



School of Woodworking Skills
Session: 2020-21 (Summer Semester)
B. Voc. III Semester,
1st In-Sem. Examination

Course Code: SCS1301

Time: 1 Hour

Course Name: Advanced Power Tools

Max. Marks: 20

Instruction:

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

Section – A

05X01 = 05 Marks

Q.1.Which one of the following is the diameter of Saw blade in Hand Circular Saw TS 55?

- (A) 155 mm
- (B) 160 mm
- (c) 150 mm
- (D) 165 mm

Q.2.Which one of the following is the depth of cut (without guide rail) at 45 degrees in Hand Circular Saw?

- (A) 45 mm
- (B) 42 mm
- (C) 43 mm
- (D) 44 mm

Q.3.Which one of the following is the Tooth shape used for clean cutting of wood fibers?

- (A) Alternate Top Bevel
- (B) Triple Chip
- (C) Both (A) & (B)
- (D) None of these

Q.4.Which one of the following is the maximum mortising width in Domino DF 500?

- (A) 22 mm
- (B) 23 mm
- (C) 28 mm
- (D) 25 mm

Q.5.Which one of the following is the maximum mortising depth in Domino DF 500?

- (A) 22 mm
- (B) 23 mm
- (C) 28 mm
- (D) 25 mm

Section – B

03X02 = 06 Marks

Q.6.What are the two advantages of using guide rail while doing grooving?

Q.7.What is MFS Template? Write two advantages of MFS Template.

Q.8.What are the two ways of Guiding of Jig Saw? Explain it.

Section – C

03X03 = 09 Marks

Q.9.What are the three major operations performed by Hand Circular Saw? Explain with diagram.

Q.10.What is Plunge Cutting? Explain with the help of diagram.



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Q.11. What is domino slot principle? Also explain the three slots principle used in Domino machine.

Sol-A



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Section – A

05X01 = 05 Marks

Q.1.Which one of the following is the diameter of Saw blade in Hand Circular Saw TS 55?

- (A) 155 mm (B) 160 mm
(c) 150 mm (D) 165 mm (B)

Q.2.Which one of the following is the depth of cut (without guide rail) at 45 degrees in Hand Circular Saw?

- (A) 45 mm (B) 42 mm
(C) 43 mm (D) 44 mm (C)

Q.3.Which one of the following is the Tooth shape used for clean cutting of wood fibers?

- (A) Alternate Top Bevel (B) Triple Chip
(C) Both (A) & (B) (D) None of these (A)

Q.4.Which one of the following is the maximum mortising width in Domino DF 500?

- (A) 22 mm (B) 23 mm
(C) 28 mm (D) 25 mm (B)

Q.5.Which one of the following is the maximum mortising depth in Domino DF 500?

- (A) 22 mm (B) 23 mm
(C) 28 mm (D) 25 mm (C)

Section – B

03X02 = 06 Marks

Q.6.What are the two advantages of using guide rail while doing grooving?

ANS: - Advantages of using guide rail while doing grooving are: -

1. Easy to handle hand router while making groove.
2. Gives accurate and precise dimensions of groove.

Q.7.What is MFS Template? Write two advantages of MFS Template.

ANS: - MFS Multi-Routering Template System is fully adjustable and expandable. Select the size we need, and add extension profiles whenever we require for different scale jobs.

Advantages

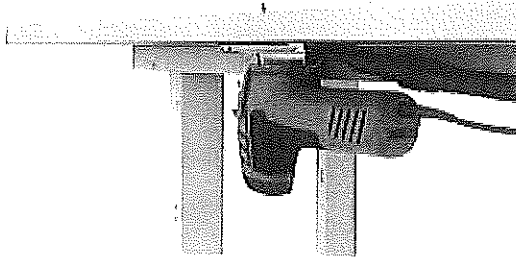
1. Get perfect guided cuts every time with a template system that will always be accurate and in square.
2. Get perfect guided cuts every time with a template system that will always be accurate and in square.

Q.8.What are the two ways of Guiding of Jig Saw? Explain it.

