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Islamabad



FURNITURE TECHNICIAN



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LEARNER GUIDE

National Vocational Certificate Level 4

Version 1 - June, 2019



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Introduction

Welcome to your Learner's Guide for the Furniture Technician Programme. It will help you to complete the programme and to go on to complete further study or go straight into employment.

The Furniture Technician programme is to engage young people with a programme of development that will provide them with the knowledge, skills and understanding to start this career in Pakistan. The programme has been developed to address specific issues, such as the national, regional and local cultures, the manpower availability within the country, and meeting and exceeding the needs and expectations of their customers.

The main elements of your learner's guide are:

- **Introduction:**
 - This includes a brief description of your guide and guidelines for you to use it effectively
- **Modules:**
 - The modules form the sections in your learner's guide
- **Learning Units:**
 - Learning Units are the main sections within each module
- **Learning outcomes:**
 - Learning outcomes of each learning units are taken from the curriculum document
- **Learning Elements:**
 - This is the main content of your learner's guide with detail of the knowledge and skills (practical activities, projects, assignments, practices etc.) you will require to achieve learning outcomes stated in the curriculum
 - This section will include examples, photographs and illustrations relating to each learning outcome
- **Summary of modules:**
 - This contains the summary of the modules that make up your learner's guide
- **Frequently asked questions:**
 - These have been added to provide further explanation and clarity on some of the difficult concepts and areas. This further helps you in preparing for your assessment.
- **Multiple choice questions for self-test:**
 - These are provided as an exercise at the end of your learner's guide to help you in preparing for your assessment.

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Module-4
LEARNER GUIDE
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Module 04: 072200894 Apply Surface Aesthetics

Objective of the module: The aim of this module to be develop advanced knowledge, skills and understanding to apply surface aesthetics on the furniture.


Duration 100 hours **Theory:** 20 hours **Practical:** 80 hours

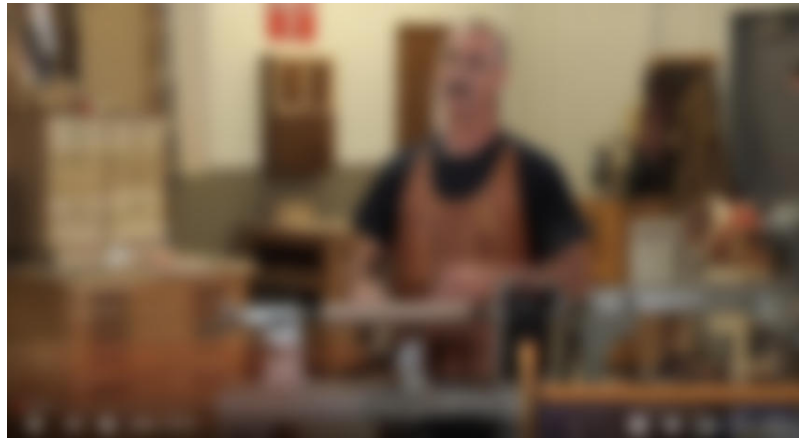
Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1: Perform profiling of components	<p>The student will be able to:</p> <ul style="list-style-type: none"> Equip machine with required tools (cutters, blades, profiles, bits, Jigs, Fixtures etc.) Perform profiling of straight components using required processes (Grooving, Rabbeting, Tenoning, Mortising, Shaping etc.) as per drawing <p>Perform profiling of curved components using required processes (Grooving, Rabbeting, Tenoning, Mortising, Shaping etc.) as per drawing</p>	<p>Introduction to the importance, requirement of the shaping, moulding in wood or board.</p> <p>Elaborate the basic machine for profiling or shaping tasks considering the introduction, parts and operations of the machine</p> <ul style="list-style-type: none"> ➤ Spindle Moulder ➤ Plunge Router ➤ Double End Tenoner ➤ 4-Side planner/moulder <p>In depth knowledge about various profiling shapes & cutter accordingly, bits, solid profile cutters, etc.</p> <p>Understand the overview, possibilities and settings using jigs and fixtures on the above mentioned machines.</p> <p>Study the advanced operations, mixed operations using jigs/fixtures etc.</p> <p>Executing the practical work after adjusting all parameter.</p>	Wood plank/Pieces Board pieces Cutters (various profile cutter Sets, grooving cutters etc.) Bits (Straight, profile, V- grooving etc.) Solid profiles Plunge router Spindle Molder Double End tenoner Ring attachment 4-Side Planner/Moulder
LU2:	<p>The student will be able to:</p>	Introduction to the wood turning lathe, its	Wood blocks

