



# BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Woodworking Skills  
Session: 2020-21 (Winter Semester)  
B. Voc. Program, 1<sup>st</sup> Semester,  
End-Sem. Examination (Make - up)

Course Code: SCS1105

Time: 3 Hours

Course Name: Carpenter Materials

Max. Marks: 100

Instruction:

Section – A

20X01= 20 Marks

**Q1) Where is Sapwood located in the structure of softwood?**

- (a) Between cambium and core
- (b) Between bast and bark
- (c) Between pith and core
- (d) Between cambium and bast

**Q2) The Aluminum Oxide used for wood working as**

- (a) adhesive
- (b) cleaning agent
- (c) abrasive
- (d) None

**Q3) The colour of cellulose fibers is?**

- (a) White
- (b) Black
- (c) Gray
- (d) Brown

**Q4) Veneers that are visible on the finished work-piece are known as**

- (a) Blind veneer
- (b) Covering veneer
- (c) Deck veneer
- (d) Barrier veneer

**Q5) Which part of the trunk is known as growth tissue (forms new cells through cell division)?**

- (a) Core
- (b) Sapwood
- (c) Cambium
- (d) Bast

**Q6) Carborundum is**

- (a) Adhesive
- (b) Abrasive
- (c) Resin
- (d) Cleaning agent

**Q7) The layer responsible for transport of nutrient to the core called as**

- (a) Core
- (b) Sapwood
- (c) Cambium
- (d) Medullary rays

**Q8) The constituent of wood used for paper production and insulation is**

- (a) Sap
- (b) Lignin
- (c) Cellulose
- (d) None

**Q9) The characteristic provided by size and cell arrangement in wood is**

- (a) Strength
- (b) tolerance
- (c) Hardness
- (d) None



**Q10) Name the wood having Brinell hardness number equal to 48 N/mm<sup>2</sup>**

- (a) Acacia (b) Oak  
(c) Teak (d) Plum tree

**Q11) The most suitable wood for Fire resistance behavior**

- (a) Acacia (b) Oak  
(c) Teak (d) Plum tree

**Q12) The wooden board stacked on top of one another at regular interval using spacer strip, arrangement used for**

- (a) Natural drying (b) Inventory management  
(c) Materials identification (d) stock verification

**Q13) When wood is dried, it releases moisture and changes its shape. This process is called**

- (a) Swelling (b) Shrinkage  
(c) Seasoning (d) None

**Q14) One of the essential properties of abrasive for its selection is**

- (a) Plasticity (b) Density  
(c) Particle size (d) Humidity

**Q15) Common grain number for rough grinding is**

- (a) 60 (b) 100  
(c) 200 (d) 0 (zero)

**Q16) Which of the following is regarded as a modern abrasive?**

- (a) Tripoli (b) Silicon carbide  
(c) Pumice (d) Boron carbide

**Q17) Which of the following is not a natural abrasive?**

- (a) Emery (b) Quartz  
(c) Silicon carbide (d) Sandstone

**Q18) Which region of heartwood is light in colour**

- (a) Inner (b) Outer  
(c) Peripheral (d) None

**Q19) Shear strength of wood depends on**

- (a) Sapwood (b) Heartwood  
(c) medullary rays (d) Lignin and fiber

**Q20) Age of tree can be judged from**

- (a) Medullary rays (b) Annual rings  
(c) Cambium (d) None



**Section – B**

06X05 = 30 Marks

Q21) Write short note on: Hardness and Bulk density.

Q22) Define is laminate with its advantage?

Q23) Write the advantages of using glasses in woodworking.

Q24) Discuss hot melt adhesives, their properties and processing instructions in detail.

Q25) Discuss contact adhesives, their properties and processing instructions in detail.

Q26) Define linoleum with its advantage.

**Section – C**

05X10 = 50 Marks

Q 27) Explain the animal wood pests and vegetable wood pests in detail.

Q 28) Discuss the various methods used for changing the wood colour.

Q 29) Explain the role of tribe in stability and growth of tree.

Q 30) Explain any three mechanical properties of solid wood.

Q 31) Describe the slicing method of veneer manufacturing. Write its advantages and disadvantages also.





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**Section – B**

06X05 = 30 Marks

**Q21. Write short note on: Hardness and Bulk density.**

Ans.



The term hardness is used in two senses, namely: (1) resistance to indentation, and (2) resistance to abrasion or scratching. In the latter sense hardness combined with toughness is a measure of the wearing ability of wood and is an important consideration in the use of wood for floors, paving blocks, bearings, and rollers.

In the case of porous substances, the ratio between mass and volume can vary greatly. The decisive factor is how much material and how much air or gas is in the volume. That is why the term density is used instead of density for such substances

### **Q22 Define is laminate with its advantage?**

**Ans.** High Pressure Laminates (HPL), as defined by the European and international standards for HPL, EN 438 and ISO 4586, are high-density panels ( $\geq 1.35\text{g/cm}^3$ ), finished and ready for use, which have exceptional mechanical, physical strength and chemical resistance, are easy to work and simple to maintain. HPL panels are made of several layers of cellulose fibre material impregnated with thermosetting resins and then simultaneously subjected to both pressure ( $>7\text{MPa}$ ) and heat ( $140 / 150^\circ\text{C}$ ) in special presses, for a fixed time, which varies depending on the type of laminate.

#### **Advantage**

HPL boards are insensitive to all normal household chemicals. They are heat-resistant up to about  $150^\circ\text{C}$ , for short-term exposure in dry heat. They are water resistant. Standing wet under parked. However, objects can stain. HPL boards have good abrasion resistance, which however Normal HPL sheets can only be bent to a limited extent. For tight Radii are available in postforming plates. The HPL boards are hard and brittle, so they are very cracked and sensitive to impact

### **Q23. Write the advantages of using glasses in woodworking.**

**Ans.**

#### **Advantages of using Glass in woodworking**

##### *Transparency*

Glass is a unique transparent material which allows light to pass through it so that the objects behind the glass are visible clearly.

##### *Aesthetically appealing*

Glass provides an ideal way to showcase a product. Glass can make the structure look more stunning, sophisticated and adds beauty to the furniture. Mirrors are also made of glass.

##### *Dustproof*

Glass has a smooth glossy surface, so it is dustproof and can be cleaned efficiently. Unlike other materials, it is easy to maintain.

##### *Waterproof*



Glass is a waterproof material also. Using glass makes it easy to clean and maintain these places with less consumption of time and energy.

### *Recyclable and easily mouldable*

Glass is 100% recyclable, and it does not degrade during the recycling process. Hence, it can be recycled repeatedly without compromising on quality or purity and can also be easily moulded into desired shapes.

### *Weather and Rust resistant*

Unlike most materials, glass is corrosion resistant, and only under certain conditions, the glass is chemically attacked. Glass is fully weather resistant. It can withstand the effects of the wind, rain, or the sun and can retain its appearance and integrity in most of the given conditions.

### **Q24. Discuss hot melt adhesives, their properties and processing instructions in detail.**

Ans.

#### *Group 3: Hot melt adhesives*

Hot melt adhesives are used in edge banding machines and hot melt glue guns in granulate or cartridge form. Hot melt adhesives are heated and applied in a molten state. They harden by cooling from the hot liquid to the cool, hard state.

#### *Properties of hot melt adhesives*

- Hot melt adhesives harden very quickly
- Joints bonded with hot melt adhesives can be loosened again by heating (exception: PUR hot melt adhesives)
- Rapid adhesives are not moisture-resistant (Exception: PUR hot melt adhesives)

#### *Processing instructions*

- The temperature of the adhesive must remain hot until the parts are completely pressed together. If the adhesive cools down beforehand the bond will not hold.
- The melting temperature must correspond exactly to the specifications of the adhesive manufacturer. Melting temperatures that are too high decompose («burn») the adhesive.

### **Q25. Discuss contact adhesives, their properties and processing instructions in detail.**

Ans.

#### *Group 4: contact adhesives*

Contact adhesives are used for bonds that cannot be pressed with pressing aids. You must apply the contact adhesive on both sides. After a specified flash-off time (drying phase), you can put the parts together and briefly and firmly press them together. The glue sticks immediately.

