# Wood Manufacturing & Finishing

# Phase 6

# Sample Test Questions & Model Answers

Question 1. State the function of the hogging head on the round end tenoning machine.

Answer 1. The hogging head on the round end tenoner is designed to trim the ends of the tenons to length and to mulch the waste into small pieces.

Question 2. Give **three** reasons why the round end tenon and slot mortice joint is most suited to the jointing of furniture framing.

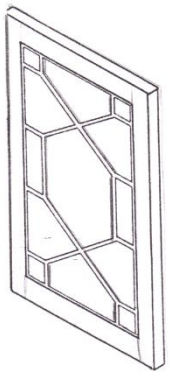
Answer 2. **2 out of 3 correct.**

1. By using round end tenons and slot mortises accurate component location and clamping are possible.
2. Due to the fact that the hogging head is fed on automatic cycles, the operator only needs to load and unload the component after the initial set up.
3. Consistently clean joints are produced with ease.

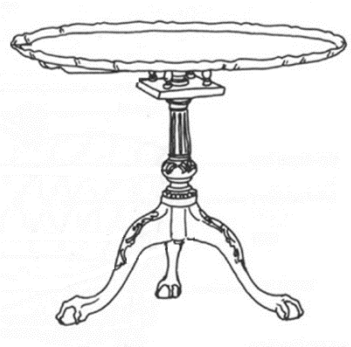
Question 3. Describe briefly how to repair a solid tabletop with a very deep scratch using a diamond plug to repair the surface.

Answer 3. Elongated diamond plugs with splayed edges should be of same species and grain configuration, if possible, from old sources. The plug with the grain direction carefully matched is placed over the damaged area. Damaged wood is removed, and the plug is fitted and glued in place. Before gluing in the plug rub white chalk around the edges this will often hold back a dark glue in light coloured timbers. Level, clean and colour match to blend in with existing surface.

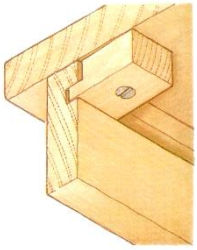
Question 4. Complete the name of the images below:



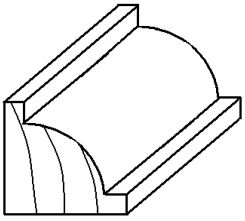
A. **13 Pane** Bar Door



B. **Piecrust or Tilt-top** Tripod Table



B. **Button** Fixing



D. **Ovolo** Moulding

Answer 4. **3 out of 4 correct.**

Question 5. A superficial scratch in a French Polished surface is usually repaired using a reviver. Explain what a reviver is and how it works.

Answer 5. A superficial scratch is a light surface scratch usually in the finish a reviver is used to repair it. The reviver cleans the surface, dissolves it slightly and leaves behind the shellac finish thus brighten the finish but leaving the patina of colour, dents and evidence of wear and tear.

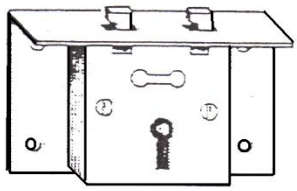
Question 6. Explain why surface finishes are applied to wood?

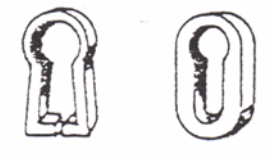
Answer 6. To protect the wood from oil, grease, liquids and other general pollution by sealing the pores. A finish will also enhance the natural beauty of the wood.

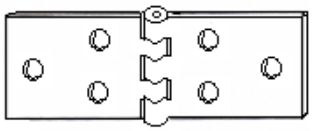
Question 7. Draw any **two** of the following fittings and give an example of where they are used:

(a) Link Plate Lock (b) Escutcheon (c) Backflap Hinge

Answer 7.







(a) Box Lock used on a trinket box or to fasten a lid.

(b) Escutcheon is used to protect a keyhole Flush or surface mounted.

(c) Backflap Hinge used to connect the writing flap to the bureau.

Question 8. Briefly describe any **three** of the following stair terms:

| | |
|---|---|
| Pitch Line | A line connecting the junctions (at the nosing) of all the risers and treads in any one flight |
| Strings | Wall or outer string, the ends of the steps are housed or fixed into them. |
| Headroom | The distance, measured vertically above the nosing line, between the nosing line and any ceiling or bulkhead above it. |
| Flight | A series of steps without a landing. |

Question 9. State **five** of the Building Regulations as they apply to a private stairs.