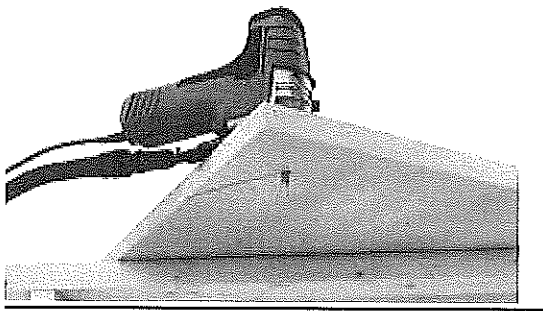
ANS: - **Guiding of the Jig saw:** -

- (a) From bottom of the work piece: - Guide the machine to the bottom of the work piece, if only one side of a work piece is visible. The jig saw is usually

rotated and inserted from below. In this way, we can see the cutting line when sawing.



(b) From top of the work piece: - If the quality of the cut does not matter much, it is usually easier to cut at the top.



Section – C

03X03 = 09 Marks

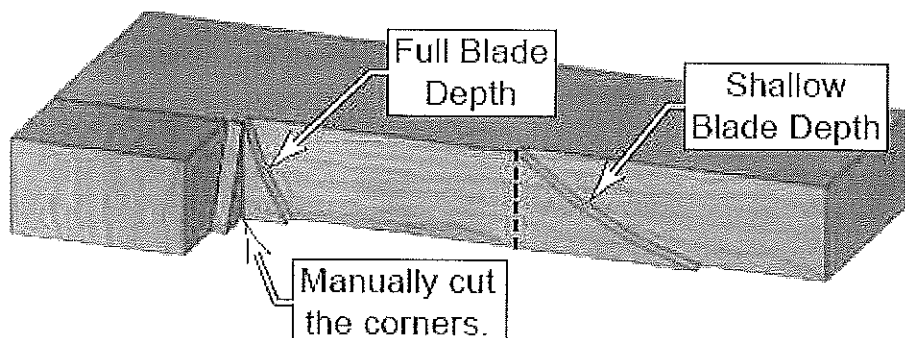
Q.9.What are the uses of Centring Mandrel, Side Stops and End Stops in LR 32 SYSTEM?

ANS: - Uses are described below: -

- I. Centring Mandrel: - Used for Centring the tool of router for drilling holes in LR 32 System.
- II. End Stops: - Used for measuring the distance of holes in LR 32 System.
- III. Side Stops: - Used for measuring the distance between center of holes and edges of Work piece.

Q.10.What is Plunge Cutting? Explain with the help of diagram.

ANS: - Plunge cutting is used when the cut does not start at the edge of the work piece. Instead, it starts in the middle of the work piece, and may continue to the end, or may stop short of the end. There is a wide variety of applications for plunge cuts. Some examples include cutting a countertop for a sink or appliance, cutting a hardwood floor for inset tile, slotting a cabinet frame for a pull-out bread board; just to name a few.



Q.11.What is domino slot principle? Also explain the three slots principle used in Domino machine.



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ANS: - The first DOMINO dowel is positioned via an exact slot, the subsequent dowels inserted in wider slots with clearance – this allows the join to be easily aligned. The result is a stable join, rotation-resistant from the first dowel.

1. The standard width, corresponding exactly to the dowel width: 13 mm plus the cutter diameter.
2. The average hole width, giving the dowel some clearance (6 mm): 19 mm plus the cutter diameter.
3. The largest hole width, providing a lot of clearance (10 mm): 23 mm plus the cutter diameter.



School of Woodworking Skills
Session: 2020-21 (Summer Semester)
B. Voc. Program, 3rd Semester,
1st In-Sem. Examination

Course Code: SCS 1304

Time: 1 Hour

Course Name: Carpenter mathematics

Max. Marks: 20

Instruction: (if any)

Section – A

05X01 = 05 Marks

1) If a share of NV of Rs 100 is selling at Rs 80 then:

- (a) the share is at a premium of Rs 20.
- (b) discounted at Rs. 20.
- (c) at par.
- (d) None of these.

2) General notation of spherical coordinates system is:

- (a) (x,y,z) b) (r, θ, z) c) (r, θ, ϕ) d) None of these

3) Location of the point $(-10, 4)$ and $(-7, -8)$ in cartesian coordinates:

- (a) I, II quadrants (b) III, IV quadrants (c) II, III quadrants (d) II, IV quadrants

4) Amount required for buying 50 shares, Rs 75 quoted at Rs 71.50.

- (a) 3750/- (b) 3575/- (c) 3475/- (d) 5363/-

5) The conversion of $(4, -1, -8)$ in cylindrical coordinates represented by:

- (a) $(\sqrt{17}, 3.3866, 8)$
- (b) $(\sqrt{19}, 4.876, 8)$
- (c) $(\sqrt{17}, 8, 3.3866)$
- (d) $(\sqrt{17}, -1, 8)$



Section – B

03X02 = 06 Marks

6) Find a relation between x and y such that the point (x, y) is equidistant from the points $(7, 1)$ and $(3, 5)$.

7) Identify the surface generated by following equation:

$$r^2 - 4r\cos\theta = 14$$

8) A company declares semiannual dividend of 6%. A man has 500 shares of NV Rs 25 each. Find his annual income.

Section – C

03X03 = 09 Marks

9) Convert the equation written in Cylindrical coordinates into an equation in Cartesian coordinates.

$$(a) 4\sin\theta - 2\cos\theta = \frac{r}{z}$$

$$(b) zr = 2 - r^2$$

10) Michael buys shares of face value \$ 50 of a company which pays 10 % dividend. At what price did he buy each share from the market if his profit is 16 % on his investment?

11) Divide Rs 29184 into two parts such that if one part is invested in 12%, Rs 100 shares at 4% discount and the other in 15%, Rs 100 shares at 8% premium, the annual incomes are equal.



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Section – A

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- (a) the share is at a premium of Rs 20.
- (b) discounted at Rs. 20.
- (c) at par.
- (d) None of these.

Ans: (b)

2) General notation of spherical coordinates system is:

- (a) (x, y, z) (b) (r, θ, z) (c) (r, θ, ϕ) (d) None of these

Ans: (c)

3) Location of the point $(-10, 4)$ and $(-7, -8)$ in cartesian coordinates:

- (a) I, II quadrants (b) III, IV quadrants (c) II, III quadrants (d) II, IV quadrants

Ans: (d)

4) Amount required for buying 50 shares, Rs 75 quoted at Rs 71.50.

- (a) 3750/- (b) 3575/- (c) 3475/- (d) 5363/-

Ans: (b)

5) The conversion of $(4, -1, -8)$ in cylindrical coordinates represented by:

- (a) $(\sqrt{17}, 3.3866, 8)$
- (b) $(\sqrt{19}, 4.876, 8)$
- (c) $(\sqrt{17}, 8, 3.3866)$
- (d) $(\sqrt{17}, -1, 8)$

Ans: (a)



Section – B

03X02 = 06 Marks

6) Find a relation between x and y such that the point (x, y) is equidistant from the points $(7, 1)$ and $(3, 5)$.

Solution: Let $P(x, y)$ be equidistant from the points $A(7, 1)$ and $B(3, 5)$.

We are given that $AP = BP$. So, $AP^2 = BP^2$

$$\text{i.e., } (x - 7)^2 + (y - 1)^2 = (x - 3)^2 + (y - 5)^2$$

$$\text{i.e., } x^2 - 14x + 49 + y^2 - 2y + 1 = x^2 - 6x + 9 + y^2 - 10y + 25$$

$$\text{i.e., } x - y = 2$$

7) Identify the surface generated by following equation:

$$r^2 - 4r\cos\theta = 14$$

Solution: To identify this equation (and you do know what it is!) let's complete the square on the X part of the equation.

$$\begin{aligned}x^2 - 4x + y^2 &= 14 \\x^2 - 4x + 4 + y^2 &= 14 + 4 \\(x - 2)^2 + y^2 &= 18\end{aligned}$$

So, we can see that this is a cylinder whose central axis is a vertical line parallel to the Z -axis and goes through the point $(2, 0)$ in the xy -plane and the radius of the cylinder is $\sqrt{18}$

8) A company declares semiannual dividend of 6%. A man has 500 shares of NV Rs 25 each. Find his annual income.