#### *Properties of contact adhesives*

- Contact adhesives adhere immediately after joining the two vented parts

#### *Processing instructions*

- Contact adhesive needs a minimum working temperature of approx. 20 ° C. At lower temperatures, the adhesive layers become too hard and cannot be pressed together well.



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- Note the information provided by the adhesive manufacturer. Different conditions have to be observed depending on the adhesive.
- Apply contact adhesives evenly and quickly.
  - Position the parts to be glued very precisely before joining, as they can no longer be moved after joining.

### Q26. Define linoleum with its advantage.

Ans.

Linoleum is a material invented a century ago and a pure natural product. It consists of linseed oil, cork flour and resins. The surface is smooth and available in different shades of color. The linseed oil oxidizes at temperatures of 80 °, whereby natural resins are mixed in and the mass is processed into linoleum cement. The linoleum cement is then mixed and kneaded with cork, wood flour, white pigments and dyes. The resulting fine-grained mass is rolled onto the carrier fabric and acquires the desired properties in a maturation process of two to four weeks.

#### Advantage

- Environmentally, linoleum has a great deal going for it. The product is made primarily from minimally processed natural ingredients.
  - Linoleum is a warm material
  - Linoleum is a natural material
  - There is no electrostatic charge on linoleum
  - Linoleum is resistant to a wide range of chemicals
- Linoleum inhibits bacterial growth, which is why it is used in buildings used as a floor covering with increased hygiene requirements becomes

### Section – C

05X10 = 50 Marks

### Q27. Explain the animal wood pests and vegetable wood pests in detail.

Ans.

#### *Wood pests*

With wood pests, a distinction is made between animal and vegetable wood pests. Wood pests love moisture, stagnant air and warmth. You have to prevent this if you want to give wood a long life.

#### *Animal wood pests*

Animal wood pests include wood pests such as the bark beetle, the goat, the ant, the wood wasp and the rodent beetle, better known under the name «wood worm». The beetles arise from larvae, which in turn

hatch from eggs. The actual wood pest is the larva, which gnaws passages into the wood with its strong jaws.

A distinction is made between fresh wood and dry wood insects. Fresh wood insects can only develop in fresh wood, i.e. in the living tree or in freshly felled wood, while dry wood insects usually infest dry wood, i.e. lumber, e.g. Furniture or built-in wood in roof structures.

There are fungi and rot in the vegetable wood pests. A distinction is made between wood-destroying and wood-staining fungi and rot.

Wood-destroying fungi and rot are:

- White rot, brown rot and mildew.

Wood-staining fungi and rot are:

- Mold, blue stain and red streak.

**Q28. Discuss the various methods used for changing the wood colour.**

**Ans.**

### **Color Schemes**

You can change the wood color by staining, patinating or bleaching.

#### ***Bleaching***

Like hair, wood can also be bleached. This makes the wood lighter and the wood structure less visible. Chemicals such as hydrogen peroxide with ammonia or oxalic acid are used for bleaching. The bleaching liquid is applied to the wood and removed again after a certain exposure time.

Always use gloves and safety glasses when doing bleaching work and work in a well ventilated area. The used rags, sponges and brushes can ignite by themselves. You should therefore always wash them well and dispose of the rags in non-flammable containers.

#### ***Pickling***

The term stain is used to color wood by applying color pigments dissolved in liquid. There are many different stains. Depending on the type, different colors and effects can be achieved, they are suitable for different types of wood and they differ in the processing. Before pickling, you must always water, grind and remove dust from all workpieces. Then you can apply the stain with the sponge, the stain brush or with the spray gun, leave it on for a certain time and then remove the excess stain.

#### ***Patinate***

The patination gives the workpiece an old, worn look. Deep-lying areas are stained dark, protruding areas are lightened with the abrasive fleece. The dark stain is normally applied with a special spray gun.

#### ***Smoking***

This coloring process is mainly used for oak because it contains tannic acid. The oak wood is treated with ammonia vapor, which causes a chemical reaction with the tannic acid and the wood becomes darker.

#### ***Treat thermally***

The thermal treatment creates thermal wood. However, a special system is necessary for this. If the wood is strongly heated, the wood changes its color to a darker brown. The longer the heating takes, the darker the color.

**Q 29 Explain the role of tribe in stability and growth of tree.**

**Solution:**

*The base layers* If you look at the cross-section of a trunk, you will see that it consists of different zones or layers.

*The marrow / marrow tube* lies at the center of the trunk and is responsible for the tree growing tall.

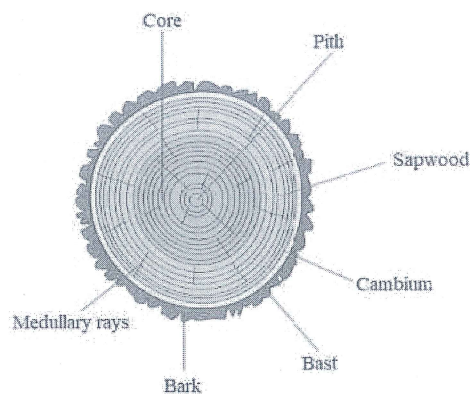
*The core (the heartwood)* lies in the inner part of the trunk. Heritage comes from old wooden cells that store nutrients. Most of the wood you use as a carpenter comes from this part of the tree because heartwood is more resistant than sapwood. Heartwood can be a darker color than sapwood. This varies depending on the type of wood.

*The sapwood (sapwood)* has the task of transporting water and nutrients from the roots to the leaves. Sapwood is less durable than heartwood. Sapwood can be lighter in color than the heartwood. This varies depending on the type of wood.

*The cambium* is the growth layer of the tree. It is a thin, sensitive layer. The cambium is responsible for the production of new wood during the growing season of the tree (spring and summer).

*The bast* is under the bark. It transports the nutrients produced in the leaves into the tree trunk.

*The bark* is the outermost layer of the tree. Their function is to protect the tree against extreme temperatures, pests and diseases. The bark is called bark together with the bast.



**Q 30) Explain any three mechanical properties of solid wood.**

**Ans:**

**TIFFNESS:** The property by means of which a body acted upon by external forces tends to retain its natural size and shape, or resists deformation. <sup>TM</sup> Thus a material that is difficult to bend or otherwise deform is stiff; one that is easily bent or otherwise deformed is flexible. Flexibility is not the exact counterpart of stiffness, as it also involves toughness and pliability.

2. **TENSILE STRENGTH:** The tensile strength of wood parallel to the grain depends upon the strength of the fibers and is affected not only by the nature and dimensions of the wood elements but also by their arrangement.



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3. **COMPRESSIVE OR CRUSHING STRENGTH:** Is very closely related to hardness and transverse shear. <sup>TM</sup> There are two ways in which wood is subjected to stress of this kind, namely, (1) with the load acting over the entire area of the specimen, and (2) with a load concentrated over a portion of the area.

4. **SHEARING STRENGTH:** Whenever forces act upon a body in such a way that one portion tends to slide upon another adjacent to it the action is called a shear. In wood this shearing action may be (1) along the grain, or (2) across the grain.

5. **TRANSVERSE OR BENDING STRENGTH: BEAMS:** When external forces acting in the same plane are applied at right angles to the axis of a bar so as to cause it to bend, they occasion a shortening of the longitudinal fibers on the concave side and an elongation of those on the convex side.

6. **TOUGHNESS: TORSION:** Wood that is difficult to split is said to be tough Toughness includes flexibility and is the reverse of brittleness, in that tough woods break gradually.

**Q 31 Describe the slicing method of veneer manufacturing. Write its advantages and disadvantages also.**

**Ans. Sliced veneers**

The sliced veneer process was developed at the beginning of the 19th century. The veneers are cut like a plane with a knife across the grain of the trunk. Before this is possible, the veneer trunks are separated into quarters or flitches and steamed in large steaming pits at 130°C for several days. In the plastic state, the wood is soft and can be sliced. The veneer sheets are then dried and tied into bundles in the correct order and labeled. The label is important because it provides information about veneer thickness, quantity and master number.

