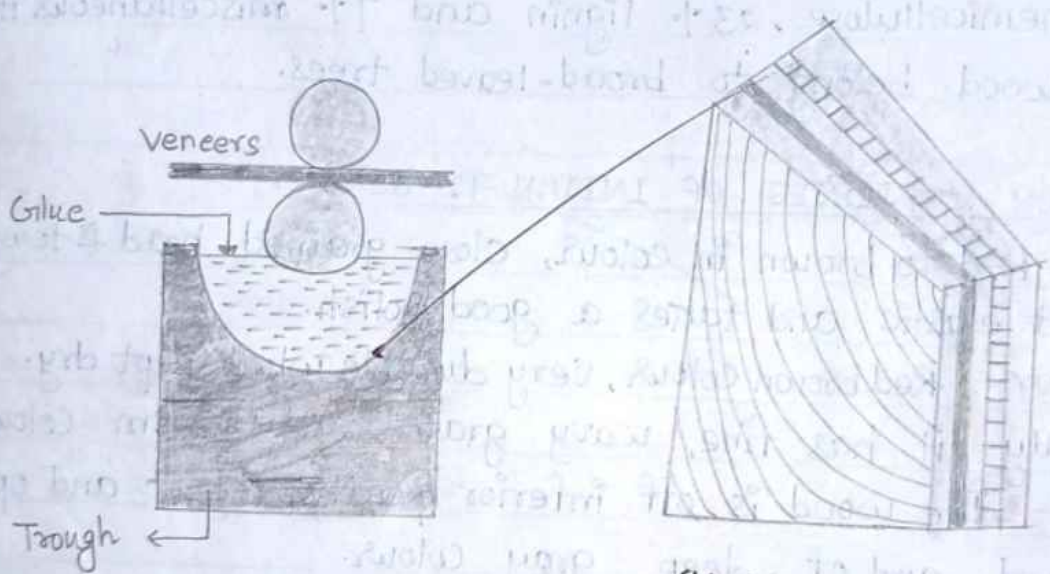
SISSU:— Dark brown in colour, tough, durable and has well-marked coarse grains.

TEAK:— Brown in colour, straight-grained, and is fragrant when freshly cut, very strong and durable, yet light and easily worked.



(a) Full log Cutting

(b) Half log Cutting



(a) Centerveneers is glued (1 Ply)

(b) Alternate veneers are glued



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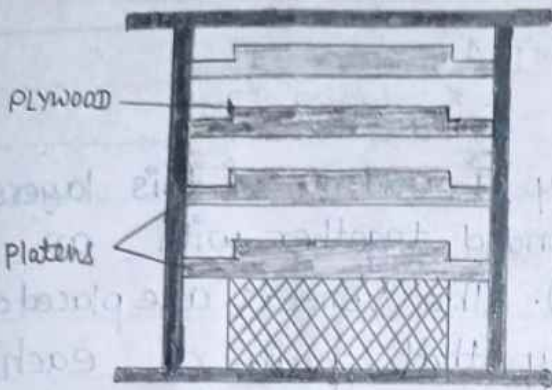
WOOD TECHNOLOGY. 4

PLYWOOD:-

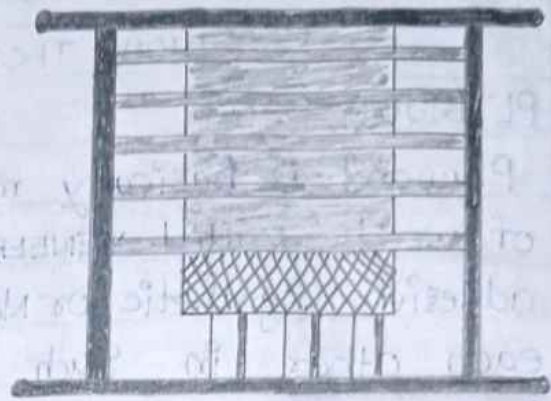
Plywood is basically made up of odd no. of this layers of wood, called VENEERS bonded together with an adhesive (Synthetic or Natural). The veneers are placed on each other in such a way that grain of each layers crosses the adjacent layer at right angle. The plywood becomes extremely strong, stable, rigid for such arrangement of veneers. it is having resistance to insect also.

The number of veneers used in making plywood is neverless than three and may be as may as 15. The art of veneers heeling and slicing has been refined with minimum thickness of 0.2 mm and maximum of a mm now possible.

Black boards are manufactured in similar lengths and widths as plywood and in thickness of 12, 16, 18, 24 & 26 mm. chipboard is manufactured from fine wood particles or wood wastes from other timber processing systems bonded together with synthetic resin & glue under heat. As veneers all made from softwood and hardwood



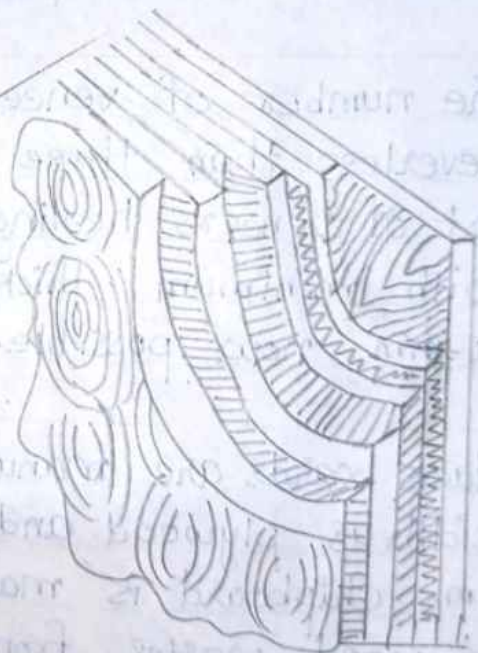
➤ Press open



➤ closed



➤ 3-PLY



➤ 5-PLY



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only the leg is first deta. i.e. outer bark is removed. in the next step the leg is cut to appropriate length known as bucking. The legs cut in length wise (known as blocks) are heated around 95°C using hot water both steam heat or hot water spray to system the legs for veneering.

Rotatory Cutting:- for most applications, the veneers are heated from cylindrical legs of good girth and clear straight grains. The veneers are heeled rotary fashion. from the block by a long knife fitted to a lathe like machine.

Slicing:- for producing decorative high quality veneers, a veneer slice is used. In this method the leg is first cut diametrically in 2 parts known as pitch. The pitch is then sliced using a slices.



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WOOD TECHNOLOGY. 5

Wood Seasoning:— Seasoning is the process of removing moisture from wood i.e. drying.

Freshly felled timber contains a large humidity of moisture roughly from 100 to 200%, based upon dry weight of wood.

Advantages of seasoning:—

- Wood becomes hard, more durable, resistance to shock and stresses produced.
- Its workability is improved.
- Its density is reduced, does not warp after seasoning.
- Shrinkage does not occur after seasoning.
- Defects like twisting, bowing and splitting do not occur.
- Improved ability to polishing and painting.
- Its resistance to fire is increased.

* There are two methods of drying or seasoning:—

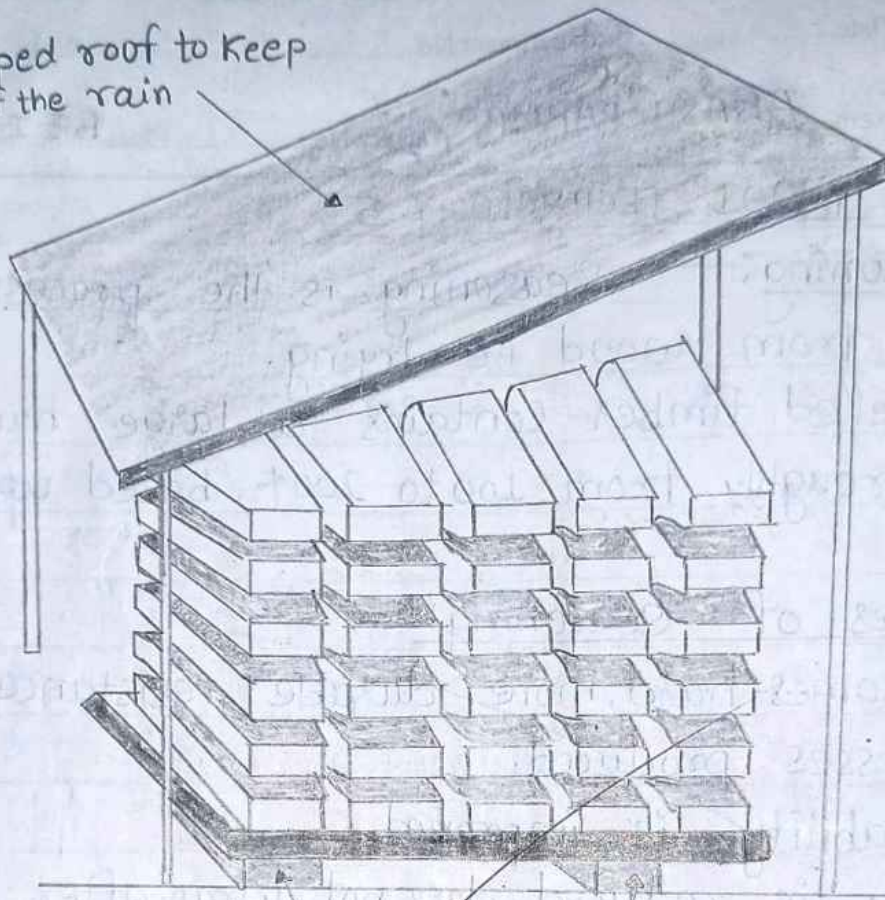
(1) Natural Seasoning:—

(a) Air drying/seasoning (b) water seasoning

(2) Artificial Seasoning:—

- (a) Kiln Seasoning
- (b) Chemical Seasoning
- (c) Electrical Seasoning

sloped roof to keep
off the rain



The timber stack is raised off
the ground to protect it from
damp

➤ Natural Seasoning (Air seasoning)