Solution: Total NV of shares = $(25 \times 500) = \text{Rs. } 12500/-$

Semiannual dividend = 6% of Rs 12500 $\left(\frac{6}{100} \times 12500\right) = \text{Rs } 750/-$

Therefore, his annual income = $(\text{Rs } 750 \times 2) = \text{Rs } 1500/-$



Section – C

03X03 = 09 Marks

9) Convert the equation written in Cylindrical coordinates into an equation in Cartesian coordinates.

$$(a) 4\sin\theta - 2\cos\theta = \frac{r}{z}$$

$$(b) zr = 2 - r^2$$

Solution: (a) $x = r\cos\theta$ $y = r\sin\theta$ $r^2 = x^2 + y^2$

To make the conversion a little easier let's multiply the equation by r to get,

$$4r\sin\theta - 2r\cos\theta = \frac{r^2}{z}$$

$$\text{Ans: } 4y - 2x = \frac{x^2 + y^2}{z}$$

$$(b) \quad zr = 2 - r^2$$
$$r^2 = x^2 + y^2$$

$$\text{Ans: } z\sqrt{x^2 + y^2} = 2 - (x^2 + y^2)$$

10) Michael buys shares of face value \$ 50 of a company which pays 10 % dividend. At what price did he buy each share from the market if his profit is 16 % on his investment?

Let the market value (M.V.) of each share be x.

The dividend is calculated on nominal value.

The dividend on one share = 10% of \$ 50 = \$ 5.

Therefore, he earned \$ 5 on an investment of x.

$$\text{A profit of 16 \% on } x = \frac{16}{100} \times x = \frac{4x}{25}$$

$$\text{Therefore, } \frac{4x}{25} = \$ 5$$

$$\Rightarrow x = \$ \frac{25 \times 5}{4}$$

$$\Rightarrow x = \$ \frac{125}{4}$$

$$\Rightarrow x = \$ 31.25$$

Ans: \$31.25



11) Divide Rs 29184 into two parts such that if one part is invested in 12%, Rs 100 shares at 4% discount and the other in 15%, Rs 100 shares at 8% premium, the annual incomes are equal.

Solution:

Let the investment in 12%, Rs 100 shares at 4% discount be Rs = x

Then, investment in 15%, Rs 100 shares at 8% premium be= Rs (29184-x)

MV of Rs 100 shares at 4% discount= Rs (100-4% of 100) = Rs 96

Annual income on 1 share of Rs 96=Rs (12% of 100) = Rs 12

Annual income on Rs x=(12x/96)=Rs x/8

$$\frac{15(29184 - x)}{108} = \frac{x}{8}$$

Ans:

$$x = 15360/-$$

Ans: Second part of amount (29184-15360) = 13824/-

SET - A



Set 1 8

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Registration No.:

School of Woodworking Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

1st In-Sem. Examination

Course Code: SCS1307

Time: 1 Hour

Course Name: Advanced Carpenter Materials

Max. Marks: 20

Instruction: All the questions are compulsory.

Section – A

05X01 = 05 Marks

Q1. Which component of the wood acts as a binding material?

- | | |
|---------------|--------------|
| (a) Cellulose | (b) Lignin |
| (c) Resins | (d) Starches |

Q2. Which factor influences the Wood moisture adjustment time?

- | | |
|-------------------------|---------------------------|
| (a) Cell wall thickness | (b) Wood dimensions |
| (c) Wood defects | (d) Relative air humidity |

Q3. Which part of the trunk is known as growth tissue (forms new cells through cell division)?