### *Advantages*

- Low cutting loss (only 20 mm rest board)
- Surface image exactly matches the one below
- Symmetrical images by falling over the veneers
- Cutting thicknesses from 0.5 to 4 mm
- Great cutting performance

### *Disadvantage*

- With thin veneers there is a risk of adhesive penetration
- Steaming can cause color changes
- The side of the knife shows small cracks
- This side is called the left side
- The knife process is used primarily to cut precious woods to veneer on deck



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Session: 2020-21 (Winter Semester)

B. Voc. Program, 1<sup>st</sup> Semester,

End Sem. (Make up) Examination

Course Code: SCS1106

Course Name: Hand Drawing

Time: 3 Hour

Max. Marks: 100

### Instruction:

- Answer all questions from section A, each question carries one mark.
- Answer all question from section B, each question carries four marks.
- Answer all question from section C, each question carries six marks.

### Section A

20X01 = 20 Marks

- Q. 1 100 mm is equivalent to  
(A) 10 cm (B) 1 cm  
(C) 1m (D) None of them
- Q. 2 In India drawing is created generally in which angle of projection  
(A) 2<sup>nd</sup> (B) 1<sup>st</sup>  
(C) 3<sup>rd</sup> (D) 4<sup>th</sup>
- Q. 3 1 Feet are equivalent to  
(A) 12 inch (B) 1 inch  
(C) 1 meter (D)None of them
- Q. 4 A point lies in front of vertical plane but below horizontal plane it lies in which quadrant.  
(A) 2<sup>nd</sup> (B) 1<sup>st</sup>  
(C) 3<sup>rd</sup> (D) 4<sup>th</sup>
- Q. 5 What is the significance of alternate long and short Dash line in technical drawing?  
(A) Outlines of the object (B) Hidden surface  
(C) A&B Both (D) line of symmetry
- Q. 6 In the given option which pencil will be the darker?  
(A) H (B) 2H  
(C) 2B (D) 3B
- Q. 7 What is the tolerance of the given dimension?  
(A) 2<sup>nd</sup> (B) 1<sup>st</sup>



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- (C) 3<sup>rd</sup> (D) 4<sup>th</sup>
- Q. 8 The Representative factor for full scale is  
(A) Equal to 1 (B) Always greater than 1  
(C) A&B Both (D) None of them
- Q. 9 If an object front view and top view both lie below xy line object is in which quadrant  
(A) 2<sup>nd</sup> (B) 1<sup>st</sup>  
(C) 3<sup>rd</sup> (D) 4<sup>th</sup>
- Q. 10 Which one will be the size for A4 Sheet in millimeter?  
(A) 420x297 (B) 29.7x21.0  
(C) 297x210 (D) 594x841
- Q. 11 In engineering field drawing is created generally in  
(A) Km (B) Meter  
(C) Millimeter (D) Decameter
- Q. 12 In India drawing is created generally in which angle of projection  
(A) 2<sup>nd</sup> (B) 1<sup>st</sup>  
(C) 3<sup>rd</sup> (D) 4<sup>th</sup>
- Q. 13 200 millimeters are equivalent to  
(A) 20 Centimeter (B) 20 meter  
(C) .2 meter (D) None of them
- Q. 14 A point lies in behind of vertical plane but below horizontal plane it lies in quadrant.  
(A) 2<sup>nd</sup> (B) 1<sup>st</sup>  
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(A) H (B) 4H  
(C) 2B (D) B
- Q. 17 In India drawing is created in which angle of projection  
(A) 2<sup>nd</sup> (B) 1<sup>st</sup>  
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- Q. 18 The Representative factor for enlarging scale is  
(A) Equal to 1 (B) Always greater than 1  
(C) A&B Both (D) None of them
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- Q. 20 Which one will be the size for A3 Sheet in millimeter?
- (A) 420x297 (B) 29.7x21.0  
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### Section B

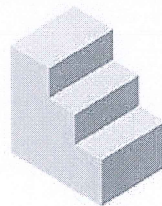
06X05 = 30 Marks

- Q. 21 Draw the all possible view of cross half lap joint.
- Q. 22 Write short notes on line used in engineering drawing with its application.
- Q. 23 Differentiate artistic drawing and Technical drawing. Draw the layout of a drawing sheet.
- Q. 24 Draw the all possible view of Corner bridle joint.
- Q. 25 What do you mean hand drawing? Explain any four type of drawing accessories
- Q. 26 Explain the type of drawing sheet use in Technical drawing with Proper Diagram.

### Section C

05X10 = 50 Marks

- Q. 27 Draw the projection
- a) A point is placed 20 mm in front of VP and 20 mm below HP.  
b) A point is placed 40 mm in front of VP and 18 mm above HP.
- Q. 28 Define the Nominal Size, Basic Size & Actual size and Tolerance.
- Q. 29 Draw the front, top and right side view of the following Diagram in 3rd angle projection.



Realistic View



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- Q. 30 Define the following
- Full size scale with example.
  - Reducing size scale an object of length with example.
  - An object of 2 feet is drawn on a size of 200mm calculate RF.
- Q. 31 Write short notes on absolute and relative coordinate system.

*S. J.*



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(C) 3<sup>rd</sup> (D) 4<sup>th</sup> Ans. D



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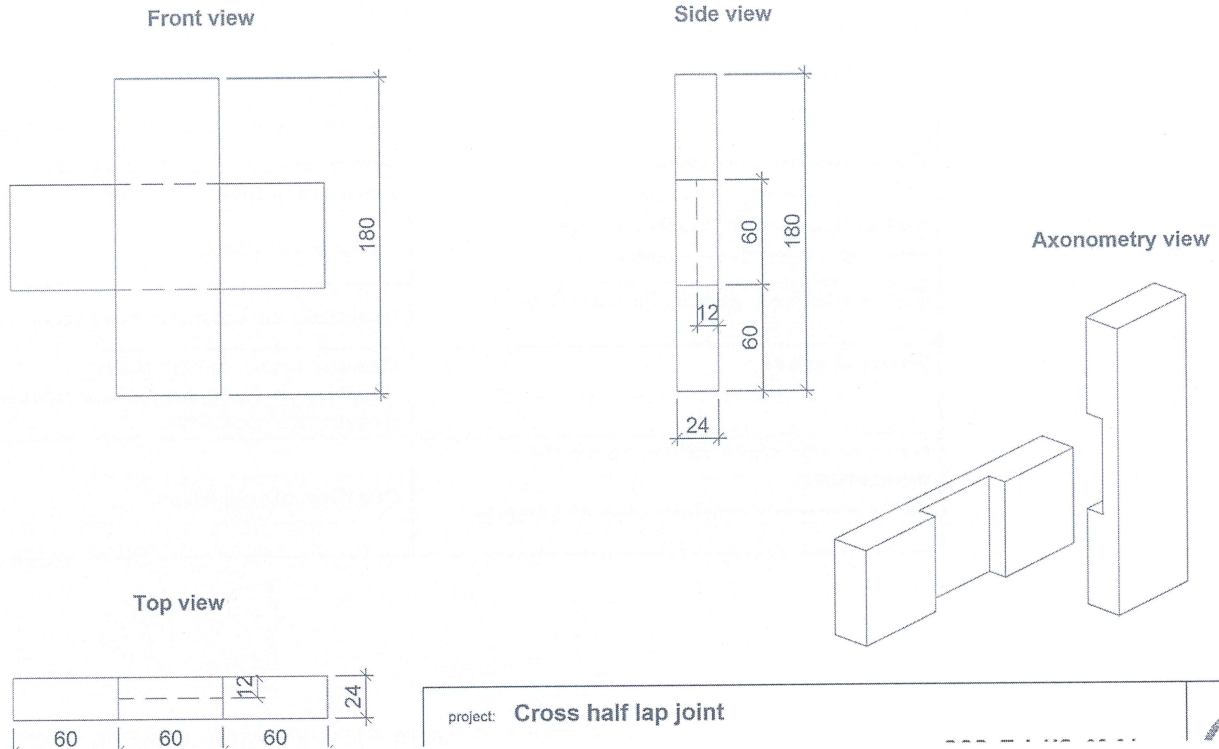
- Q. 10 Which one will be the size for A4 Sheet in millimeter?  
(A) 420x297 (B) 29.7x21.0  
(C) 297x210 (D) 594x841 Ans. C
- Q. 11 In engineering field drawing is created generally in  
(A) Km (B) Meter  
(C) Millimeter (D) Decameter Ans. C
- Q. 12 In India drawing is created generally in which angle of projection  
(A) 2<sup>nd</sup> (B) 1<sup>st</sup>  
(C) 3<sup>rd</sup> (D) 4<sup>th</sup> Ans. B
- Q. 13 200 millimeters are equivalent to  
(A) 20 Centimeter (B) 20 meter  
(C) .2 meter (D) None of them Ans. C
- Q. 14 A point lies in behind of vertical plane but below horizontal plane it lies in quadrant.  
(A) 2<sup>nd</sup> (B) 1<sup>st</sup>  
(C) 3<sup>rd</sup> (D) 4<sup>th</sup> Ans. C
- Q. 15 What is the significance of Dash line in technical drawing?  
(A) Outlines of the object (B) Hidden surface  
(C) A&B Both (D) line of symmetry Ans. B
- Q. 16 In the given option which pencil will be the Softer?  
(A) H (B) 4H  
(C) 2B (D) B Ans. D
- Q. 17 In India drawing is created in which angle of projection  
(A) 2<sup>nd</sup> (B) 1<sup>st</sup>  
(C) 3<sup>rd</sup> (D) 4<sup>th</sup> Ans. B
- Q. 18 The Representative factor for enlarging scale is  
(A) Equal to 1 (B) Always greater than 1  
(C) A&B Both (D) None of them Ans. B
- Q. 19 An object front view and top view both lie below xy line object is in which quadrant  
(A) 2<sup>nd</sup> (B) 1<sup>st</sup>  
(C) 3<sup>rd</sup> (D) 4<sup>th</sup> Ans. D
- Q. 20 Which one will be the size for A3 Sheet in millimeter?  
(A) 420x297 (B) 29.7x21.0  
(C) 297x210 (D) 594x841 Ans. A