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(1) Natural Seasoning:-

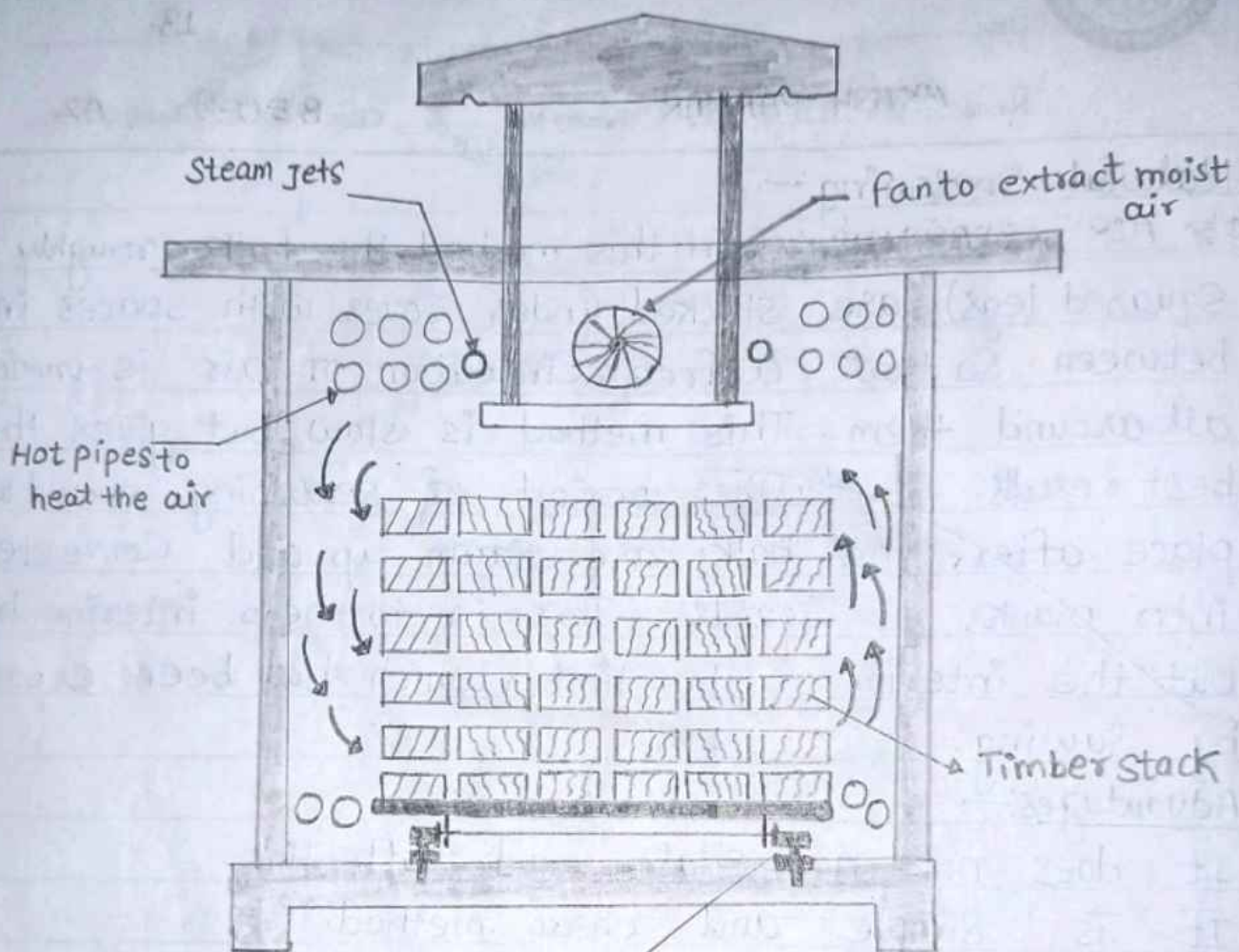
AIR SEASONING:- In this method the balks (roughly squared logs) are stocked under cover with spaces in between. So that a free circulation of air is provided all around them. This method is slow, but gives the best results. A further period of seasoning should take place after the balks are sawn up and converted into planks or boards. This is to help interior dry out the interior of the timber which has been exposed by sawing.

Advantages:-

- It does not necessitate much attention.
- It is simple and cheap method.
- Less chances of damage to the timber.

Disadvantages:-

- Very slow extend over years.
- For large stacks considerable space is required.
- Rigid Control Cannot be exercised.
- Block the Capital a long time.
- Timber may get damaged by insects and fungi during seasoning period.



➤ ARTIFICIAL SEASONING
(KILN METHOD)



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(2) Artificial Seasoning:

➡ KILN SEASONING:— In this method the period of seasoning is very much reduced in matter of two or three week being sufficient, according to the size or species of timber to be seasoned. The timber is stacked on a special truck and wheeled into a chamber which is then sealed. Hot air is circulated by fans, and a certain amount of steam is added in order to retain the correct humidity. Samples are tested at intervals to ascertain the percentage of moisture remaining in the timber. Seasoned timber still contains a proportion of moisture, which varies from 16% to 12% according to the seasoning conditions and this need not be dried out further if intended for use out of doors.

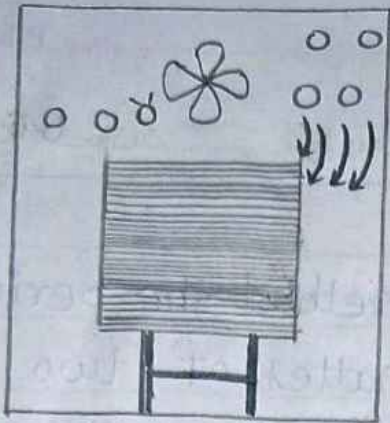
Advantages:—

- Moisture content can be reduced as per requirement.
- Less time required for seasoning, less shrinkage.
- The drying is controlled, so no chances for the attack of fungi and insects.
- The drying of different surfaces is even and uniform.

Disadvantages:—

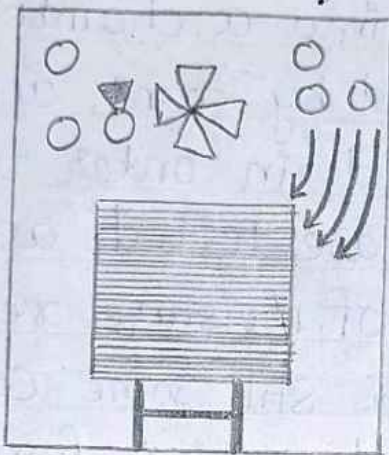
- It is costly & more skilled labor required.

①



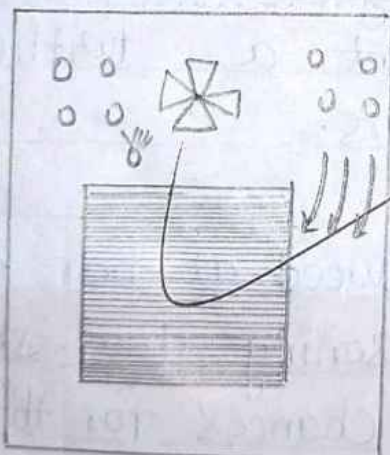
Steam high
Heat low
Wood green

②



Steam reduced
Heat increased
Wood drying

③



Little steam
High heat
Wood seasoned



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In a number of argument, artificial seasoning is better than its natural counterpart as it is less time consumer and an efficient process.

—: WOOD TECHNOLOGY: 6:—

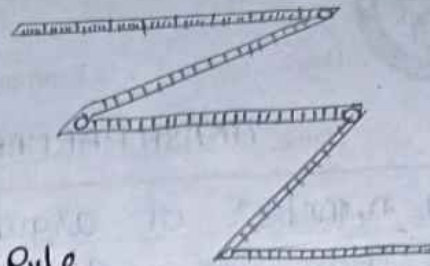
Wood Preservations:—

Wood preservation means treating wood with certain solutions so as to make it poisonous to fungi, insects and marine bours. There are various method to preserve wood from these harmful agents the most common one being pressure method.

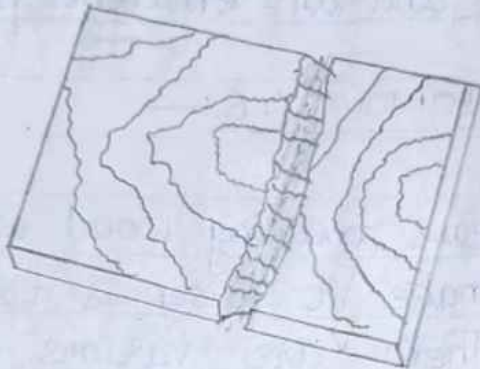
Wood Preservations By Pressure:—

In this method, timber is simply placed in a metal cylinder and the preservative is pumped into the cylinder under pressure. This method is used for preservation of new timber.

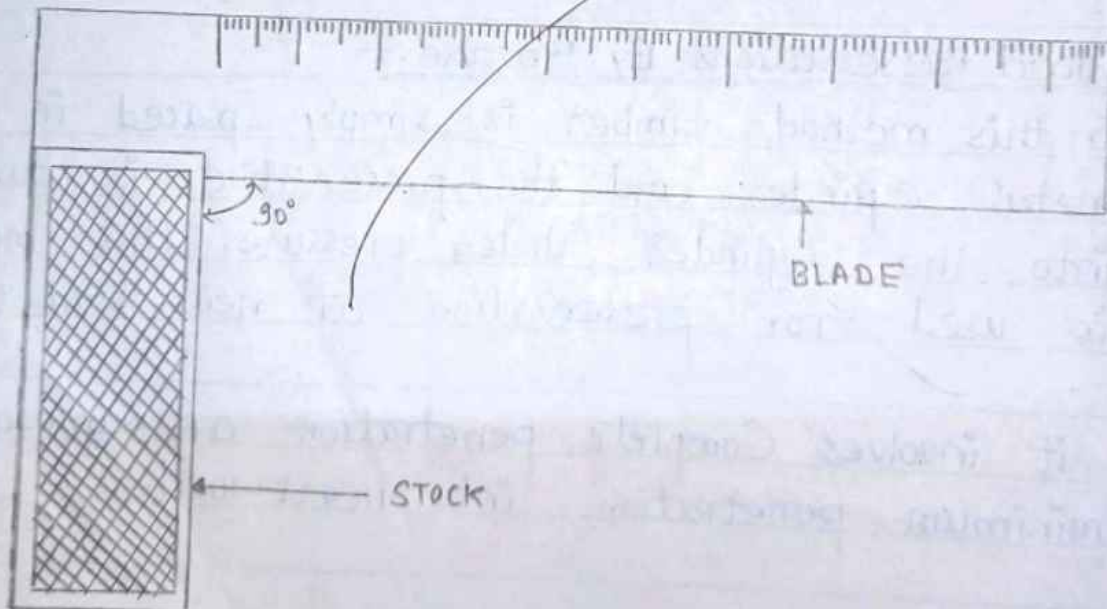
it involves complete penetration of Sapwood and minimum penetration into heartwood.