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

Q4. Density of MDF board lies in the range of

- | | |
|-------------------------------------|-------------------------------|
| (a) 0-500 kg/m ³ | (b) 500-800 kg/m ³ |
| (c) More than 800 kg/m ³ | (d) None |

Q5. The permanent deformation of material is called

- | | |
|-------------------------|---------------------------|
| (a) Plastic deformation | (b) Elastic deformation |
| (c) Creep | (d) Inelastic deformation |

Section – B

03X02 = 06 Marks

Q6. Explain the following wood properties.

- | | |
|--------------|----------------|
| (a) Hardness | (b) Elasticity |
|--------------|----------------|

Q7. Describe the trunk cut methods with diagram.



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Q8. Explain the following properties for wooden based panels.

(a) Toughness

(b) Sustainability

Section – C

03X03 = 09 Marks

Q9. Describe the reaction wood in detail with diagram. Also write its disadvantages.

Q10. Explain the storage of Water content in the wood with diagram.

Q11. Write the advantages and disadvantages of wooden based products.



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Section – A

05X01 = 05 Marks

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| (a) Plastic deformation | (b) Elastic deformation | |
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Section – B

03X02 = 06 Marks

Q6. Explain the following wood properties.

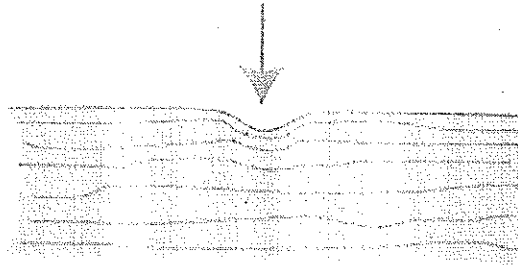
- | | |
|--------------|----------------|
| (a) Hardness | (b) Elasticity |
|--------------|----------------|

Ans. (a) Hardness



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The hardness is the resistance that the wood offers to local impressions. The harder a material, the smaller the trace left by the pressed-on body (Brinell hardness), or the greater the effort required to achieve the same impression (Janka hardness).



Ans. (b) Elasticity

Elastic materials do not retain their deformation caused by stress, but return to their original shape. Particularly elastic woods are: ash, hickory, wenge.



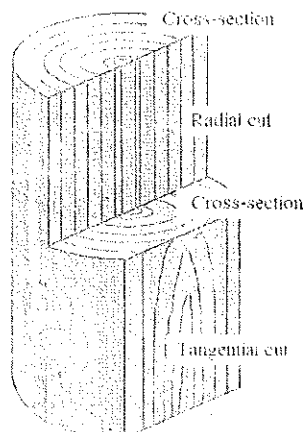
Q7. Describe the trunk cut methods with diagram.

Ans. Trunk cuts

Cross-section (forehead cut): cut perpendicular to the trunk axis. From the eye we see the bark, sapwood, heartwood, annual rings with early and late wood, the marrow tube and, in the case of individual hardwood species, the vascular cells (pores).

Radial cut (rift or mirror cut): This longitudinal cut, parallel to the trunk axis, runs through the center of the trunk. The annual rings are visible as straight, parallel stripes. In the case of individual woods (oak), the wood rays appear as broad, often shiny strips (mirrors).

Tangential cut (chord or flat cut): This longitudinal cut runs parallel to the trunk axis outside the trunk center. The individual tree rings are cut diagonally, resulting in the decorative flattening.





Q8. Explain the following properties for wooden based panels.

(a) Toughness

(b) Sustainability

Ans.

Toughness: Toughness is the ability of a material to absorb energy and plastically deform without fracturing. The material toughness is the amount of energy per unit volume that a material can absorb before rupturing. This measure of toughness is different from that used for fracture toughness, which describes load bearing capabilities of materials with flaws. It is also defined as a material's resistance to fracture when stressed.

Sustainability: The sustainability of material is defined as consistently able to withstand loads and forces or ability to exist constantly without failure for long time. The rate and level of depletion of material is very less than material is called as sustainable material.