Answer 9. Any **five** correct

| **Regulation** | **Private** |
|---|---|
| Pitch (degrees) | 42 degrees max |
| Headroom | 2 metres min. |
| Rise | 220 mm max |
| Going | 220 mm min. |
| Twice rise plus going (2R + G) | 550 – 700 mm |
| Width (unobstructed) | 800 mm min. |
| Handrail height(wall) | 900 – 1000 mm |
| Handrail height(flight) | 900 – 1000 mm |
| Handrail height(landing) | 900 – 1100 mm |

The rises and goings should all be the same in any one flight.
There should be no more than 16 risers in any one flight.
A sphere of 100mm diameter should not be able to pass through any point of the stairs.
If the width of the stairs exceeds 1m a second handrail is required.
Landing should be at least as great as the width of the stairs.
Top and bottom of stairs should be at least 400mm clear of door openings.

Question 10. Select a suitable going to comply with the 2R + G formula of a private stairs with a total rise of 2340mm. An optimum rise of 180mm is supplied.

Answer 10. Model Answer, correct method should prove whatever figures used.

2450 divided by 180 = 13

(13 risers needed 12 threads formula 2R + G = 550 – 700mm)

180 + 180 = 360mm  Mid point = 625mm

625 – 360 = 265 going

(Recheck formula 180 + 180 + 265 = 625mm within regulations )

(Also check the pitch is less than 42°)

Tan A = $\frac{\text{Rise}}{\text{Going}}$  Tan A = $\frac{180}{265}$  Tan A = 0.6792  A = $\text{Tan}^{-1}$ 0.6792
A = 34.18°

Question 11. €22,000 was invested at compound interest for 3 years. The first year rate was 5% The second year rate was 3% The third year rate was 3.5%. • Calculate the final amount and the interest earned.

Answer 11. Model Answer, correct method.

| | € |
|---|---|
| Invest | 22000.00 |
| +5% | 1100.00 |
| Yr1 | 23100.00 |
| +3% | 693.00 |
| Yr2 | 23793.00 |
| +3.5% | 832.75 |
| Yr3 | €24,625.75 |

€24,625.75 - €22,000.00 = €2,625.75
Interest = €2,625.75
Final amount= €24,625.75

Question 12. A builder estimates that for every € 1.25 he spends on materials he needs €2.00 for labour and € 0.75 for overheads. On a job costing a total of €120,000 what is the amount of (a) overheads (b) labour (c) materials

Answer 12. Model Answer, correct method.

$$\frac{2.00 : 1.25 : 0.75}{0.25} = 8 : 5 : 3 = 16 \text{ parts}$$

€120,000 ÷16 = 7,500

Overheads = 3 parts 7,500 x 3 = €22,500

Labour = 8 parts 7,500 x 8 = €60,000

Materials = 5 parts 7,500 x 5 = €37,500

Question 13. Calculate the percentage waste when 16 circular stool seats, 400mm in diameter, are cut from a sheet of MDF measuring 1.220m x 2.440m.

Formula for the area of a circle = $\pi r^2$

Formula for percentage waste = $\frac{\text{Waste} \times 100}{\text{Material}}$

Answer 13. Model Answer correct method.

Area of MDF sheet = 1.220 x 2.440 = 2.976m²

Area of 1 stool seat = 3.14 x 0.20 x 0.20 = 0.1256m²

Area of 16 stool seats = 0.1256 x 16 = 2.0096m²

Sheet Area - 16 stool seats = Waste 2.976 - 2.0096 = 0.9664m²

Waste ÷ Sheet Area = Percentage waste

0.9664 ÷ 2.976 = 0.325 (x 100)

Percentage waste = 32.5%

Question 14. Sketch **one** of the following items of furniture

a) Trafalgar Chair **or** b) Drop Leaf Table

Trafalgar Chair

Sabre legs and continuous back leg.

Drop Leaf Table

Any style, must show drop leaf.