➤ Folding Rule



➤ STRAIGHT EDGE



➤ TRY SQUARE



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WOOD WORKING HAND TOOLS :-

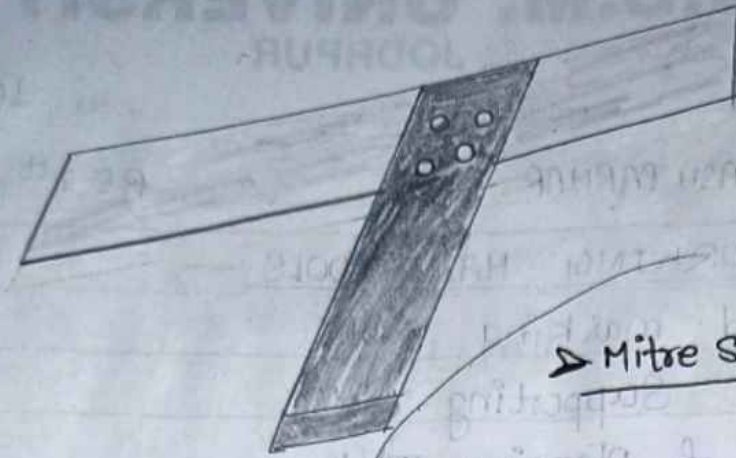
- (1) Measuring and marking Tools
- (2) Holding and Supporting Tools
- (3) Cutting Tools & planing Tools
- (4) Boring and Drilling Tools
- (5) Striking Tools
- (6) Miscellaneous Tools

(1) Measuring and Marking Tools :-

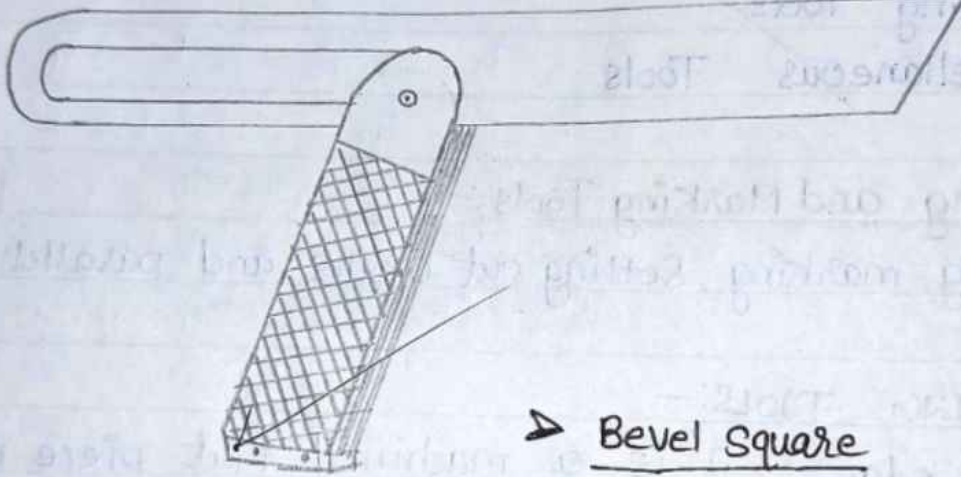
Measuring, marking, Setting out angles and parallel lines and testing.

MEASURING TOOLS :-

- (a) Straight edge:- it is a machined flat piece made of wood or metal having tanely straight and parallel edge. one of the longitudinal edge is generally made leveled. This is used to test the trueness of large surface and edge.
- (b) TRY SQUARE:- Used for measuring and setting out dimensions, testing the finish of a planed surfaces, draw parallel lines at right angles (90°) to plane surfaces, draw mutually perpendicular lines over a plane surface and test the squareness to two adjacent surfaces. It consists of a steel Blade fitting into a wooden or metallic.



➤ Mitre Square



➤ Bevel Square



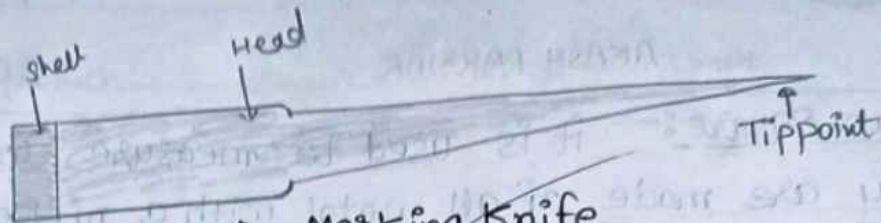
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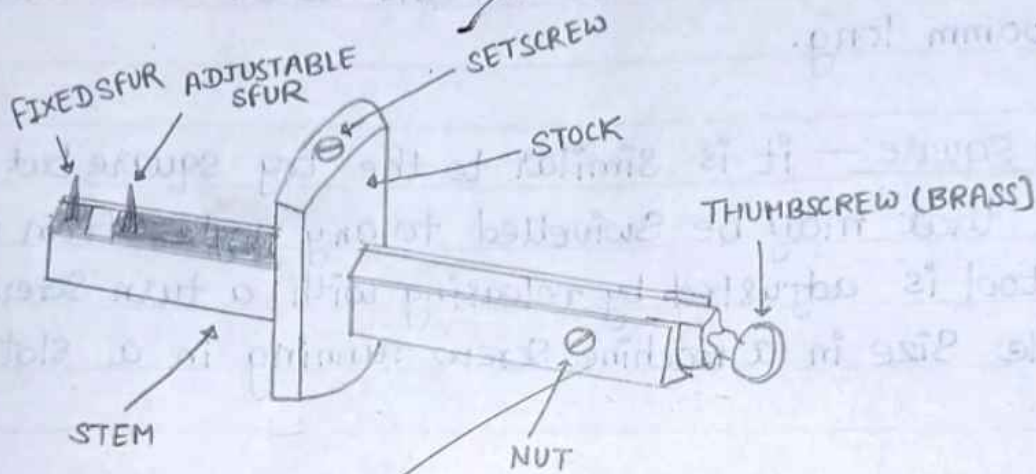
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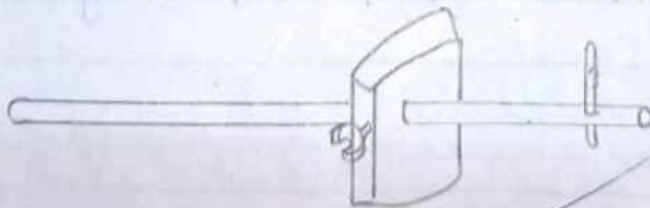
- (c) Mitre Square:— it is used to measure an angle of 45° . They are made of all metal with a nickel-plated finish or with a steel blade, and an ebony or rose-wood stock. The Blade varies from 200 mm and so on to a maximum of 300mm long.
- (d) Bevel Square:— it is similar to the try square but has a blade that may be swivelled to any angle from 0° to 180° . This tool is adjusted by releasing with a turn screw of suitable size in a machine screw running in a slot in the blade.
- (e) Combination square:— Some wood workers prefer a Combination square which is similar to the Combination Set used in bench work. it is a combination of a square 45° bevel, set square, rule, straight edge and center finder.



➤ Marking Knife



➤ MORTISE GAUGE



➤ Cutting gauge



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MARKING TOOLS:-

(a) Marking knife or scribe — Marking knives are used for converting the pencil lines into cut lines. They are made of steel having one end pointed and the other end formed into a sharp cutting edge.

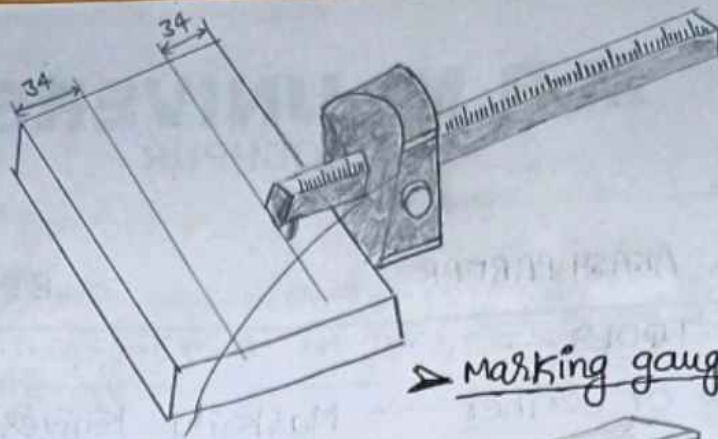
(b) Gauges:- Gauges are used to mark lines parallel to the edge of a piece of wood. The stem carries one or more steel marking points or a cutting knife. The stock is set to the desired distance from the steel point and fixed by the thumbscrew.

Types of Gauges:-

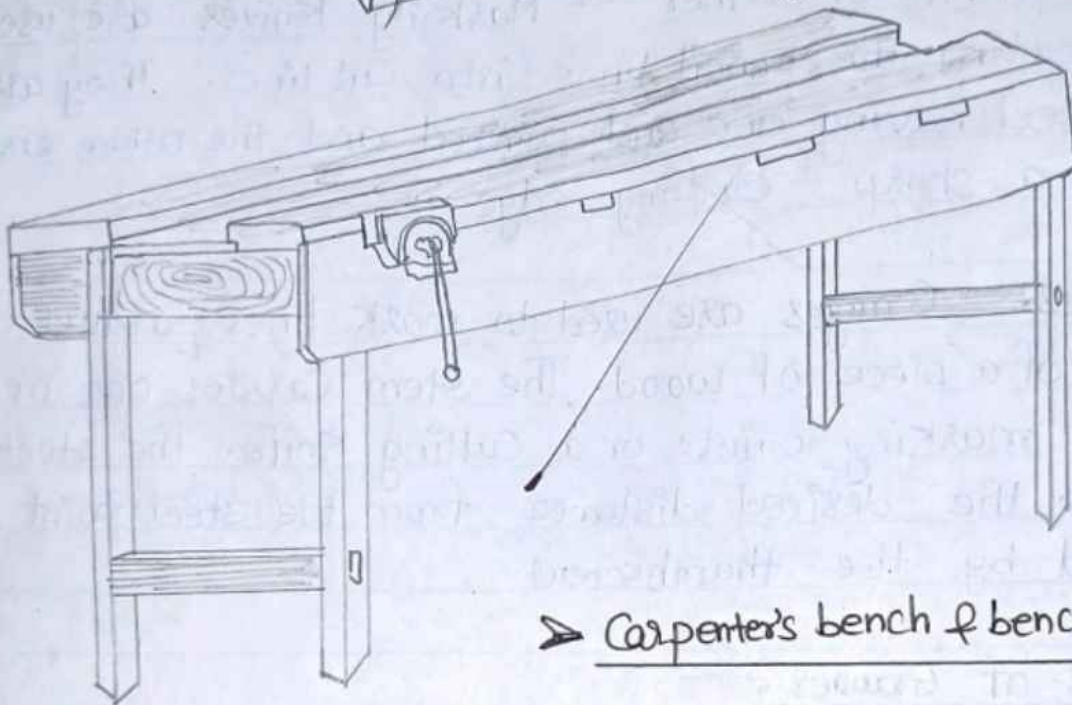
(i) Mortise gauge:- It is used to draw two parallel lines. Its working is similar to marking gauge except it has two sharp edges. one fixed and second adjustable.