### Section B

06X05 = 30 Marks

- Q. 21 Draw the all possible view of cross half lap joint.

Ans.










Q. 22 Write short notes on line used in engineering drawing with its application.

Ans. **Lines**

It is one important aspect of technical drawing. Lines are always used to construct meaningful drawings. Various types of lines are used to construct drawing, each line used in some specific sense. Lines are drawn following standard conventions mentioned in BIS (SP46:2003). A line may be curved, straight, continuous, segmented. It may be drawn as thin or thick. A few basic types of lines widely used in drawings are shown in Table

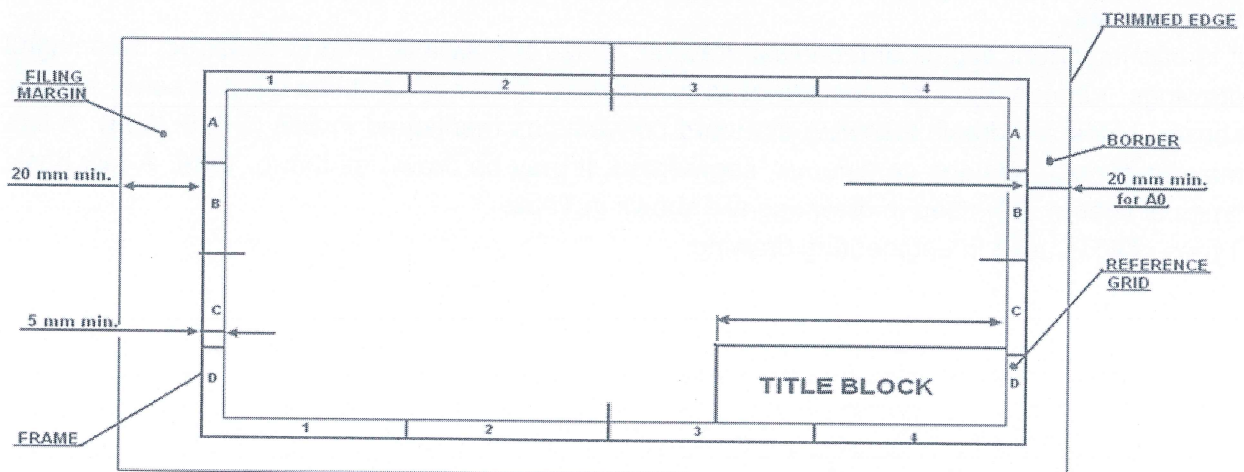
Types of lines used in engineering drawing.

Illustration	Application
<b>Thick</b> 	Outlines, visible edges, surface boundaries of objects, margin lines
<b>Continuous thin</b> 	Dimension lines, extension lines, section lines leader or pointer lines, construction lines, boarder lines
<b>Continuous thin wavy</b> 	Short break lines or irregular boundary lines – drawn freehand
<b>Continuous thin with zig-zag</b> 	Long break lines
<b>Short dashes, gap 1, length 3 mm</b> 	Invisible or interior surfaces
<b>Short dashes</b> 	Center lines, locus lines Alternate long and short dashes in a proportion of 6:1,
<b>Long chain thick at end and thin elsewhere</b> 	Cutting plane lines

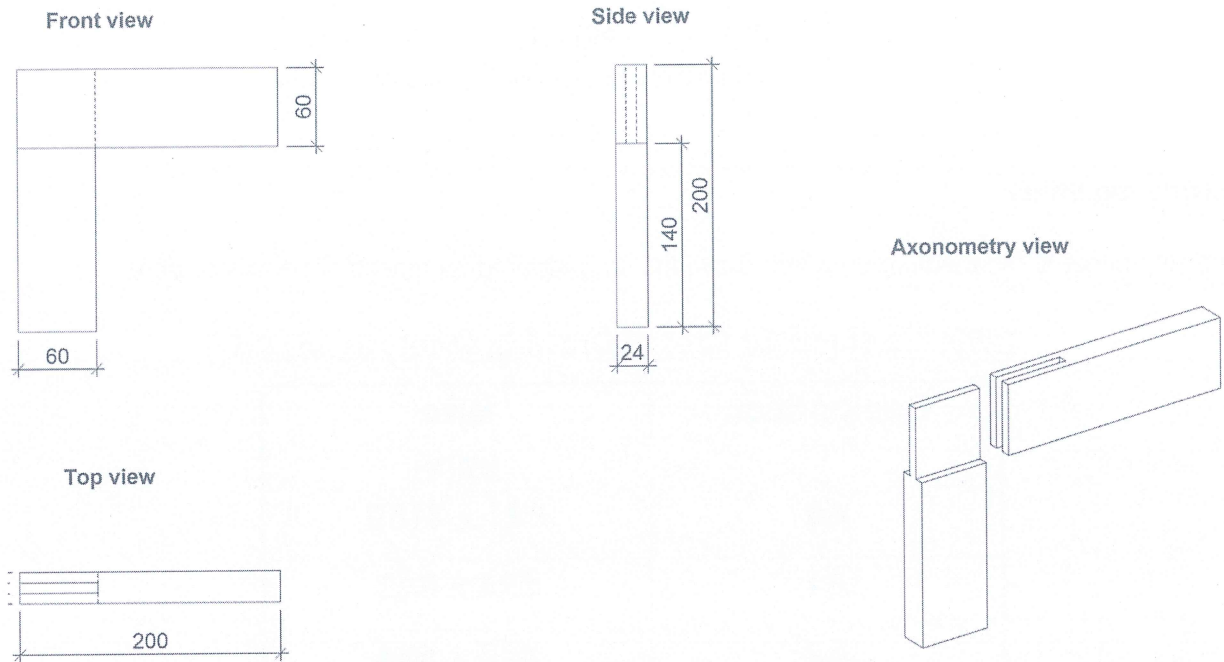
Q. 23 Differentiate artistic drawing and Technical drawing. Draw the layout of a drawing sheet.

Ans Drawing is the Graphical means of expression of technical details without the barrier of a language. Engineering Drawing is the Universal Language for Engineers.