Section – C

03X03 = 09 Marks

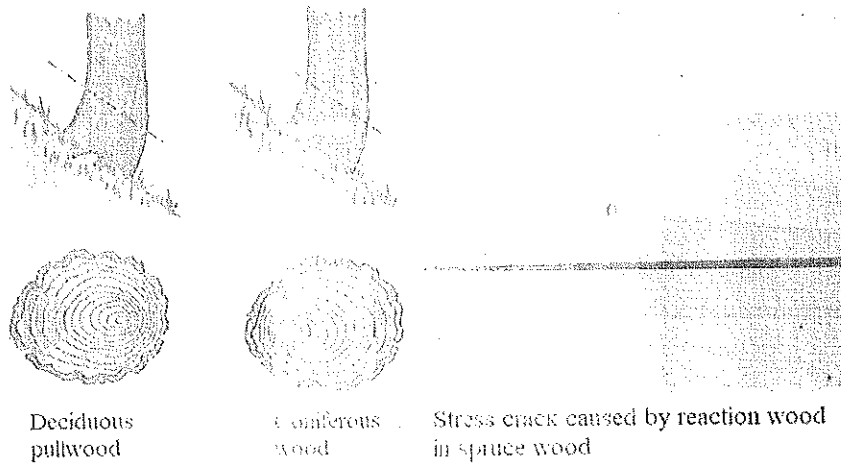
Q9. Describe the reaction wood in detail with diagram. Also write its disadvantages.

Ans. Reaction wood

This occurs with trees on a slope, with one-sided loading of edge trees or on the top or bottom of branches. The upright softwood tree forms pressure wood on the underside, hardwood trees form tension wood on the top. The trunk is then placed vertically again. The one-sided reaction wood formation creates an eccentric growth. Reaction wood should never be used!

Disadvantage

- Is considered waste wood
- Lower tensile strength in conifers
- Hard and brittle
- Large longitudinal shrinkage
- Severe deformation
- High tensions in such wood can lead to kickbacks and jamming of the saw blade and thus pose a danger.



Deciduous pullwood

Coniferous wood

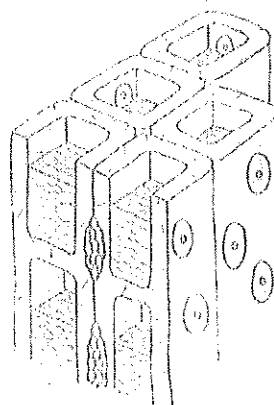
Stress crack caused by reaction wood in spruce wood


Q10. Explain the storage of Water content in the wood with diagram.


Ans. Water content of the wood

Wood can contain water in two different ways. If the cell walls are saturated with water, the cell cavities fill with water. This water is called free or capillary water. The proportion of this unbound water is usually very high, but is relatively easy to remove. The water that is bound in the cell walls is called bound water. This is difficult to remove, and this explains the drying speed as the degree of dryness of the wood increases. The area in which there is no free water in the wood is called the fiber saturation area. Depending on the type of wood, it is between 22 and 35% wood moisture.

When moisture is absorbed or released below this area, the wood swells or shrinks, while changes in wood moisture above the fiber saturation area cause changes in shape only to a very small extent.



 Free water

 Bound water

Schematic representation:
free and bound water in the wood



Q11. Write the advantages and disadvantages of wooden based products.

Ans.

Advantages:

1. The strength properties of wood composites are generally lower than solid timber they are more consistent. This means that they can support loads with smaller safety margins, which in effect reduces the apparent difference in strength between solid wood and composites.
2. Bacteria, fungi and insects, readily decay wood, especially when it is wet. Some panel products are better in this respect, particularly in the case of insect attack.
3. Cement bonded composites have been found to be extremely resistant to degradation by fungi and even termites. Other benefits of wood composites come from the fact that their properties can be engineered.

Disadvantages

1. Not as high-grade as solid wood furniture.
2. Process cost is higher than solid wood.
3. Sometimes engineering properties such as strength, hardness and stiffness not similar to solid wood which affect the quality of product.