(ii) Cutting gauge:-

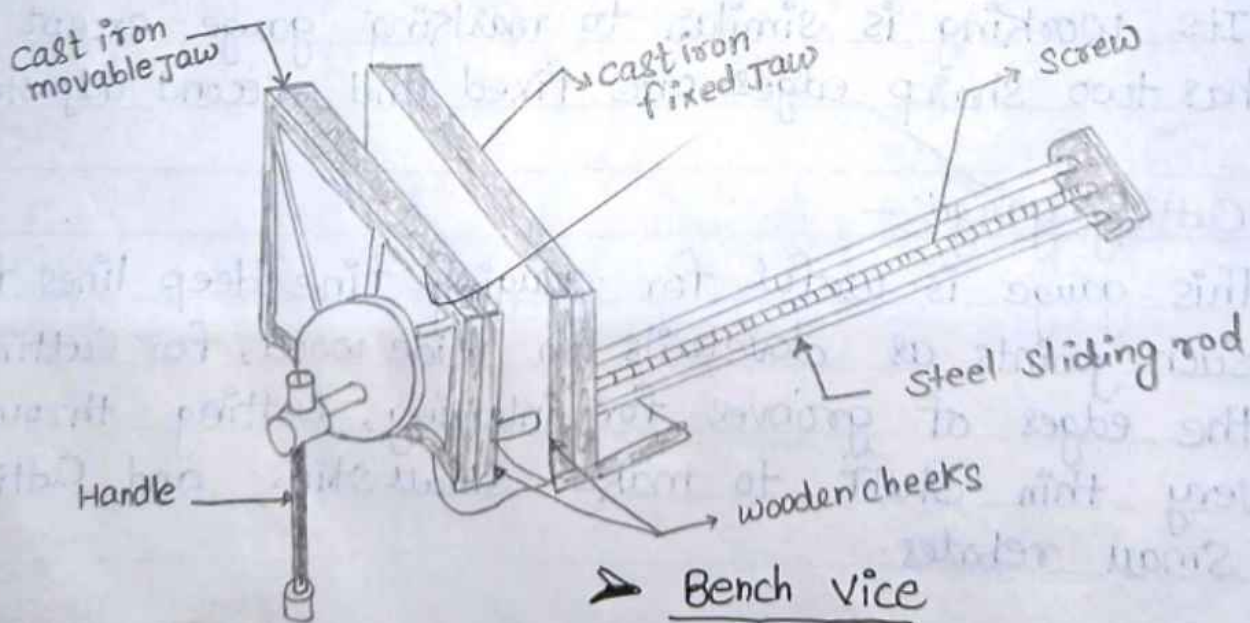
This gauge is useful for gauging fine deep lines for such points as dovetails on wide wood, for cutting the edges of grooves, for inlaying, cutting through very thin stuff to make small strips and cutting small rebates.



➤ marking gauge



➤ Carpenter's bench & bench hook



➤ Bench vice



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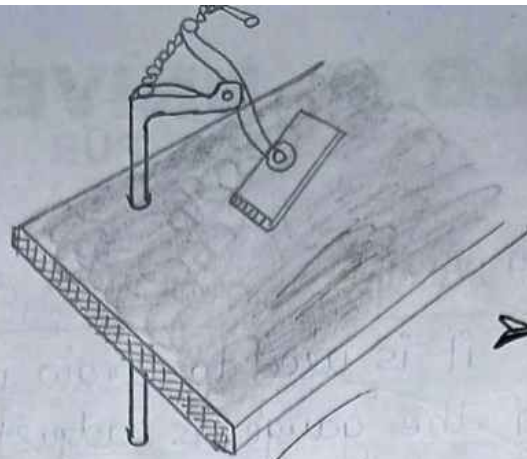
Date..... Experiment No..... P. No. 19.....

Name AKASH PARMAR..... Faculty No..... Class B.E. (Ist) Batch A2.....

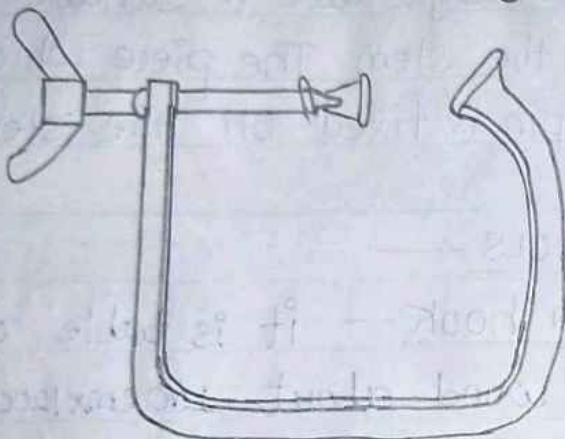
- (iii) Marking gauge:— it is used to draw parallel lines. The movable portion of the gauge is adjustable to suitable position and is tightened on the stem. The piece which slides is called stock & scribing pin is fixed on the stem.

HOLDING AND SUPPORTING TOOLS:—

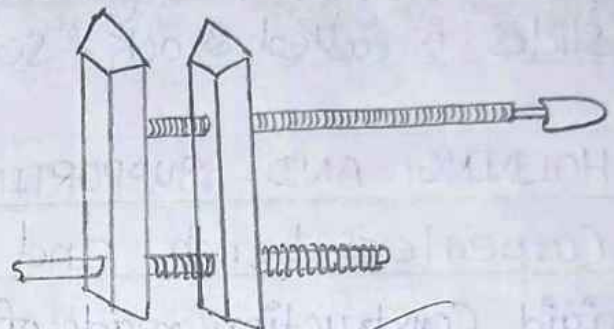
- (a) Carpenter's bench and bench hook:— it is table of rigid construction made of hard wood about 180cm x 120cm x 90cm(H) size. four Carpenter vice are fitted on opposite sides of bench to hold the jobs during operation.
- (b) Bench vice:— The bench vice illustrated is the most commonly used. Its one jaw is fixed to the side of the table while the other is kept movable by means of a screw and a handle. The whole vice is made of iron and steel.
- (c) Bench holdfast:— Bench holdfast is made with a cast iron pillar, square-cut screw threads on a steel bar, with a light vice handle and a drop-forged steel arm. This is useful for holding a piece of wood down on the bench when a vice is not advisable.



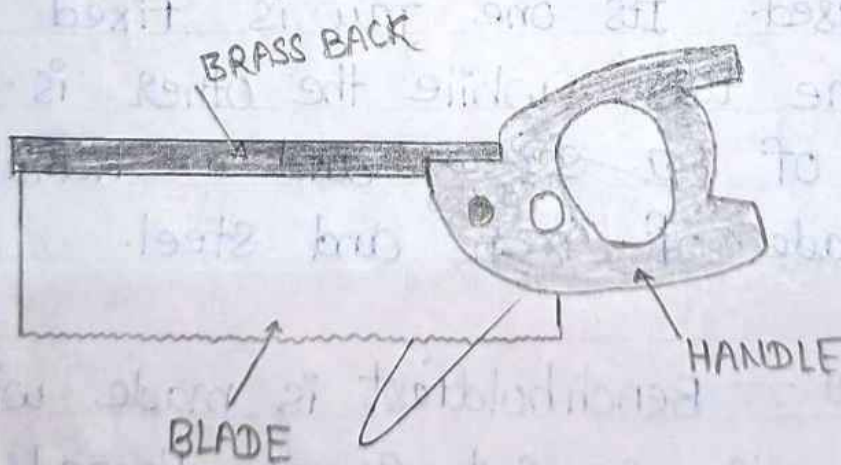
➤ Bench holdfast



➤ G-cramp



➤ Hand screw



➤ TENON SAW (BACK SAW)



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(d) G-Clamp:— The G-Clamp is used for smaller work. it consists of a malleable iron frame that can be swivelled and a steel screw to which is fitted a thumbscrew.

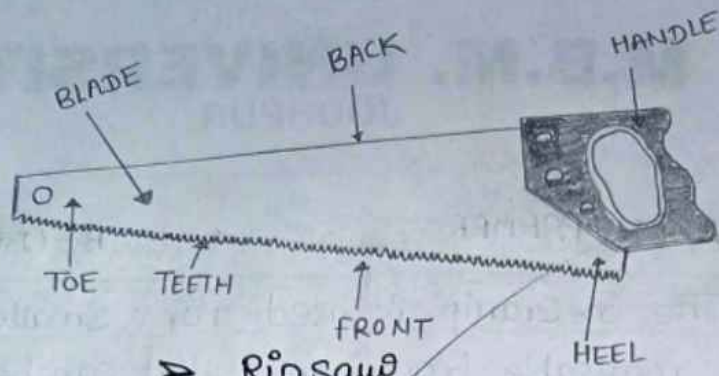
(e) Handscrew:— it is used where a wider area of pressure than that provided by a G-clamp is required. it consists of two steel screws fitted to two jaws made of wood.

CUTTING TOOLS:—

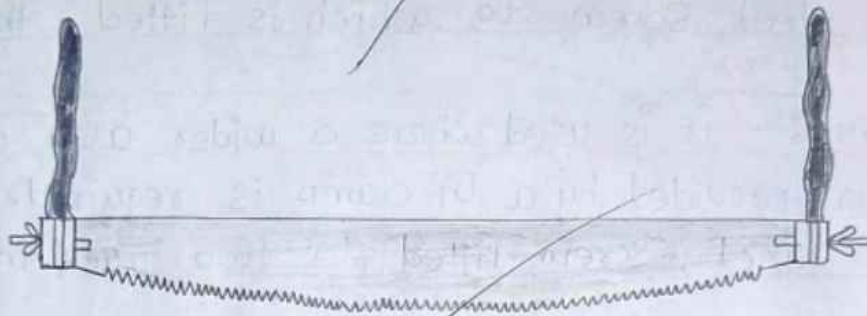
(a) Saws:— Sawing means cutting woods along the grains. The main parts of a saw are blade and handle. The size of a saw is the length of the blade in mm. The tooth is specified by its pitch and the angle. The teeth are bent slightly by its pitch and the angle. Common types of Saws:—

(i) Tenon Saw (Back Saw):—

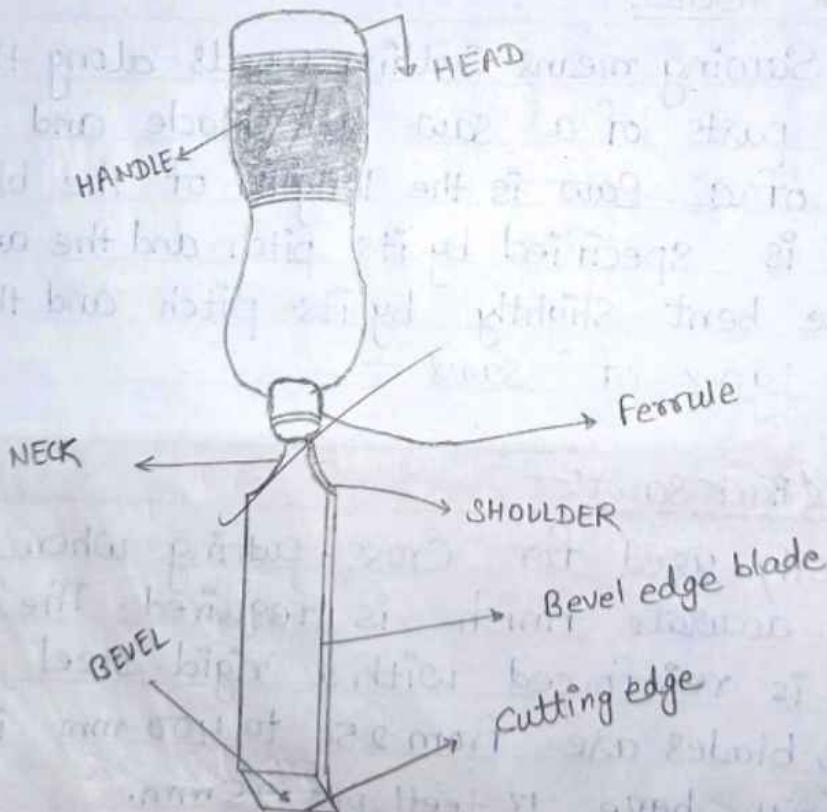
it is mostly used for cross-cutting when a finer and more accurate finish is required. The blade, being very thin, is reinforced with a rigid steel back. Tenon saw blades are from 250 to 400 mm in length and generally have 13 teeth per 25 mm.