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
Perform turning of components	<ul style="list-style-type: none"> Equip machine with required tools (Chucks, chisels, gouges, Fixtures etc.) Perform Cylinder turning of components to achieve required finish as per drawing Perform face plate turning of components to achieve required finish as per drawing <p>Perform buffing of the components as per product requirement</p>	<p>parts and operations in detail.</p> <p>Detailed knowledge about turning chisels, sizes and appropriate operations</p> <p>Elaborating the chucks used on wood turning lathe about their probable use according to the job</p> <p>Understand the finishing operations like sanding and buffing to smoothen the product component</p>	<p>Wood turning lathe</p> <p>Turning chucks</p> <p>Turning chisels & gouges</p> <p>Sand papers</p> <p>Caliper's (Inside & Outside)</p>
<p>LU3:</p> <p>Perform carving manually</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> Align the work piece on workstation Paste the drawing paper on work pieces as per process requirement Mark the carving design on work piece using template as per process requirement Carve the design using required tools (Chisel, Gouges etc.) as per drawing or marking <p>Perform sanding on carved</p>	<p>Introduction to the carving, importance , requirement of the carving</p> <p>Kinds of carving in detail</p> <p>Introduction to the basic kinds of chisels used for carving. Advanced knowledge about all the set of carving chisels.</p> <p>Study the fixing requirements to perform carving such as design pasting, boring, clamps, holdfast and carver's vice.</p> <p>Executing the practical work after adjusting all parameter.</p>	<p>Wood planks</p> <p>Board pieces (M.D.F. or H.D.F.)</p> <p>Carving Chisel Set</p> <p>Carver's vice</p> <p>Hold fast</p> <p>Pencils</p> <p>Drawing Sheets</p> <p>Sanding papers</p> <p>Portable Electric drill</p> <p>Drill Press</p> <p>Boring bit (Various sizes & types)</p>

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
	design to achieve required smoothness		
LU4: Perform Marquetry/Parquetry Manually	The trainee will be able to: <ul style="list-style-type: none"> • Paste Marquetry/Parquetry drawing on Veneer sheets • Align multiple veneer sheets as per tool (Scroll Saw, Copying Saw, Fret Saw) capacity • Bore blade entry holes on the Veneer sheets as per process requirement • Cut veneer sheets as per Marquetry/Parquetry drawing • Paste Marquetry/Parquetry Veneer Layer on required board as per product design Fill gaps of cutting faults to achieve required Marquetry/Parquetry finish	Introduction to veneer, veneer sources and veneer cutting methods Introduction to various veneer matching techniques and processing Tools used to work with veneer to work manually Introduction to various machines involved in the marquetry process from scratch to final pressing including the parts and operations <ul style="list-style-type: none"> ➤ Veneer Cutting machine ➤ Zigzag veneer splicing machine ➤ Glue spreader ➤ Hydraulic press ➤ Scroll saw Introduction of glues and their application using various methods Executing the practical work after adjusting all parameter.	Veneer lengths Veneer samples Board pieces Scroll saw Veneer splicer Veneer cutting machine Glue spreader Hydraulic hot press Veneer tape roll Thread roll Urea formaldehyde glue Hot Melt Glue Glue Gun

Examples and illustrations

	<p>Woodturning a Wooden Goblet -- Full sized https://www.youtube.com/watch?v=KeV1r4wQeQA</p>
	<p>Woodturning - A Waterfall Vase !! https://www.youtube.com/watch?v=i672qeFXm5M</p>



Understanding a Starter Set of Lathe Chisels | Woodworkers Guild of America

<https://www.youtube.com/watch?v=kunZlZNNxUY>



Wood carving. Подарок - ложка.

<https://www.youtube.com/watch?v=bmvTlgu5I>



Wood Carving Tools & Techniques for Beginners
<https://www.youtube.com/watch?v=4EVr-HnOKBY>



How to Carve a Relief Carving
<https://www.youtube.com/watch?v=StcAWU0eVx0>



My Chip Carving - Proper Technique

<https://www.youtube.com/watch?v=Gv-G-VdvA7I>



Marquetry Tutorial

<https://www.youtube.com/watch?v=rnvHKG7MIhw>



Marquetry making, marquetry cabinet part 1
<https://www.youtube.com/watch?v=0EhL22IaMEU>



How to Create Marquetry Pictures with Wood Veneers
<https://www.youtube.com/watch?v=Anu1VniA8X0>



Q & A Bits and Bobs, Veneering, Box Making, Parquetry and Marquetry Test pieces.

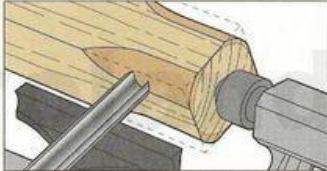
<https://www.youtube.com/watch?v=P5q48LzuA-g>



IN THE SHOP

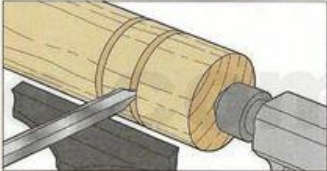
Roughing Gouge

■ One of the first tools I reach for when turning a spindle is a roughing gouge. As you can see, a roughing gouge is designed to be quite stout. This way, you can take some hefty cuts that will make quick work of "roughing" a workpiece into a cylinder (see below).



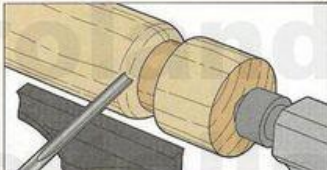
Diamond Parting Tool

■ To set off parts of a turning or remove it from the lathe, I use a diamond-shaped parting tool. The shape provides better clearance and less friction when cutting deep into a workpiece. Plus, a parting tool makes quick work of cutting tenons on the ends of workpieces.



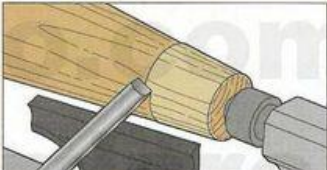
Spindle Gouge

■ A spindle gouge (see margin and drawing below) is the multi-purpose tool of turning. With it, there isn't much you can't do. I've used a spindle gouge to rough out a square blank and then shape it into a graceful table leg refined with delicate beads and coves.




Skew Chisel

■ A skew chisel, like the oval-shaped model in the margin, is the smoothing plane of turning. Like a hand plane, it leaves behind a velvety-smooth surface that's ready to be finished — whether you're turning a cylinder, a graceful taper, or a set of beads.




Bowl Gouge

■ When it comes to turning a bowl, a bowl gouge is the tool of choice. While it looks similar to a spindle gouge, it actually has a thicker, beefier body and a deeper, U-shaped flute. This design helps to quickly remove the large amount of waste necessary to create a bowl, yet produces a smooth chatter-free cut.

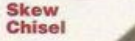


Scrapers


■ Finally, you can add a round-nose scraper and a square-end scraper to complete your set of tools (see margin). I know, scraping doesn't sound like fine turning. But in many cases, the tiny burr that's formed at the end of the scraper when it's sharpened is often the only way to make a tear-out-free cut in a workpiece.




Skew Chisel




Bowl Gouge



Round-nose Scraper



Square-end Scraper



No. 73
ShopNotes
27


BOWL GOUGE SIZES
www.TurnAWoodBowl.com

LARGE

- Fast Removal of Waste Material
- Large Bowls

FLUTE 5/8" (16mm)
SHANK 3/4" (19mm)



www.TurnAWoodBowl.com

MEDIUM

- Great First Gouge
- All Purpose
- Waste Removal
- Finishing Cuts

FLUTE 1/2" (13mm)
SHANK 5/8" (16mm)



www.TurnAWoodBowl.com

SMALL

- Medium to Small Bowls
- Finishing Cuts

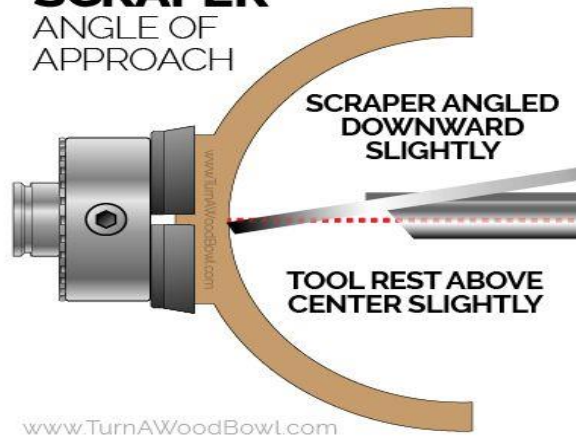
FLUTE 3/8" (10mm)
SHANK 1/2" (13mm)



www.TurnAWoodBowl.com



**ROUND NOSE
SCRAPER**
ANGLE OF
APPROACH





**Bowl Jaws #1
168-707**



**Bowl Jaws #2
168-710**



**Bowl Jaws #3
168-713**



**Smooth Column
Jaws #1 168-740**



**Saw Tooth Jaws #1
168-728**



**Saw Tooth Jaws #2
168-731**





Source: www.pinterest.com

Module summary

Course: <Furniture Technician>	Total Course Duration: 1200 Hrs
Course Overview:	
<p>The purpose of these qualifications is to set high professional standards for furniture industry.</p> <ul style="list-style-type: none"> • Improve the professional competence of the trainees • Shift from informal and non-formal to formal technical and vocational training • Provide opportunities for recognition of skills attained through non-formal or informal pathways • Improve the quality and effectiveness of training and assessment for furniture sector • Enable the existing workforce to capacitate themselves in new technologies and methods 	

Module	Learning Unit	Duration
Module 1: Develop drawings of furniture products manually Aim: The aim of this module to be develop knowledge, skills and understanding to develop drawings of furniture products manually.	LU1: Develop component and size chart LU2: Prepare 2D Multiview drawing of Furniture LU3: Prepare 2D Multiview drawing of Furniture Components LU4:	140 hours
Module 2: Prepare wooden components of the furniture Aim: The aim of this module to be develop knowledge, skills and understanding of preparing wooden components of the furniture.	LU1: Cut wood logs into Planks LU2: Prepare templates for furniture components LU3: Cut wood planks into furniture components LU4: Cut board/ panels into furniture components LU5: Plain surfaces of wooden components LU6: Finalize the size of wooden components	60 hours

Module	Learning Unit	Duration
<p>Module 3: Make Furniture Joints</p> <p>Aim: The aim of this module to be develop knowledge, skills and understanding of making different types of joints being used for furniture manufacturing.</p>	<p>LU1: Perform Cutting</p> <p>LU2: Perform Planing</p> <p>LU3: Prepare joints as per design / drawing</p> <p>LU4: Assemble joints</p>	200 hours
<p>Module 4: Apply surface aesthetics</p> <p>Aim: The aim of this module to be develop advanced knowledge, skills and understanding to apply surface aesthetics on the furniture.</p>	<p>LU1: Perform profiling of components</p> <p>LU2: Perform turning of components</p> <p>LU3: Perform Carving Manually</p> <p>LU4: Perform Marquetry/Parquetry Manually</p>	100 hours
<p>Module 5: Assemble Furniture Products</p> <p>Aim: The aim of this module to be develop basic knowledge, skills and understanding required to assemble the furniture products.</p>	<p>LU1: Pre-Assemble Furniture Products parts</p> <p>LU2: Assemble Furniture Products parts</p> <p>LU3:</p> <p>LU4:</p>	20 hours
<p>Module 6: Perform Finishing Operations on Furniture</p> <p>Aim: The aim of this module to be develop advanced knowledge, skills and understanding required to perform finishing operations on furniture.</p>	<p>LU1: Prepare the surfaces</p> <p>LU2: Perform staining on surfaces</p> <p>LU3: Perform sealing</p> <p>LU4: Perform top finishing</p> <p>LU5: Apply powder coating on metal furniture</p>	120 hours