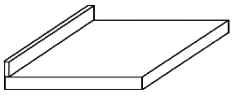
Answer 14. Model Answer: Sketch similar to either

Question 15. Explain what is the meant by the following Furniture Terms; Use sketches to support your answer.

| | |
|---|---|
| The apron rail | The front rail on a chair directly under the seat. (also under table) |
| An upstand: | Upright rail at the back of cabinets or on worktops to stop spills or items falling down behind cabinets. |
| A breakfront top: | A top with a break jutting out the front line, large bookcase etc. |
| A tracery door: | Bar door set out on a tracery board, usually curved/shaped bars. |

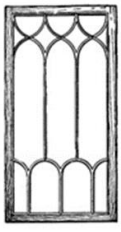
Answer 15. **3 out of 4 correct.**

Apron Rail



An Upstand

Breakfront Top



Tracery Door

Question 16. Provide the Standard Sizes for the following in relation to Furniture:

Answer 16. **3 out of 4 correct**

| | |
|---|---|
| Minimum depth of a wardrobe unit: | 500mm |
| Height of dining chair seat: | 450mm |
| Minimum distance between pillars on a writing desk: | 600mm |
| Writing desk height: | 700mm |

Question 17. You have been asked to run some edging on the Edge-banding machine. List **four** examples of items that will have to be set-up/checked/calibrated prior to running it.

1. The thickness of the material getting edged.
2. Whether pre-milling is accounted for or not.
3. The height and width of the edging material itself.
4. The temperature required for the adhesive used.
5. The final edging finish required e.g. rounded profile.
6. Whether scrapers are to be engaged or not.

Answer 17. **Any 3 of 4 correct.**

Question 18. What components can be incorporated onto the table of the CNC to prevent the cutter coming into contact with Table?

Saddles and Baseboards.

Question 19. List three advantages of using CAD/CAM software when generating C.N.C. programmes.

Answer 19. Similar model answer.

1. Complex shapes can be handled easily.
2. Programmes can be designed from a remote office, not interrupting the production process.
3. Programmes can be tested for accuracy before output.

Question 20. State the functions of both the front chip breaker and the rear pressure shoe, situated on the top spindle of a 4-sided planer moulder, and list the heights with which each should be set in conjunction with the work piece.

Answer 20. Similar model answer.

1. The function of the chip breaker is to hold down the work piece against the work table in front of the cutter block and to reduce forward riving by causing the chips to curl and break.
2. The function of the rear pressure shoe is to hold the work piece against the table after the cutter block to prevent vibration thereby enhancing surface quality.

List the heights with which each should be set in conjunction with the work piece.

1. Chip breaker height: approx. 3mm below height of unmachined component.
2. Rear pressure shoe height: just touching the machined surface.

Question 21. When machining curved components on a spindle moulder the operator will use either a guide bearing or a ring fence:

Briefly describe each system outlining the main differences between both.

Answer 21. The guide bearing is mounted on top of the tool spindle and requires provision for independent lead-in and lead-out and does not require different cutting depths to be set.

The ring fence is a guide mounted above the cutter block and is fixed onto the machine table:

a. The size and shape of the ring fence provides lead-in and lead-out for the work piece:

b. It provides a full depth of cut at one point of cut only, at a reference mark and can be adjusted independently of the spindle for depth of cut.

Question 22. In relation to timber machining, explain what is meant by the following terms:
Answer 22. **3 out of 4 correct**

In relation to timber machining, explain what is meant by the following terms:

| |
|---|
| Deeping: |
| Deeping: Rip sawing a plank down its width (greater cross-sectional dimension) |
| Flatting: Rip sawing a plank down its depth (smaller cross-sectional dimension) |
| Rip sawing a plank down its depth (smaller cross-sectional dimension) |
| Peripheral speed: |
| Cutting speed: the speed of a rotating object (saw blade) measured as a distance |
| travelled in given time, usually meters per minute: |
| Pitch marks: |
| The ripple marks made by rotating cutters, most pronounced with a low rotational speed |
| coupled with high feed speed |

Question 23. When machining soft timbers, describe why high-speed steel cutters are likely to produce a cleaner finish than tungsten carbide cutters?

Answer 23. High speed steel can be ground to a finer point but will dull quicker.