➤ Rip saw



➤ Cross-cut Saw



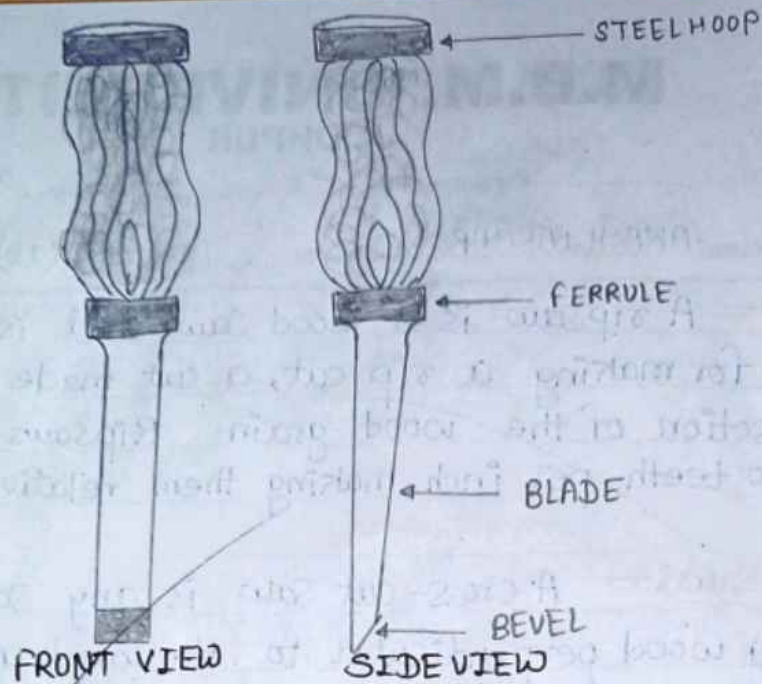
➤ firmer chisel



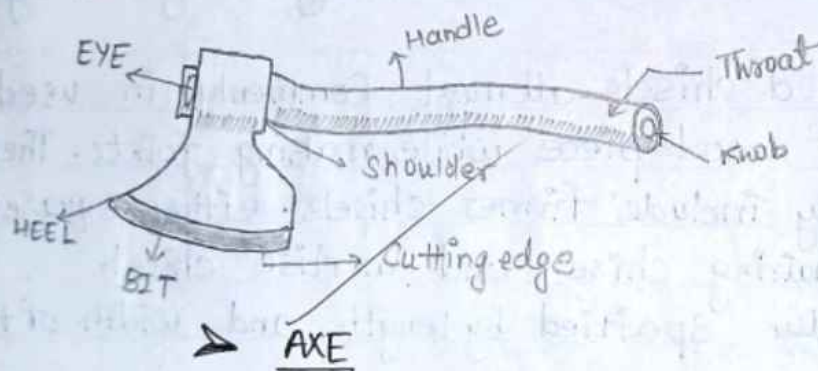
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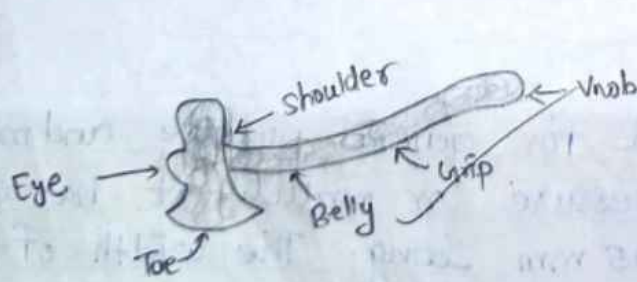
- (ii) Rip Saws:- A rip saw is a wood saw that is specially designed for making a rip cut, a cut made parallel to the direction of the wood grain. Ripsaws typically have 4-10 teeth per inch, making them relatively Coarse.
- (iii) Cross-cut Saw:- A cross-cut saw is any saw designed for cutting wood perpendicular to the wood grain. Crosscut Saws may be small or large, with small teeth close together for fine work like woodworking & log bucking.
- (b) Chisels:- wood chisels all most Commonly in used for Cutting of wood piece while making joints. There most Commonly include firmer chisels. either square of bevel edged, pairing chisel and mortise chisel. They are usually Specified by length and width of the blade.
- (i) firmer chisel:-
 it is the most useful for general purpose and may be used by hand pressure or mallet. it has a flat blade about 125 mm long. The width of the blade varies from 1.5 to 50 mm.



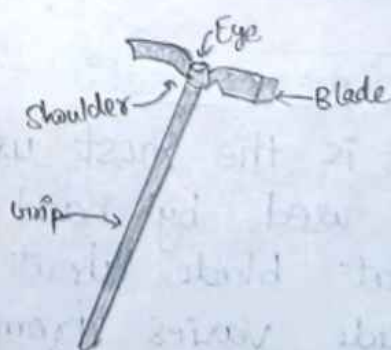
➤ MORTISE CHISEL



➤ AXE



➤ Side axe



➤ Adze



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Date..... Experiment No..... P. No. 22

Name AKASH PARMAR Faculty No..... Class B'E (1st) Batch A2

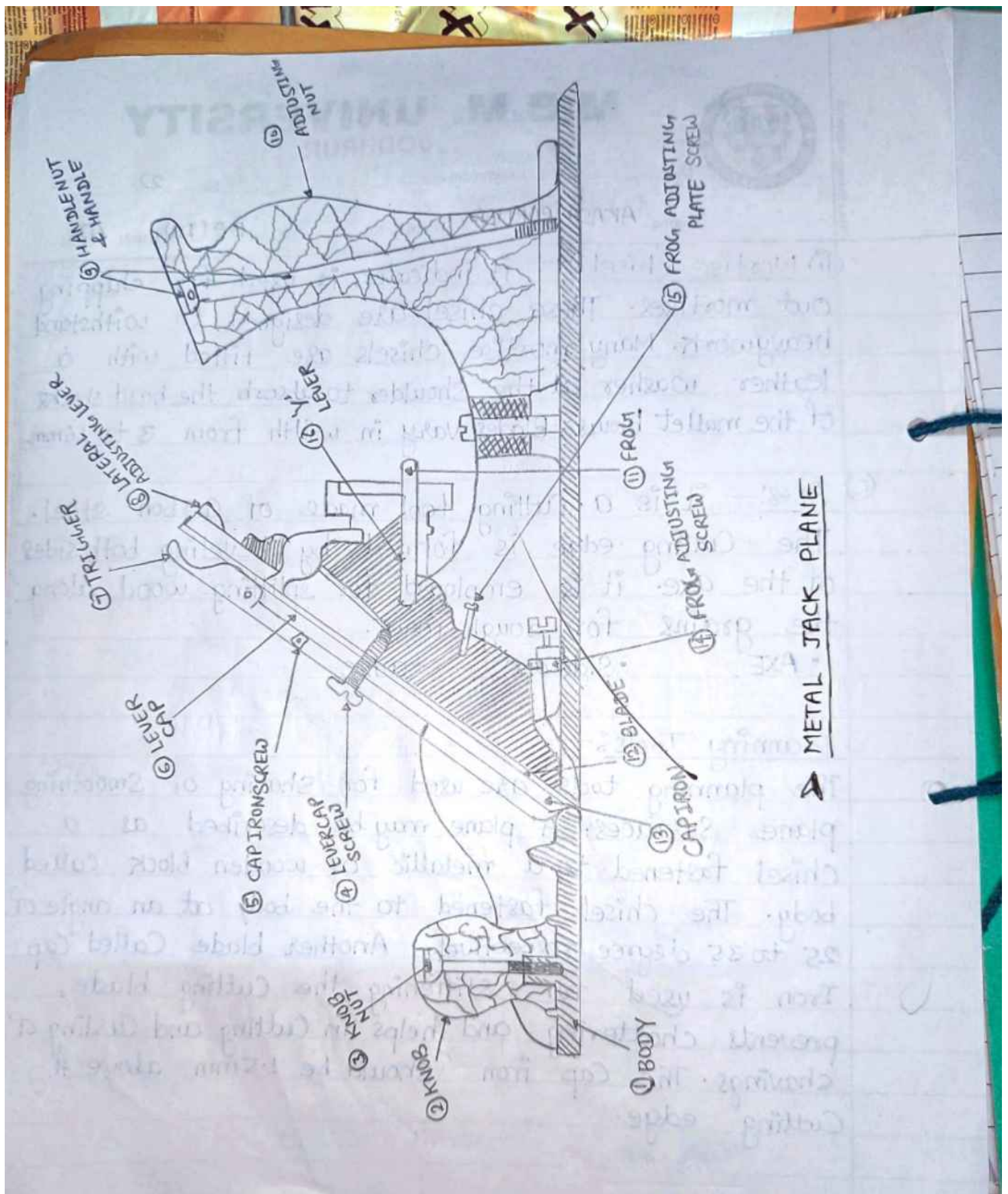
(ii) Mortise chisel :— it indicates, is used for chipping out mortises. These chisel are designed to withstand heavy work. Many mortise chisels are fitted with a leather washer at the shoulder to absorb the hard shocks of the mallet blows. Blades vary in width from 3 to 16mm.

(c) Axes :— it is a cutting tool made of carbon steel. The cutting edge is formed by beveling both sides of the axe. it is employed for splitting wood along the grains for rough work.

- AXE
- Sideaxe
- adze

Planning Tools :—

The planning tools are used for shaving or smoothing plane surfaces. A plane may be described as a chisel fastened to a metallic or wooden block called body. The chisel fastened to the body at an angle of 25 to 35 degree respectively. Another blade called Cap Iron is used for stiffening the cutting blade, prevents chattering and helps in cutting and curling of shavings. The Cap iron should be 1.5mm above the cutting edge.



➤ METAL JACK PLANE



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Date..... Experiment No..... P. No. 23

Name AKASH PARMAR Faculty No..... Class BE (1st) Batch A2

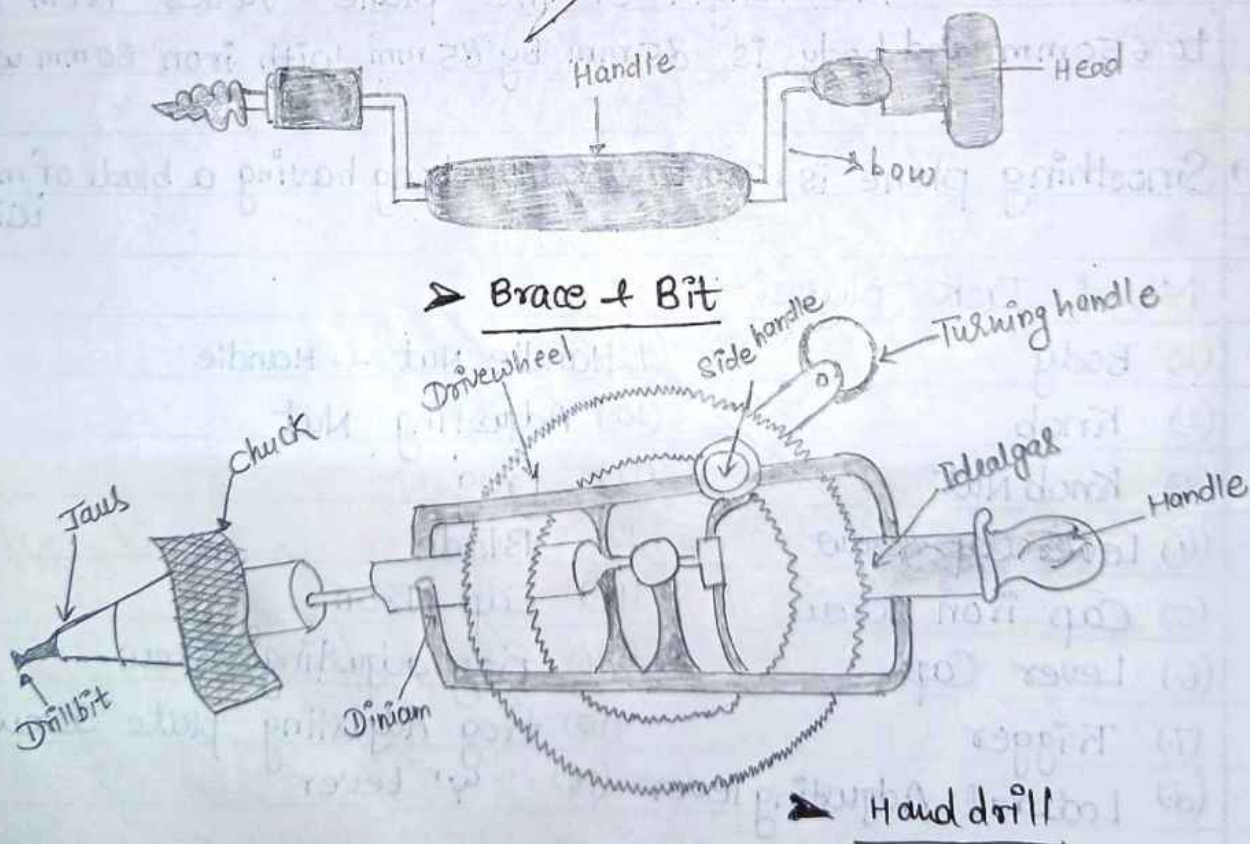
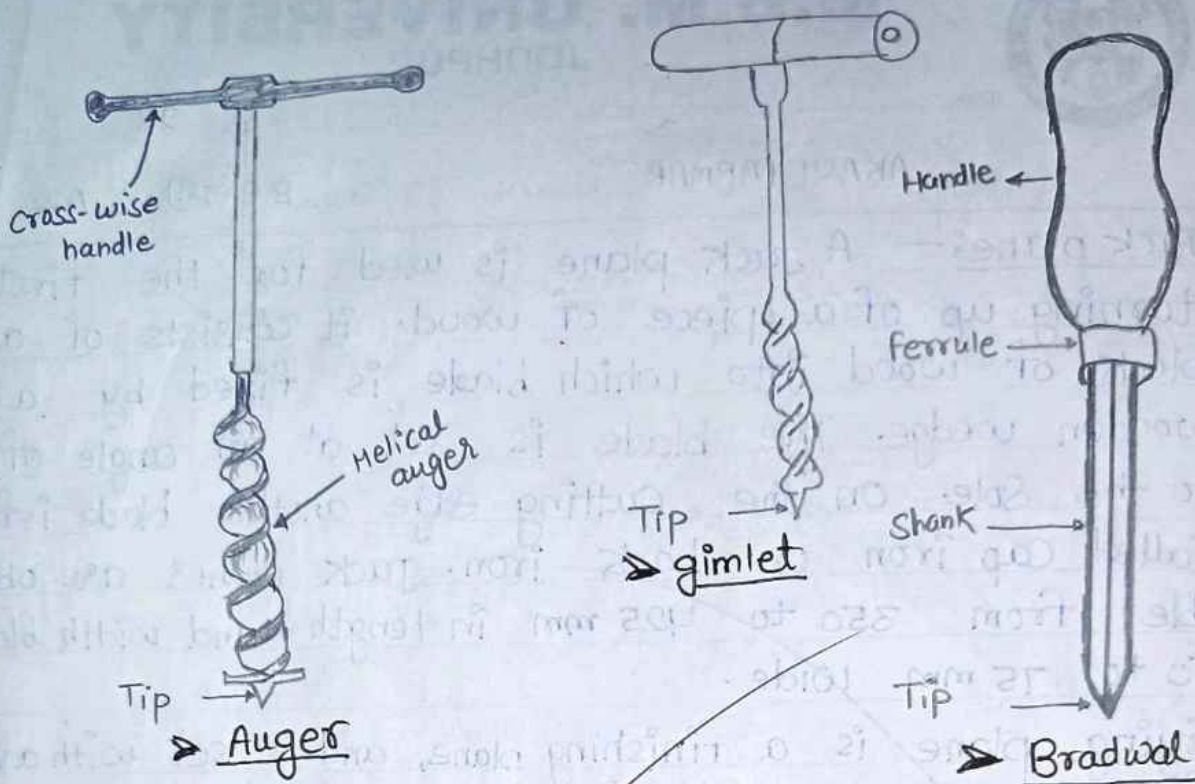
* Jack plane:- A jack plane is used for the first turning up of a piece of wood. it consists of a block of wood into which blade is fixed by a wooden wedge. The blade is set at an angle of 45° to the sole. On the cutting edge another blade is fixed called cap iron or back iron. Jack planes are obtainable from 350 to 425 mm in length and width blade 50 to 75 mm wide.

→ Trying plane is a finishing plane, and is set with a very fine cut. The length of the plane varies from 550 to 650 mm and body is 85 mm by 85 mm with iron 60 mm width.

→ Smoothing plane is 200 to 250 mm long having a blade of mm wide.

Metal Jack plane:-

- | | |
|-----------------------------|---------------------------------|
| (1) Body | (9) Handle Nut & Handle |
| (2) Knob | (10) Adjusting Nut |
| (3) Knob Nut | (11) frog |
| (4) Lever Cap screw | (12) Blade |
| (5) Cap iron screw | (13) Cap Iron |
| (6) Lever Cap | (14) frog adjusting screw |
| (7) Trigger | (15) frog Adjusting plate screw |
| (8) Lateral Adjusting lever | (16) 'y' lever |





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Name AKASH PARMAR Faculty No..... Class B.E. (1st) Batch A2

Boring and Drilling Tools:-

A Carpenter's boring machine is a hand-driven machine to bore holes in beams such in the process of making a mortise and tenon joints together.

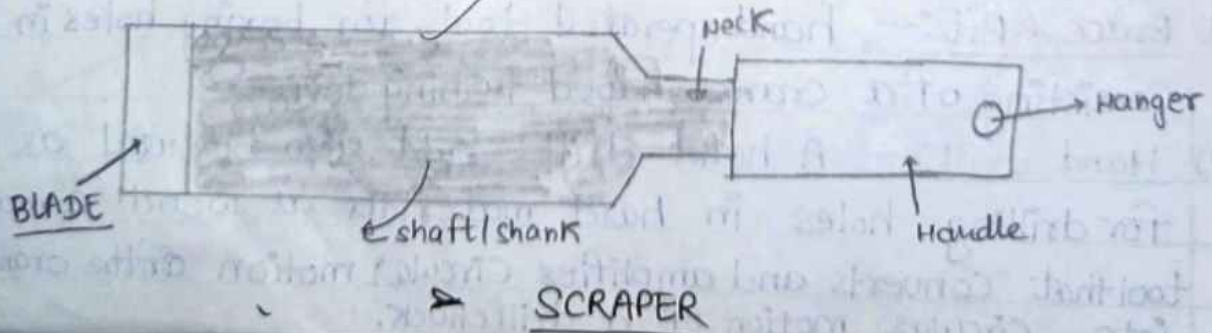
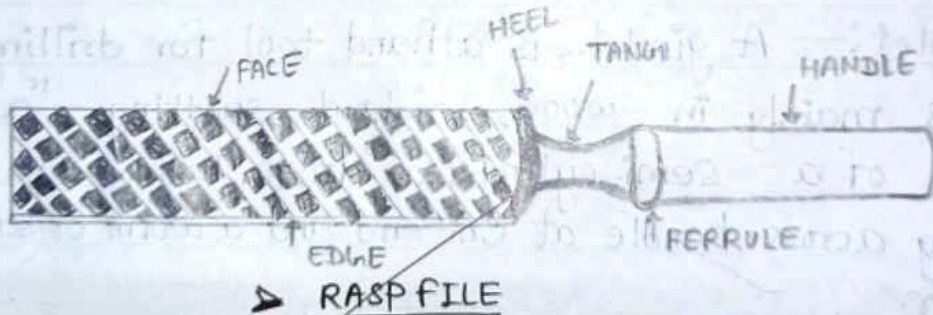
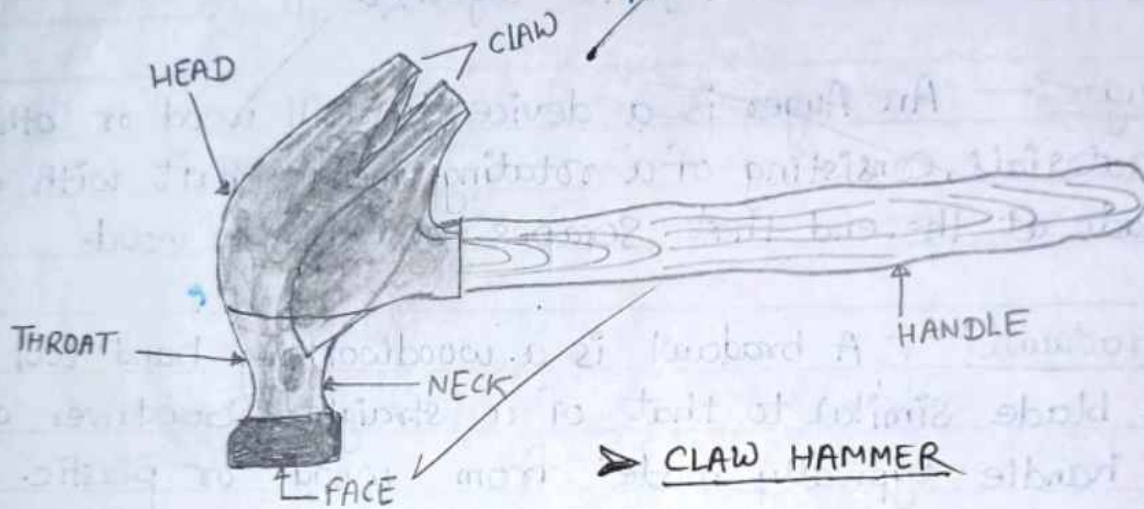
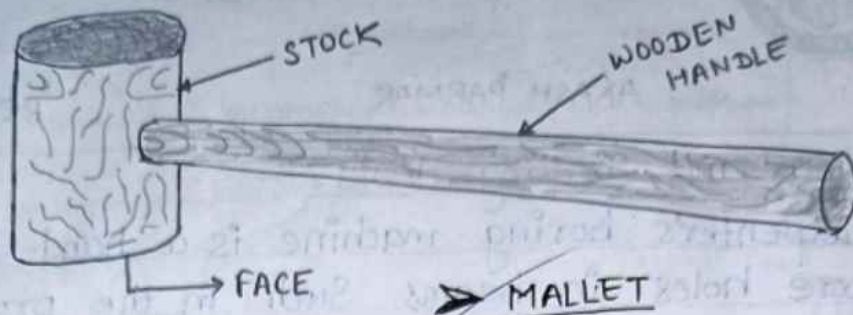
(a) Auger:- An Auger is a device to drill wood or other materials, consisting of a rotating metal shaft with a blade at the end that scrapes or cuts the wood.

(b) Bradawl:- A bradawl is a woodworking hand tool with a blade similar to that of a straight screwdriver and a handle typically made from wood or plastic.

(c) Gimlet:- A gimlet is a hand tool for drilling small holes mainly in wood, without splitting. "a piece of steel of a semi-cylindrical form, hollow on one side, having a cross handle at one end and a worm or screw at the other.

(d) Brace & Bit:- hand operated tool for boring holes in wood, consisting of a crank-shaped turning device.

(e) Hand drill:- A hand drill could also be used as a tool for drilling holes in hard materials as wood. a manual tool that converts and amplifies circular motion of the crank into circular motion of a drill chuck.





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Date..... Experiment No..... P. No. 25.....

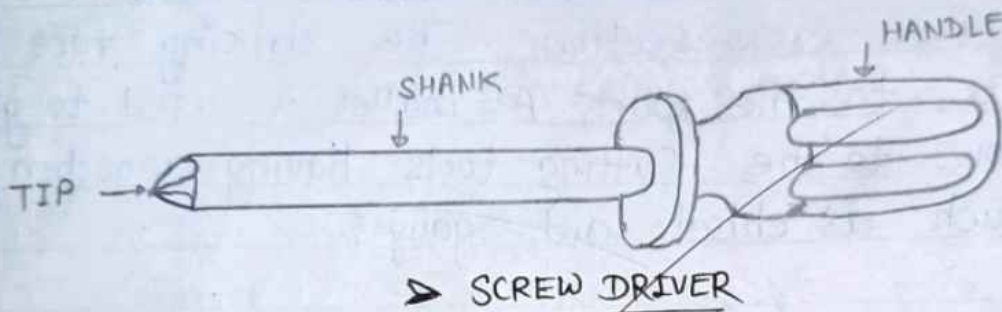
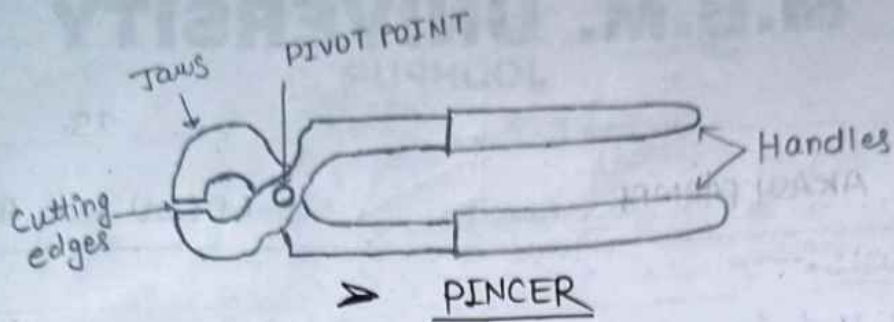
Name AKASH PARMAR Faculty No..... Class B.E (1st) Batch A2.....

STRIKING TOOLS:-

- (a) Mallet:- Mallet is a wooden-handed hammer of round or rectangular cross-section. The striking face is made plate to the work. A mallet is used to give light blows to the Cutting tools having wooden handle Such as chisel and gauges.
- (b) Claw hammer:- A claw hammer is a hammer primarily used in Carpentry for driving nails into or pulling them from wood. a claw hammer has been associated with woodworking, but is also used in general applications.

MISCELLANEOUS TOOLS:-

- (a) Rasp file:- These are useful for cleaning up some Curved Surface. Scratches left by the file Can be removed with the Scraper and glass paper.
- (b) Scraper:- As its name implies, it scrapes very small shavings off the wood. It consists of a piece of thin steel, hardened and tempered. A fine edge is made by pushing over or burnishing the edge of the metal to form that what is called a "burr."





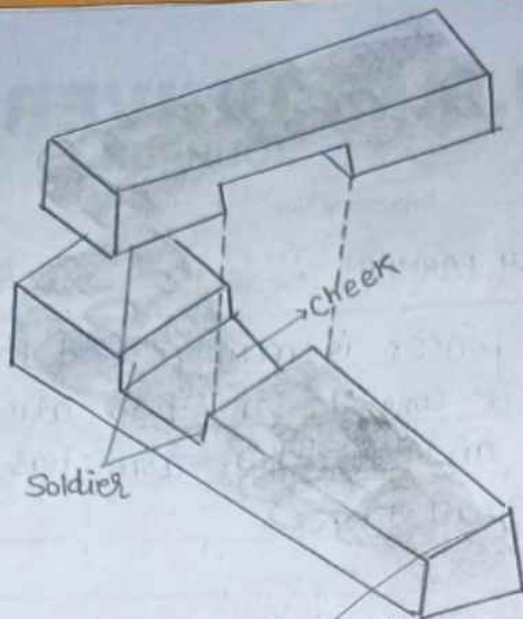
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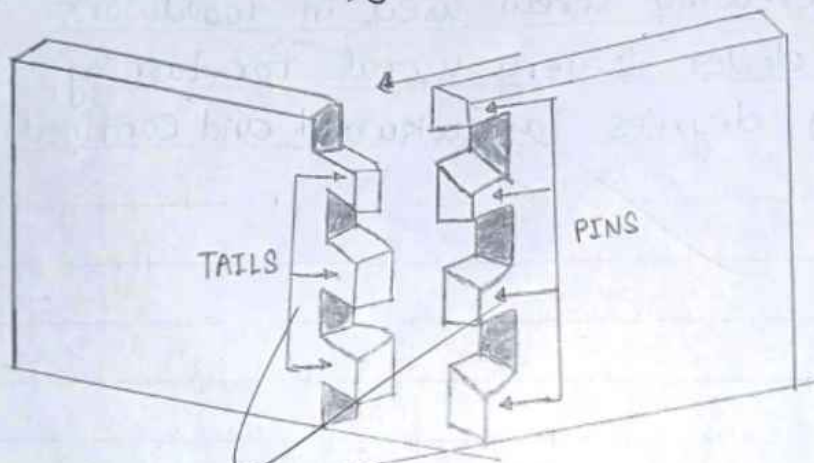
Date..... Experiment No..... P. No. 26.

Name... AKASH PARMAR ... Faculty No..... Class... R.E (1st) ... Batch... A2

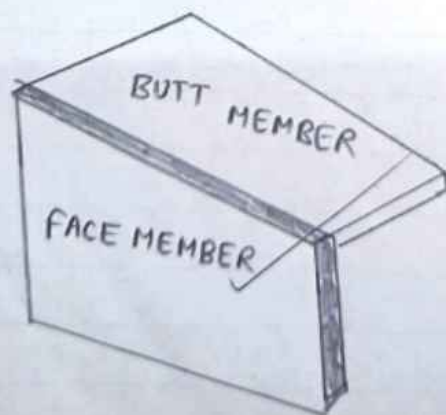
- (c) Pincer:- The pincer is mainly used for pulling out nails, tacks etc. it consists of two arms one arm has a ball end and the other arm has a claw end for levering out small tacks.
- (d) Screw driver:- Screw drivers are used for screwing or unscrewing screw used in woodwork. The ratchet screw driver is very useful for turning screw through a few degrees in awkward and confined spaces.



➤ Halving joint



➤ Dovetail joints



➤ Corner joints



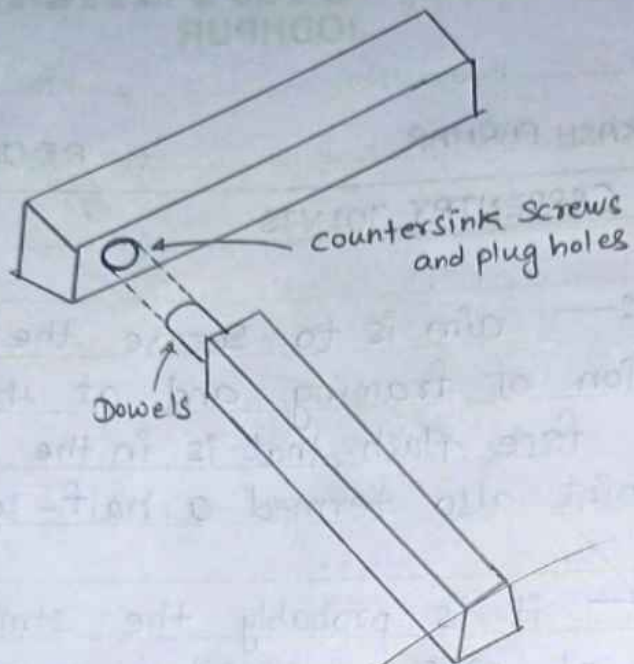
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Date..... Experiment No..... P. No. 27.