The following set of instruments are required for ensuring perfection in manual drawing:



Q. 24 Draw the all possible view of Corner bridle joint.  
 Ans.



Q. 25 What do you mean hand drawing? Explain any four type of drawing accessories  
 Ans. Drawing is the Graphical means of expression of technical details without the barrier of a language. Engineering Drawing is the Universal Language for Engineers.

The following set of instruments are required for ensuring perfection in manual drawing:

### 1. Drawing Board

Drawing board is made of soft wooden platens. Almost perfect planning of the working surface of the drawing board is to be ensured.



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Table 1.1. Standard dimension of Engineer's Drawing Board

Designation	Length x Width (mm)	Recommended for use with sheet sizes
D0	1500 x 1000	A0
D1	1000 x 700	A1
D2	700 x 500	A2
D3	500 x 500	A3

D0 and D1 for drawing offices, for students use – D2

## 2. Drawing Sheet

Drawing sheet is the medium on which drawings are prepared by means of pencils or pen.

Table 1.2 Standard Sizes of Drawing sheets as per BIS

Designation	Size (mm)
A0	841 x 1189
A1	594 x 841
A2	420 x 594
A3	297 x 420
A4	210 x 297

## 3. Mini-drafter

This is a device used to draw parallel or inclined lines very effectively with ease. This is mounted on the top left corner of the drawing board by means of a clamping mechanism which is an integral part of the device.

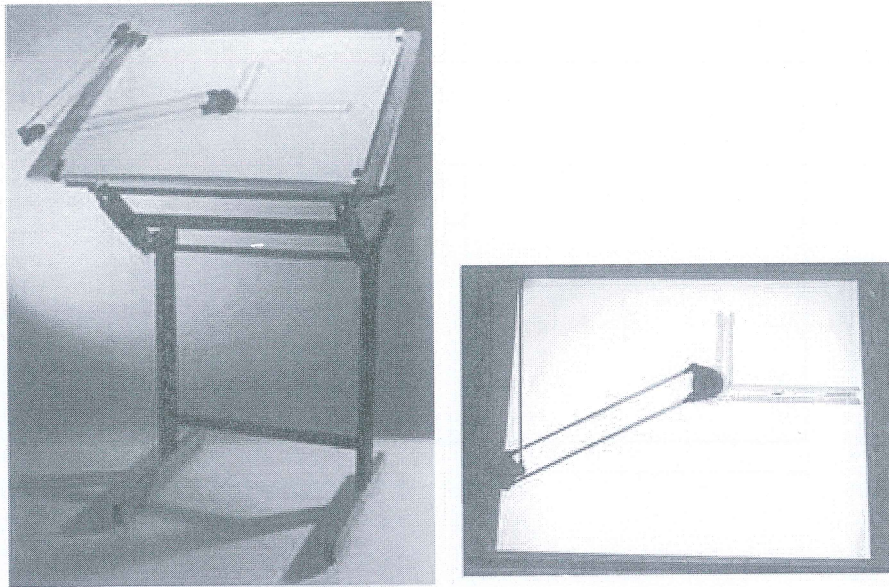


Figure 2. Photograph of a typical college level drawing table, drawing board and mini-drafter assembly

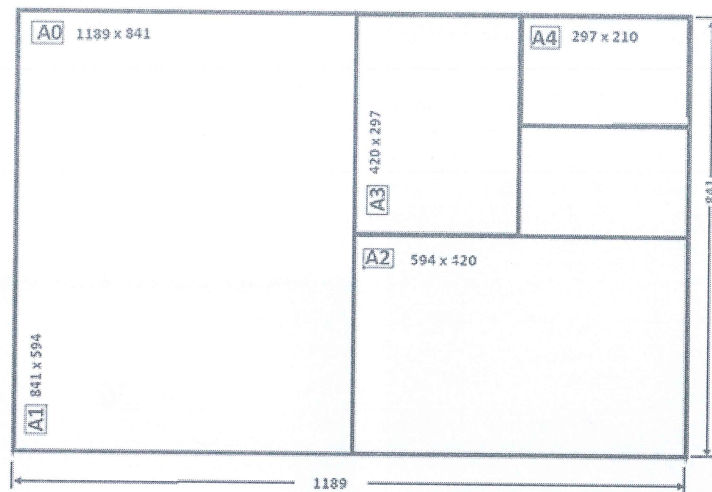
**4.Set squares** Set squares are a set of 45° set square and 30°-60° set-square, as shown in figure

Q. 26 Explain the type of drawing sheet use in Technical drawing with Proper Diagram.

Ans. **Drawing Sheet:** Drawing sheet is the medium on which drawings are prepared by means of pencils or pen.

According to the BIS standard size of drawing sheet are as follows

S. No.	Designation	Size
1.	A <sub>0</sub>	1189x841
2.	A <sub>1</sub>	841x594
3.	A <sub>2</sub>	594x420
4.	A <sub>3</sub>	420x297
5.	A <sub>4</sub>	297x210



## Section C

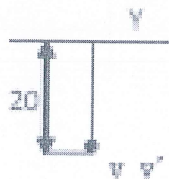
05X10 = 50 Marks

Q 27. Draw the projection

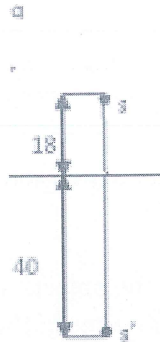
- A point is placed 20 mm in front of VP and 20 mm below HP.
- A point is placed 40 mm in front of VP and 18 mm above HP.

Ans.

a)



b)



Q 28. Define the Nominal Size, Basic Size & Actual size and Tolerance.

Ans.

**Nominal size:** The nominal size of a dimension is the size specified in the drawing. It is usually given in the drawing as rounded of whole millimeters.

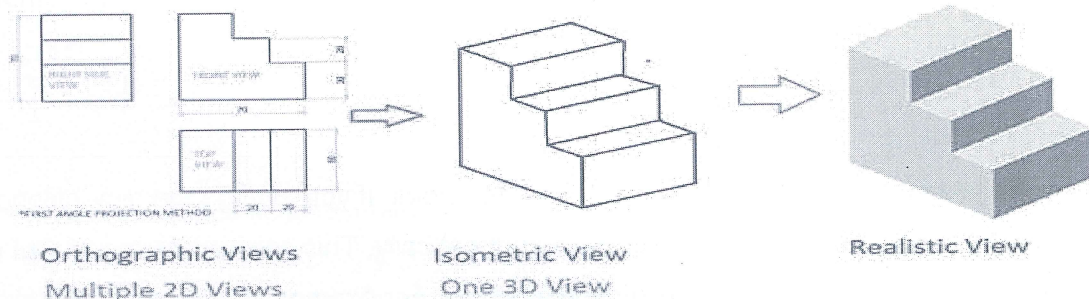
**Basic size:** The basic size of dimension is the size in relation to which all limits of variations are determined.

**Actual size:** the actual size of a dimension is its measured.

**Tolerance :** It is the difference between upper and lower limit .

Q. 29 Draw the front, top and right side view of the following Diagram in 3rd angle projection.

Ans





## BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Q. 30 Define the following

- Full size scale with example.
- Reducing size scale an object of length with example.
- An object of 2 feet is drawn on a size of 200mm calculate RF.

Ans. A scale is defined as the ratio of the linear dimensions of the object as represented in a drawing to the actual dimensions of the same.

- Drawings drawn with the same size as the objects are called full sized drawing.
- It is not convenient, always, to draw drawings of the object to its actual size. e.g. Buildings,
- Heavy machines, Bridges, Watches, Electronic devices etc.
- Hence scales are used to prepare drawing at
  - Full size
  - Reduced size
  - Enlarged size

$$\text{Representative Factor (RF)} = \frac{\text{Drawing length of an object}}{\text{Actual length of an object}}$$

$$\text{Actual length of an object} = 2 \text{ feet} = 2 \times 12 \times 25.4 \text{ mm}$$

$$\text{Drawing length} = 200 \text{ mm}$$

$$Rf = \frac{200}{4 \times 12 \times 25.4 \text{ mm}} = 0.082$$

Q. 31 Write short notes on absolute and relative coordinate system.

Ans. Absolute dimension

The absolute dimension refers to a zero point and is therefore also called reference.

Absolute dimensioning is the basis for the CNC program creation particularly suitable. It is easy to interpret and can be easily converted into a program. Similarly, edits can easily be compared and controlled with the plan.

Relative dimensioning:

The measures always refer to the previously measured point. If you change the dimensions of the previous point, all other points will be moved automatically. This can lead to errors, but is also very handy for edits that need to be moved together. For example, in a series hole drilling, if the first hole is moved, all the other holes should also be moved. The relative dimensioning is also known as chain or incremental.



**School of Woodworking Skills**  
**Session: 2020-21 (Winter Semester)**  
**B. Voc. Program, 1<sup>st</sup> Semester,**  
**End-Sem. Examination (Make - up)**

**Course Code: SCS1107**

**Time: 3 Hours**

**Course Name: Open Elective – I (DIY Furniture)**

**Max. Marks: 100**

**Instruction:**

1. Answer all question from section A, each question carries one mark.
2. Answer all question from section B, each question carries six marks.
3. Answer all question from section C, each question carries ten marks.

**Section – A**

20X01= 20 Marks

Q.1 What should you do in case you have damaged a tool while working.

- |                           |                         |
|---------------------------|-------------------------|
| (a) Report to the trainer | (b) Leave it unattended |
| (c) Ignore the tool       | (d) None of the above   |

Q.2 Which one of the following is the soft wood.?

- |            |          |
|------------|----------|
| (a) Pine   | (b) Teak |
| (c) Acacia | (d) Sal  |

Q.3 Which one of the following is the hard wood?

- |                 |                    |
|-----------------|--------------------|
| (a) Pine        | (b) Particle Board |
| (c) Steam Beach | (d) None of these  |

Q.4 Which one of the following wood is used to make biscuits?

- |                   |                   |
|-------------------|-------------------|
| (a) Pine wood     | (b) Steam Beach   |
| (c) Both of these | (d) None of these |

Q.5 Which one of the following tool is used to mark lines of different angle.

- |                |                   |
|----------------|-------------------|
| (a) Try square | (b) Marking gauge |
| (c) Caliper    | (d) Bevel angle   |

Q.6 Which one of the following is a planning tool?

- |                       |                  |
|-----------------------|------------------|
| (a) Try square        | (b) Screw driver |
| (c) Japanese pull saw | (d) None of them |

Q.7 Which one of the following is a marking tool?

- |                        |                       |
|------------------------|-----------------------|
| (a) Manual hand planer | (b) Perforated chisel |
| (c) Try square         | (d) None of them      |

Q.8 Which one of the following is not a marking tool?

- |                 |                   |
|-----------------|-------------------|
| (a) Try square  | (b) Steel ruler   |
| (c) Jack planer | (d) Marking gauge |

- Q.9 Which one of the following is used to make particle boards?  
(a) Wood dust (b) Wood chips  
(c) PVC (d) None of these
- Q.10 Which one of the following is not used to make tenon in Hand skill?  
(a) Handy machine (b) Hand saw  
(c) Chisel (d) Mortise gauge
- Q.11 Which one of the following is a type of pine wood?  
(a) Hard Wood (b) Soft wood  
(c) Particle wood (d) None of these
- Q.12 Which one of the following is the use of marking gauge?  
(a) Mark dimension (b) Check 90°  
(c) Both of these (d) None of these
- Q.13 Which one of the following is used to check 90°?  
(a) Marking gauge (b) Try square  
(c) Chisel (d) Hammer
- Q.14 Which one of the following is use to transfer angle from one piece to another?  
(a) Try square (b) Marking gauge  
(c) Double meter (d) Sliding bevel
- Q.15 Which one of the following tool is used to sharp chisel?  
(a) Flat file (b) Sharpening stone  
(c) Both of these (d) None of these
- Q.16 Which one of the following is not a part of wood structure?  
(a) leaves (b) Bark  
(c) Pith (d) Heart wood
- Q.17 Which one of the following is an example of fiber board?  
(a) Particle board (b) Solid Wood  
(c) MDF (d) Ply board
- Q.18 Which one of the following is the smallest measurement mark on a double meter?  
(a) Meter (b) Millimeter  
(c) Inch (d) Foot
- Q.19 Which one of the following is the smallest measurement mark on a roll meter?  
(a) Foot (b) Meter  
(c) Inch (d) Millimeter
- Q.20 Which one of the following saw is used to make half lap joint?  
(a) Indian saw (b) Japanese saw  
(c) Coping saw (d) All of the above



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## Section – B

05X06 = 30 Marks

- Q.1 What is a carpenter triangle and why do we use it.
- Q.2 Define dovetail joint for box construction.
- Q.3 Explain any four differences between Hard wood and Soft wood.
- Q.4 Define any four measuring tools in woodworking.
- Q.5 Write the name of eight basic hand tools used in carpentry workshop.

## Section – C

05X10 = 50 Marks

- Q.1 Explain corner bridle joint with their neat sketch and also mention their two advantages and two disadvantages.
- Q.2 Explain tenon and mortice joint with their neat sketch and also mention their two advantages and two disadvantages.
- Q.3 What kind of safety precautions should be kept in mind while working with wood working workshop.
- Q.4 Discuss the structure of wood construction with suitable diagram.
- Q.5 Write short notes on:

(a) Chisels

(b) Hammer

(c) Hand saw

(d) Files





School of Woodworking Skills  
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Section – A

20X01= 20 Marks

Q.1 What should you do in case you have damaged a tool while working.

- (a) Report to the trainer (b) Leave it unattended  
(c) Ignore the tool (d) None of the above (a)

Q.2 Which one of the following is the soft wood.?

- (a) Pine (b) Teak  
(c) Acacia (d) Sal (a)

Q.3 Which one of the following is the hard wood?

- (a) Pine (b) Particle Board  
(c) Steam Beach (d) None of these (c)

Q.4 Which one of the following wood is used to make biscuits?

- (a) Pine wood (b) Steam Beach  
(c) Both of these (d) None of these (b)

Q.5 Which one of the following tool is used to mark lines of different angle.

- (a) Try square (b) Marking gauge  
(c) Caliper (d) Bevel angle (d)

Q.6 Which one of the following is a planning tool?

- (a) Try square (b) Screw driver  
(c) Japanese pull saw (d) None of them (d)

Q.7 Which one of the following is a marking tool?

- (a) Manual hand planer (b) Perforated chisel  
(c) Try square (d) None of them (c)

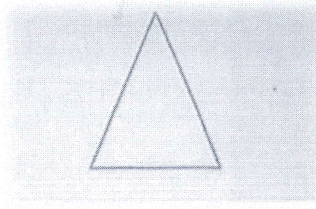
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(a) Particle board (b) Solid Wood  
(c) MDF (d) Ply board (a)
- Q.18 Which one of the following is the smallest measurement mark on a double meter?  
(a) Meter (b) Millimeter  
(c) Inch (d) Foot (b)
- Q.19 Which one of the following is the smallest measurement mark on a roll meter?  
(a) Foot (b) Meter  
(c) Inch (d) Millimeter (d)
- Q.20 Which one of the following saw is used to make half lap joint?  
(a) Indian saw (b) Japanese saw  
(c) Coping saw (d) All of the above (d)

Q.1 What is a carpenter triangle and why do we use it.

**Ans.** We use symbols to combine work piece together. The symbol that is used to combine is called triangle sign. The aim of drawing symbol is that the individual parts of the work are evaluated at the same time and by each person. Sometimes we use the left part instead of the right part and the top part instead of the bottom because there are several identical pieces of the same size, so we need to number them accordingly and this can be done by making triangle sign. The sign should not be too small. It should be clearly visible. It should be drawn from the bottom to the top and from front to back.



Triangle

Q.2 Define dovetail joint for box construction.

**Ans.** A series of 'pins' cut to extend from the end of one board interlock with a series of 'tails' cut into the end of another board. The pins and tails have a trapezoidal shape. Once glued, a wooden dovetail joint requires no mechanical fasteners. Dovetail joints are so named from the shape of the piece which make the joint. This is probably the strongest method for joining two pieces of wood. The strength of the dovetail joint comes from the interlocking of the parts. There is a great variety of forms of dovetail joints.