Module	Learning Unit	Duration
<p>Module 7: Perform Upholstery</p> <p>Aim: The aim of this module to develop advanced knowledge, skills and essential understanding of materials, techniques needed to perform upholstery on furniture.</p>	<p>LU1: Apply Tapestry on the furniture</p> <p>LU2: Apply Canning on the furniture</p> <p>LU3:</p> <p>LU4:</p>	100 hours
<p>Module 8: Prepare Metal Furniture Products</p> <p>Aim: The aim of this module to be develop advanced knowledge, skills and essential understanding required to prepare metal furniture products</p>	<p>LU1: Cut required components from raw material</p> <p>LU2: Prepare furniture components as per design</p> <p>LU3: Assemble the furniture components using welding</p> <p>LU4: Assemble the furniture components using Knockdown method</p>	110 hours
<p>Module 9: Handle Logistics</p> <p>Aim: The aim of this module to develop basic knowledge, skills and understanding needed to handle the logistics at warehouse</p>	<p>LU1: Pack the furniture</p> <p>LU2: Load the furniture for delivery and transportation</p> <p>LU3:</p> <p>LU4:</p>	20 hours
<p>Module 10: Develop drawings of furniture products using CAD/CAM</p> <p>Aim: The aim of this module is to develop advanced knowledge, skills and understanding needed develop drawings of furniture products using CAD/CAM.</p>	<p>LU1: Draw 2D Multiview drawing of Furniture Components on CAD</p> <p>LU2: Develop 3D model of Furniture Components</p> <p>LU3: Convert CAD drawing into CAM Code</p>	140 hours

Module	Learning Unit	Duration
<p>Module 11: Apply surface aesthetics using CNC Machines</p> <p>Aim: The aim of this module to develop advanced knowledge, skills and understanding needed to apply surface aesthetics using CNC machines</p>	<p>LU1: Perform Turning of components on CNC Turning Centre</p> <p>LU2: Perform Carving on CNC Machining Centre</p> <p>LU3: Perform Marquetry/Parquetry on CNC Laser Machine</p>	<p>190 hours</p>

Frequently Asked Questions

<p>1. What is Competency Based Training (CBT) and how is it different from currently offered trainings in institutes?</p>	<p>Competency-based training (CBT) is an approach to vocational education and training that places emphasis on what a person can do in the workplace as a result of completing a program of training. Compared to conventional programs, the competency based training is not primarily content based; it rather focuses on the competence requirement of the envisaged job role. The whole qualification refers to certain industry standard criterion and is modularized in nature rather than being course oriented.</p>
<p>2. What is the passing criterion for CBT certificate?</p>	<p>You shall be required to be declared “Competent” in the summative assessment to attain the certificate.</p>
<p>3. What are the entry requirements for this course?</p>	<p>The entry requirement for this course is 8th Grade or equivalent.</p>
<p>4. How can I progress in my educational career after attaining this certificate?</p>	<p>You shall be eligible to take admission in the National Vocational Certificate Level-3 in Furniture Technician (Finisher, Upholster, Metal Fabricator). You shall be able to progress further to National Vocational Certificate Level-4 in Furniture Technician (Furniture Designer); and take admission in a level-5, DAE or equivalent course. In certain case, you may be required to attain an equivalence certificate from The Inter Board Committee of Chairmen (IBCC).</p>
<p>5. If I have the experience</p>	<p>You can opt to take part in the Recognition of Prior</p>

and skills mentioned in the competency standards, do I still need to attend the course to attain this certificate?	Learning (RPL) program by contacting the relevant training institute and getting assessed by providing the required evidences.
6. What is the entry requirement for Recognition of Prior Learning program (RPL)?	There is no general entry requirement. The institute shall assess you, identify your competence gaps and offer you courses to cover the gaps; after which you can take up the final assessment.
7. Is there any age restriction for entry in this course or Recognition of Prior Learning program (RPL)?	There are no age restrictions to enter this course or take up the Recognition of Prior Learning program
8. What is the duration of this course?	The duration of the course work is 1,510 hrs. (approx. 11 months)
9. What are the class timings?	The classes are normally offered 25 days a month from 08:00am to 01:30pm. These may vary according to the practices of certain institutes.
10. What is equivalence of this certificate with other qualifications?	As per the national vocational qualifications framework, the level-4 certificate is equivalent to Matriculation. The criteria for equivalence and equivalence certificate can be obtained from The Inter Board Committee of Chairmen (IBCC).
11. What is the importance of this certificate in	This certificate is based on the nationally standardized and notified competency standards by

National and International market?	and job	National Vocational and Technical Training Commission (NAVTTTC). These standards are also recognized worldwide as all the standards are coded using international methodology and are accessible to the employers worldwide through NAVTTTC website.
12. Which jobs can I get after attaining this certificate? Are there job for this certificate in public sector as well?		You shall be able to take up jobs in the Furniture making companies in the functions of cutting, assembly and finishing of furniture articles.
13. What are possible career progressions in industry after attaining this certificate?		You shall be able to progress up to the level of supervisor after attaining sufficient experience, knowledge and skills during the job. Attaining additional relevant qualifications may aid your career advancement to even higher levels.
14. Is this certificate recognized by any competent authority in Pakistan?		This certificate is based on the nationally standardized and notified competency standards by National Vocational and Technical Training Commission (NAVTTTC). The official certificates shall be awarded by the relevant certificate awarding body.
15. Is on-the-job training mandatory for this certificate? If yes, what is the duration of on-the-job training?		On-the-job training is not a requirement for final / summative assessment of this certificate. However, taking up on-the-job training after or during the course work may add your chances to get a job afterwards.
16. How much salary can I get on job after attaining this		The minimum wages announced by the Government of Pakistan in 2019 are PKR 17,500. This may vary in subsequent years and different

certificate?	regions of the country. Progressive employers may pay more than the mentioned amount.
17. Are there any alternative certificates which I can take up?	There are some short courses offered by some training institutes on this subject. Some institutes may still be offering conventional certificate courses in the field.
18. What is the teaching language of this course?	The teaching language of this course is Urdu and English.
19. Is it possible to switch to other certificate programs during the course?	There are some short courses offered by some training institutes on this subject. Some institutes may still be offering conventional certificate courses in the field.
20. What is the examination / assessment system in this program?	Competency based assessments are organized by training institutes during the course which serve the purpose of assessing the progress and preparedness of each student. Final / summative assessments are organized by the relevant qualification awarding bodies at the end of the certificate program. You shall be required to be declared "Competent" in the summative assessment to attain the certificate.
21. Does this certificate enable me to work as freelancer?	You can start your small business of stitching Furniture making, upholstery or finishing or other products. You may need additional skills on entrepreneurship to support your initiative.

Short Question & Answers

<p>What do you know about carving?</p>	<p>Carving is a technique used to beautify the object under consideration by making floral pattern, geometrical figures of various styles</p>
<p>How many basic kinds of chisels being used for carving?</p>	<p>In general six basic kinds of chisels are used to carve. Within these six kinds various sizes are used accordingly.</p>
<p>For what purpose 4-side planer/molder is being used.</p>	<p>4-side planer is used to plane the wood on all of its four sides in one pass. Additionally molder functions are used to add various profiles, grooves or rabbet in a single pass. It greatly enhances the productivity saving lot of time and fatigue. As doing it manually requires lot of skills, attention and devotion to do it perfect without having any injury.</p>
<p>How many profiles are available to work with?</p>	<p>Countless profiles are available to work with. Additionally still lot of profiles is also adding to the list as well.</p>
<p>What functions a wood turning lathe can perform?</p>	<p>Wood Turning Lathe is used to turn the wood. Following two main functions are being performed on it.</p> <ol style="list-style-type: none"> 1. Cylinder turning 2. Faceplate turning

Narrate the difference between Marquetry and Parquetry?	Marquetry is working with veneer using floral or related patterns. Parquetry specifically related to working with veneer having geometrical patterns.

Test Yourself (Multiple Choice Questions)

MODULE 4

Question 1 Roughing out is performed by

- A Chisels
- B Gouges
- C Blades
- D None of the above

Question 2 Basic turning chisels are of

- A 8 types
- B 6 types
- C 5 types
- D None of the above

Question 3 Marquetry is an art of work on

- A Plywood
- B Veneer
- C Wood
- D All of the above

Question 4 4-jaw chuck is meant for

- A Light Duty work
- B Medium Duty work
- C Heavy Duty work
- D None of the above

Question 5 Scroll saw can support

A Marquetry Work

B Parquetry work

C Veneer Inlay

D All of the above


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