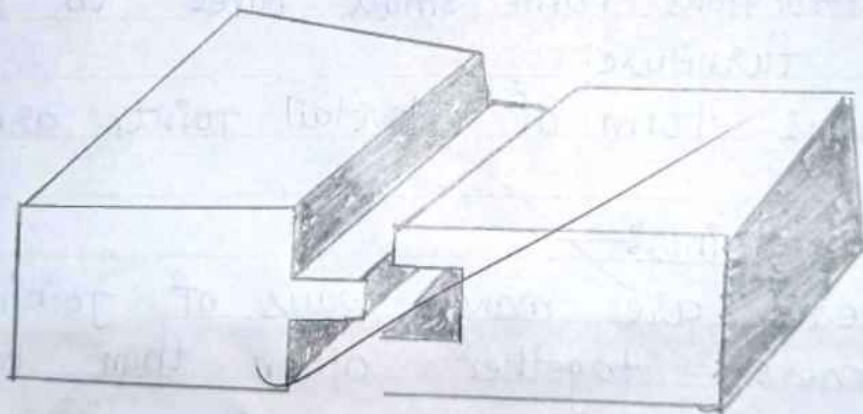
Name... AKASH PARMAR ... Faculty No..... Class... B.E. (IT) ... Batch... A2...

CARPENTRY JOINTS

- (1) Halving joint:— aim is to secure the corners and intersection of framing and at the same time keep all the face flush, that is in the same plane. The halving joint also termed a half-lap joint.
- (2) Dovetail joint:— it is probably the strongest of all corner joints. It was primarily a joint intended to take a strain in one direction, but it has several variations and many applications particularly in making box or Carcase-like constructions from small boxes to large pieces of furniture. Various form of dovetail joints are there.
- (3) Corner joints:— There are many ways of joining angles or corners together other than by dovetailing.



➤ DOWEL JOINT



➤ Tongue and groove joint



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Date..... Experiment No..... P. No. 28.

Name. AKASH PARMAR Faculty No..... Class. B.E (Ist) Batch. A2

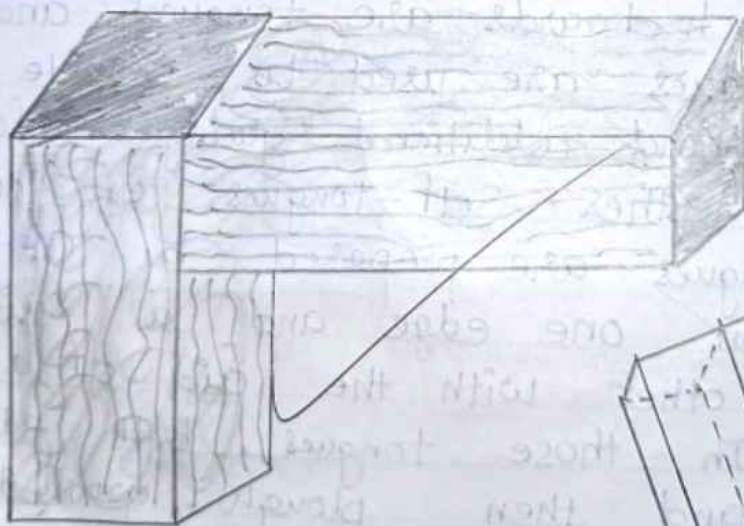
(4) Dowel joint:- it is often used as a farming joint in the place of the mortise and tenon joint. This may be use to advantage in many cases, such as the joints in circular work, but jointing two edges or positioning movable fittings.

(5) Tongue and Groove Joint:-

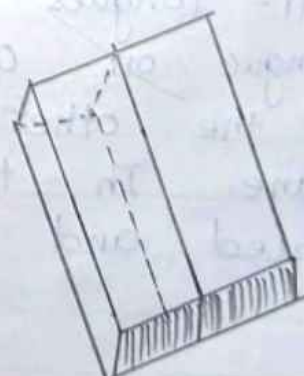
Commercially machined boards for edge to edge jointing, such as drawing boards, floor boards and match boards are tongued and grooved. The tongues are used to provide extra support and additional gluing surface. These may be either self-tongues or loose. Self-tongues are prepared by cutting a tongue on one edge and a suitable groove on the other with the aid of a matching plane. In those tongues, both edges are trued and then plough grooved.



➤ BRIDLE JOINT



➤ BUTT JOINT



➤ Rubbed joint



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(6) Briddle Joint:—

It is really the reverse of the mortise and tenon joint and is often called the open mortise and tenon.

The marking out is the same as for the through mortise and tenon joint, except for placing of the cut lines. It will be mortised that there is no mortise, but two grooves; and what was a tenon now becomes a slot.

(7) Butt or Rubbed joint:—

The fastening of boards edge to edge is frequently necessary to give a wider board for example, drawing boards, table top, counter top etc. The commonest form of edge joint is the butt or rubbed joint. In which two true edges are joined with glue. If properly done, this joint is very strong.

The rubbed joint is made by planing the two edges true with a trying plane.



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CARPENTRY PROCESS

Carpentry work involve a number of hand operations to finish the work to the desired shape and size with required accuracy. The following is the principal process used in wooden construction:-

- (a) Marking:- Marking is the process of setting out dimensions on a piece of wood for producing the required shapes. These dimensions can be measured from an existing model or can be set out with a folding rule which is most convenient for general use. It is generally done using instruments such as Caliper, try square, marking gauge etc.
- (b) Sawing:- Sawing is one of the basic operations carried out in a carpentry shop. A wood is required to be sawn along the grain or across the grain and in many shapes such as straight inclined or curved. To start the cut, the thumb of left hand is placed against the blade. One or two short movements are first given, taking care that the saw works in the right direction.



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(c) Planing :— it is the process of turning up a piece of wood by a plane. This is known as "facing & edging". and the Success of most pieces of work is dependent on this preliminary operation being properly carried out. A properly planned surface should be straight in all directions over the complete width of surface.

(d) chiselling :— chiselling is the process of cutting a small piece of wood to produce the desired shape. To cut horizontally with the grain, the chisel is held slightly fitted to one side and pushed forward in the direction of the grain. for roughing down to size the bevel side is down; for the finish cut the bevel side is up. The handle is slightly lowered down and chiselled from both sides to avoid splintering the corners with the chisel held flat the high spot in the center is removed.

(e) Boring :— Boring is the process of producing round holes through or blind, in the wood. The boring can be done straight or inclined to suit the type of work. while boring, the work is firmly secured in a holding tool in order to avoid product



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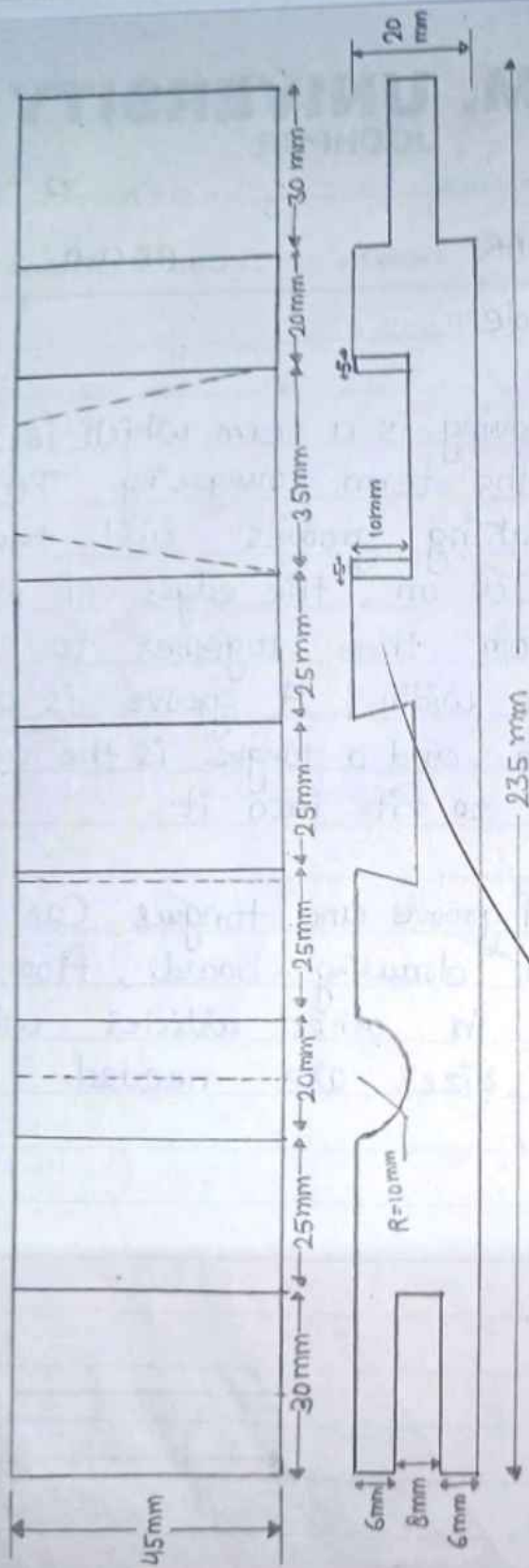
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of an eccentric hole.

- (f) Grooving :- The grooving is a term which is almost always used with the term tongueing. There are operations of making grooves and tongues that are usually cut on the edges of planks and boards to join them together to form big boards of large width. A groove is a channel cut to any shape and a tongue is the corresponding projections formed to fit into it.

Actual application of groove and tongues can very well be seen in drawing boards, floor boards wall partitions and in other articles where considerably large sizes are needed.



All dimensions in mm



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EXPERIMENT-1

👉 Aim:- To practice of Common wood working operations: planing, sawing, marking, measuring, chiselling, Tennoning, Grooving & mortising.

👉 Materials required:- Teak wood size 235mm x 20mm x 45mm

👉 Tools required:- Metal Jack plane 350mm, Try square 250 mm, Marking gauge 250 mm, Tennon Saw 250mm, firmer chisel 20mm, Scriber foot rule 300 mm, Mortise chisel 9 mm.

👉 PROCEDURE:-

- Plane the work piece with jack plane to proper size making the side flat, smooth and at right angles.
- Mark the work piece as per drawing.
- Cut the work piece as per drawing making the spot with tenon saw and mortise chisel.
- Use firmer chisel to cut the grooves.
- Do the final finish with the plane checking the dimensions.



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PRECAUTIONS: —

- Be attentive while doing the practical work.
- Do not wear loose dress.
- Use tools correctly and do not use them if they are not in proper working conditions.
- wear safety goggles when working in areas where sparks or chips of wood are flying.

Signature
18/11/2023