Advantage – Dovetail joint will be extremely strong and is resistant to pulling apart.

Disadvantage – This type of joint may be too hard for a beginner, as it needs precision cutting.

Q.3 Explain any four differences between Hard wood and Soft wood.

**Ans.**

Characteristics	Softwood	Hardwood
Source	Softwood is collected from conifer trees which are evergreen having needle-shaped leaves. these are generally gymnosperms.	Hardwood is obtained from deciduous trees (loses leaves in autumn). They are basically angiosperms.
Fibre	Less dense, strait fiber is found.	In case of hardwood, the fibers are quite close and dense.
Weight	Lightweight and softer than hardwood.	Heavyweight and harder than softwood.
Colour	Softwood is light in color.	Normally these are dark colored woods.



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Example	Pine, Redwood.	Oak, Steam Beech.
---------	----------------	-------------------

Q.4 Define any four measuring tools in woodworking.

Ans.

1. Steel Ruler - Steel ruler is suitable for measuring short distances. It measures distances accurately in the range of millimeter.
2. Vernier Caliper - It is mainly used for fine measurements in wood working. They ensure a precise measurement of inside and outside dimension as well as depth.
3. Double Meter - The foldable double meter consists of short strips of wood, plastic or metal which are connected by swivel joint.
4. Roll Meter - They are available in different length and designs. They ensure a measurement of exact length and circular work pieces.

Q 5. Write the name of eight basic hand tools used in carpentry workshop.

Ans.

- i. Hammer
- ii. Jack Planer
- iii. Try Square
- iv. Hand Saw
- v. Chisels
- vi. Steel Ruler
- vii. Double Mater
- viii. Marking Gauge

### Section – C

10X05 = 50 Marks

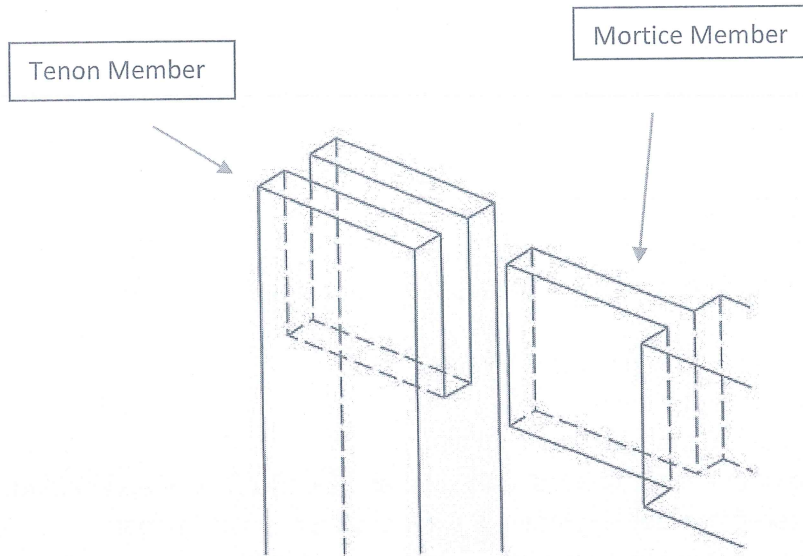
Q.1 Explain corner bridle joint with their neat sketch and also mention their two advantages and two disadvantages.

Ans. A bridle joint is a woodworking joint, similar to a mortise and tenon, in that a tenon is cut on the end of one member and a mortise is cut into the other to accept it. The difference feature is that the tenon and the mortise are cut to the full width of the tenon member. The corner bridle joint joins two members at their respective ends, forming a corner. The bridle joint is very popular in workbench construction. This joint is very decorative and very stable for window frames.

A bridle joint is similar to a mortise and tenon woodworking joint, though in most circumstances it would not be as strong. It is open ended mortise and tenon joint. A bridle joint is quick and easy to make, since most of the waste wood is removed with a saw.

Advantage – 1. Very good strength in compression  
2. Simpler alternative to the mortise and tenon joint cause of no need mortise machine in narrow frame.

Disadvantage – 1. Outer visibility of joints.  
2. If any gap remains in construction, then mechanical fastener or pin is often required.



Q.2 Explain tenon and mortice joint with their neat sketch and also mention their two advantages and two disadvantages.

Ans. A mortise and tenon joint is a type of joint that connects two pieces of wood at usually angle of  $90^\circ$ . Mortise and tenon are two components: the mortise hole and the tenon tongue. The tenon is cut to fit the mortise hole exactly and usually has shoulders that seat when the joint fully enters the mortise hole. The joint may be glued, pinned, or wedged to lock it in place.

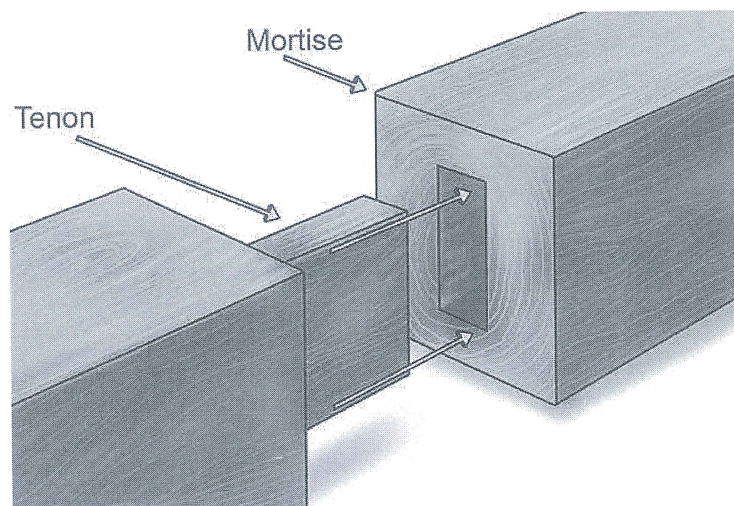
A mortise and tenon joint is one in which the rectangular end (the tenon) of one piece fits into a rectangular hole (the mortise) of the same size, in the other piece. Mortise and tenon joints are made in a number of different types. The blind mortise and tenon is the most common. It is used extensively in cabinetmaking for joining rails to legs or stiles, and in many other constructions well. When properly designed, proportioned, and well made, mortise and tenon joints are strong and neat in appearance.

Advantage – 1. Very good strength for heavy doors and gates.

2. It is both simple and strong.

Disadvantage – 1. Complex production while mortise hole.

2. Higher accuracy required to produce this joint.



Q.3 What kind of safety precautions should be kept in mind while working with wood working workshop.

Ans. The following are general safety procedures that apply to almost every work situation.

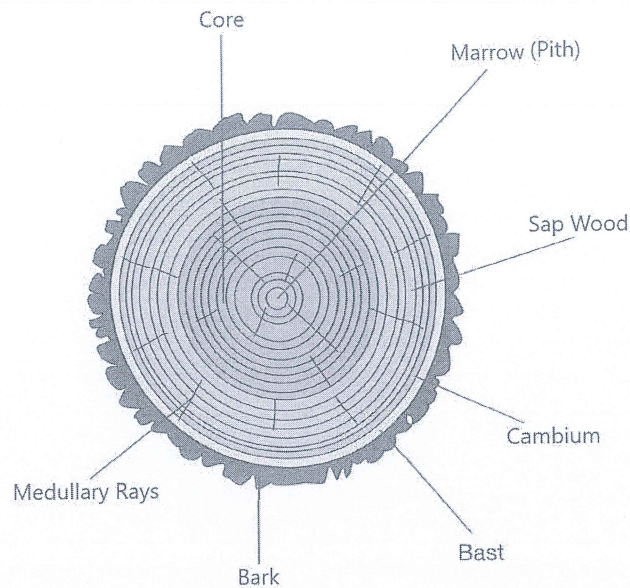
- Adhere to instructions.
- Read labels and warnings on containers and tools.
- Follow the manufacturer's recommendations for use and maintenance of a specific tool.
- Pay attention to signs posted in the work area.
- Follow the instructor's directions.
- Wear safety glasses in the shop at all times.
- Wear protective gear such as gloves, earplugs, and safety shoes if appropriate.
- Do not wear loose-fitting clothing that could get caught in a moving part.
- Wear a hair net to prevent long hair from getting caught in a tool.
- Keep work areas clean and free of clutter.
- Inspect each tool before using it to make sure it is working properly.
- Tell the instructor about any damaged tool.
- Do not use a tool that is not working properly.
- Return each tool to its proper place of storage.

Q.4 Discuss the structure of wood construction with suitable diagram.

Ans. When you look at the cross section of a trunk, you notice that it is made up of different zones or layers.

- **The Marrow (Pith)** is at the centre of the trunk and is responsible for the tree's heightening.
- **The core (the heartwood)** lies in the inner part of the trunk. It consists of old wood cells that store nutrients. The largest part of the wood used by you as carpenter practice comes from this tree part, since heartwood is more resistant than sapwood. The Core part can have a darker colour than the sapwood. This variety depending on the type of wood.
- **The sapwood (sapwood)** has the task of transporting water and nutrients from the roots to the leaves. Sapwood is less suitable than heartwood. Sapwood may have a lighter colour than the heartwood. This differs depending on the type of wood.
- **The cambium** is the growth layer of the tree. It is a dilute, sensitive layer. The cambium is responsible for the production of new wood during the growing season of the tree (spring and summer).
- **The bast** lies under the bark. He transports the nutrient produced in the tree trunk.
- **The bark** is the outermost layer of the tree. Its function is the protection of the tree against extreme temperatures, pests and diseases.

The medullary rays are not a parent layer. They connect the centre of the stem with the various layers of the cells for the transport of water and nutrients.



Q.5 Write short notes on:

- (a) Chisels                      (b) Hammer                      (c) Hand saw                      (d) Files

**Ans. (a) Chisels** - Chisels are tools that can remove thick or thin shavings of wood. We can remove material by the chisel by cutting edge of blade on its end, for flat and carving. The handle is made of plastic and wood or blade of chisel are made of metal with a sharp edge in it. Chiseling use involves forcing the blade into some material to cut it. The driving force may be applied by pushing by hand, or by using a mallet or hammer.

**(b) Hammer** – A hammer is a tool that delivers a sudden impact to an object. These are hand tools used to drive nails, fit objects. Hammers vary in shape, size, and structure, depending on their purposes. **Application** – Punching, Striking and Pulling.

**(c) Hand saw** - Hand saw is designed to cut hard and soft wood. Saw is used to make straight cuts across the grain and along the grain of the wood. A hand saw has a long, wide blade which usually cannot be removed from the handle. The teeth of a saw are pointed like a knife and cut on both the forward and backward strokes as per the quality of the blade. Traditionally, hand saws would have either crosscut teeth (for cutting wood across the grain) or rip teeth (for cutting along the grain). Nowadays, most models have teeth that are able to do both. These are often referred to as “universal” or “utility” teeth.

**(d) Files** - Files are useful for forming and smoothing irregular shapes such as curves and cuts. They are classified by shape (triangular, half-round, round, and flat), length (6 in., 8 in., 10 in., and 12 in.), teeth design (single cut and double cut. The Flat Teeth coarseness wood to be filed must be put in a vice or other device to hold it firmly. Files should be held at a slight angle to the work, with filing done from the Heel Face Point edge to the centre to avoid splintering the wood.





School of Woodworking Skills  
Session: 2020-21 (Winter Semester)  
B. Voc. Program, 1<sup>st</sup> Semester,  
End-Sem. Examination (Make - up)

Course Code: SCS1107

Time: 3 Hours

Course Name: Open Elective – I (DIY Furniture)

Max. Marks: 100

**Instruction:**

1. Answer all question from section A, each question carries one mark.
2. Answer all question from section B, each question carries six marks.
3. Answer all question from section C, each question carries ten marks.

**Section – A**

20X01= 20 Marks

Q.1 What should you do in case you have damaged a tool while working.

- |                           |                         |
|---------------------------|-------------------------|
| (a) Report to the trainer | (b) Leave it unattended |
| (c) Ignore the tool       | (d) None of the above   |

Q.2 Which one of the following is the soft wood.?

- |            |          |
|------------|----------|
| (a) Pine   | (b) Teak |
| (c) Acacia | (d) Sal  |

Q.3 Which one of the following is the hard wood?

- |                 |                    |
|-----------------|--------------------|
| (a) Pine        | (b) Particle Board |
| (c) Steam Beach | (d) None of these  |

Q.4 Which one of the following wood is used to make biscuits?

- |                   |                   |
|-------------------|-------------------|
| (a) Pine wood     | (b) Steam Beach   |
| (c) Both of these | (d) None of these |

Q.5 Which one of the following tool is used to mark lines of different angle.

- |                |                   |
|----------------|-------------------|
| (a) Try square | (b) Marking gauge |
| (c) Caliper    | (d) Bevel angle   |

Q.6 Which one of the following is a planning tool?

- |                       |                  |
|-----------------------|------------------|
| (a) Try square        | (b) Screw driver |
| (c) Japanese pull saw | (d) None of them |

Q.7 Which one of the following is a marking tool?

- |                        |                       |
|------------------------|-----------------------|
| (a) Manual hand planer | (b) Perforated chisel |
| (c) Try square         | (d) None of them      |

Q.8 Which one of the following is not a marking tool?

- |                 |                   |
|-----------------|-------------------|
| (a) Try square  | (b) Steel ruler   |
| (c) Jack planer | (d) Marking gauge |



- Q.9 Which one of the following is used to make particle boards?  
(a) Wood dust  
(b) Wood chips  
(c) PVC  
(d) None of these
- Q.10 Which one of the following is not used to make tenon in Hand skill?  
(a) Handy machine  
(b) Hand saw  
(c) Chisel  
(d) Mortise gauge
- Q.11 Which one of the following is a type of pine wood?  
(a) Hard Wood  
(b) Soft wood  
(c) Particle wood  
(d) None of these
- Q.12 Which one of the following is the use of marking gauge?  
(a) Mark dimension  
(b) Check 90°  
(c) Both of these  
(d) None of these
- Q.13 Which one of the following is used to check 90°?  
(a) Marking gauge  
(b) Try square  
(c) Chisel  
(d) Hammer
- Q.14 Which one of the following is use to transfer angle from one piece to another?  
(a) Try square  
(b) Marking gauge  
(c) Double meter  
(d) Sliding bevel
- Q.15 Which one of the following tool is used to sharp chisel?  
(a) Flat file  
(b) Sharpening stone  
(c) Both of these  
(d) None of these
- Q.16 Which one of the following is not a part of wood structure?  
(a) leaves  
(b) Bark  
(c) Pith  
(d) Heart wood
- Q.17 Which one of the following is an example of fiber board?  
(a) Particle board  
(b) Solid Wood  
(c) MDF  
(d) Ply board
- Q.18 Which one of the following is the smallest measurement mark on a double meter?  
(a) Meter  
(b) Millimeter  
(c) Inch  
(d) Foot
- Q.19 Which one of the following is the smallest measurement mark on a roll meter?  
(a) Foot  
(b) Meter  
(c) Inch  
(d) Millimeter
- Q.20 Which one of the following saw is used to make half lap joint?  
(a) Indian saw  
(b) Japanese saw  
(c) Coping saw  
(d) All of the above



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## Section – B

05X06 = 30 Marks

- Q.1 What is a carpenter triangle and why do we use it.
- Q.2 Define dovetail joint for box construction.
- Q.3 Explain any four differences between Hard wood and Soft wood.
- Q.4 Define any four measuring tools in woodworking.
- Q.5. Write the name of eight basic hand tools used in carpentry workshop.

## Section – C

05X10 = 50 Marks

- Q.1 Explain corner bridle joint with their neat sketch and also mention their two advantages and two disadvantages.
- Q.2 Explain tenon and mortice joint with their neat sketch and also mention their two advantages and two disadvantages.
- Q.3 What kind of safety precautions should be kept in mind while working with wood working workshop.
- Q.4 Discuss the structure of wood construction with suitable diagram.
- Q.5 Write short notes on:

(a) Chisels

(b) Hammer

(c) Hand saw

(d) Files