Question 24. In relation to surface finishes:

a) Bichromate of potash is dissolved in water and applied to wood as a stain. Explain how chemical stains work?

b) What type of finish should be used on a bar top counter?

c) What does the term “raise the grain” mean ?

d) When spraying lacquer, you sometimes get orange peel, what is orange peel and what causes it to occur??

Answer 24. **3 out of 4 correct**.

a) These chemicals react with the tannic acid that is present in woods and thus change the colour of the wood based on how much tannin is in the wood. Bichromate of potash will turn mahogany a darker brown each time it is applied to the surface, so care is needed limit overlapping when applying.

b) A water resistant finish like French polish, oil or polyurethane lacquer.

c) If you are applying a water based stain to a hairy timber like oak the water will raise the grain so the timber will need to be pre-treated with clean water and allowed to dry. Then sand and apply the stain.

d) Orange peel is a dimpling effect seen in lacquer as a result of lacquer being applied too thick. Fix the air pressure or thin the lacquer.

Question 25. When operating a band re-saw, fluid is required to be applied at a constant rate.

| |
|---|
| State the function of this fluid. |
| The oil prevents dust and debris from sticking to the blade and pulley wheel. |
| List two methods by which the fluid may be applied. |
| Drip & mist. |
| Outline why diesel oil must never be used in a mist application system. |
| Diesel oil has a relatively low auto ignition temperature. |

Answer 25. **2 out of 3 correct.**

Question 26. Describe the **four** stages of the life cycle of the Death Watch Beetle.

Answer 26. Similar answer or sketches correctly showing the lifecycle.

Stage 1: The Egg. The female beetle lays its eggs in cracks & crevices in decaying or infested hardwood mainly oak. After a few weeks the eggs hatch into worms or grubs.

Stage 2: The Larvae. The lava eats its way through the wood causing great damage. The grub can live in the wood for 5 to 12 years depending on the size of the cross section of the wood.

Stage 3: The Pupa. The lava bores its way to just under the surface and changes into a pupa or chrysalis. During this month it changes into a beetle.

Stage 4: The Beetle. The adult beetle bores its way out of the wood. It flies off to mate, the male beetles attract the females by banging their heads on the wood making a tapping sound. The Death watch beetle was often heard by people on vigil with their loved ones in church, this is how it got its name. The female beetle lays eggs then dies. The cycle begins again.

Question 27. Describe Dry Rot **and** give an example of where you might find it.

Answer 27. Similar answer

It is a wood destroying fungus that attacks wet or very damp timber (usually above 20% moisture content). Dry rot attacks the cellulose found mainly in the sapwood of timber. A white cotton like mycelium is sometimes present. Timber loses strength and weight, becomes dry and brittle and develops cracks with and across the grain.

Dry rot usually occurs indoors in damp humid conditions with little or no ventilation like cellars, basements, attics etc.

Question 28. Name two methods of timber preservative treatment.

Answer 28. Non-pressure treatment: brushing, spraying, dipping and steeping

Pressure treatment: empty-cell process and full-cell process

Question 29. There are various methods used to guard woodworking machines against accidental operator contact with moving parts.

List **four** different methods used **and** for each one, name a machine type on which it is used.

Answer 29. **Any 3 correct**

1. Enclosure: A box/tunnel guarding used to enclose the cutting area to the greatest extent possible and can be found on the single end tenoner.
2 Electronic exclusion: (electronic sensor) If the operator enters the operational zone while the machine is in operation the process stops. This can be found on the CNC router (pressure mats).
3 Electronic interlocking: If the guard is removed or not properly closed the machine will not operate, this function can be found on most machines.

4 Physical exclusion: A physical barrier keeps the operator at a safe distance, often electrically interlocked. This method of guarding can be found on the round end tenoner.
5 Two hand start control: Both hands must be in physical contact with the start controls before the machine will operate, and can be found on the veneer guillotine.

Question 30. In relation to the mounting of an abrasive wheel on a grinding machine, state:

Three safety precautions that must be observed before starting the machine:

Answer 30.

1. Check the wheel for cracks before fitting:
2. Ensure the paper packings are intact and in place:
3. Ensure the hole in the grinding wheel is the correct size for arbor:
4. Ensure guards are in place and secure: