

Design & Technology

Woods

Materials required for questions

- Pencil
- Rubber
- Calculator

Instructions

- Use black ink or ball-point pen
- Try answer all questions
- Use the space provided to answer questions
- Calculators can be used if necessary
- For the multiple choice questions, circle your answer

Advice

- Marks for each question are in brackets
- Read each question fully
- Try to answer every question
- Don't spend too much time on one question

Good luck!

Q1. Which hardwood has very few knots?

- A** Mahogany
- B** Ash
- C** Beech

Q2. What is one factor that makes hardwoods more expensive than softwoods?

- A** Hardwoods need more care
- B** Hardwoods have higher density
- C** Hardwoods grow slower

Q3. Which hardwood is good for steam bending?

- A** Ash
- B** Pine
- C** Beech

Q4. What manmade board has perpendicular layers?

- A** Chipboard
- B** Plywood
- C** MDF

Q5. Which softwood stains well?

- A** Spruce
- B** Pine
- C** Larch

Q6. Chipboard can be toxic/hard to recycle for what reason?

- A** The adhesives in it
- B** Its recycled wood
- C** It has a very high density

Q7. Plywood is used in many school workshops for what reason?

- A** More durable than natural timber
- B** Cheap in comparison to natural timber
- C** Finishes well

Q8. What is the main advantage of manufactured boards over natural timbers?

- A** Much more aesthetic than natural timber
- B** Made in any shape/size/thickness
- C** Much stronger than natural timber

Q9. MDF is going to be used to make a picture frame backing board.

(a) Explain the environmental advantage of using MDF instead of pine to make a wall clock? **(2 marks)**

(b) MDF comes in 61cm × 122cm sheets.

Determine the number of 400mm x 400mm squares that can be cut from the given sheet. **(4 marks)**

Q10. A CNC router was used to create the base of a chess board from a single bit of oak.

Explain three mechanical properties of oak that make it a good choice for the construction of the chess board **(6 marks)**

Q11. The handle of a kitchen knife has been made from the hardwood mahogany

Explain two benefits of using mahogany instead of pine for the kitchen knife handle **(4 marks)**

Q12. Plywood is to be used to make a phone stand.

What are two advantages, aside from cost, of using plywood instead of solid wood for the production of the phone stand **(4 marks)**

Q13. Explain two reasons why mahogany might not be considered a sustainable material. **(6 marks)**

Answers

Q1. A

Q2. C

Q3. A

Q4. B

Q5. A

Q6. A

Q7. B

Q8. B

Q9a.

- Because MDF is created with waste materials (1), there is no need for the leftovers to be disposed of or dumped in a landfill (1).
- Using MDF will reduce the amount of natural timber being cut down (1), therefore pine as a natural resource will last longer/be put to better use (1).

Q9b.

400 mm = 40 cm (1)

61 = 1 whole cuts (1)

122 = 3 whole cuts (1)

$1 \times 3 = 3$ whole cuts (1)

Q10.

- Strong (1) to withstand splitting (1)
- Tough (1) can absorb impacts (1)
- Hard (1) so won't wear away during use (1)
- Dense (1) allowing for high-definition machining (1)
- Stable (1) to prevent warping (1)
- Heavy (1) preventing movement when in use (1)
- Durable (1) so will be long-lasting (1)

Q11.

- Mahogany is less likely to splinter (1), as it is more dense than pine (1).
- Mahogany is more durable (1), meaning it is less likely to break when used (1).

- Mahogany is knot free (1), so there won't be any vulnerable weak areas (1).

Q12.

- Plywood resists warping (1) since it is a dimensionally stable material (1).
- Because plywood has uniform strength (1), tiny details are less prone to come loose (1).
- Plywood can be knot free (1), so there won't be any vulnerable weak areas (1).

Q13.

- Mahogany grows in tropical regions / equatorial rain forests (1) meaning it is transported large distances to market (1) thus increasing carbon emissions / impacting on the carbon footprint (1)
- Logging of mahogany has led to deforestation (1) causing loss of animal habitats / damaging ecosystems (1) and leaving barren land that is not replanted / reducing oxygen regeneration/CO2 absorption (1)
- Despite being protected by law / ethics (1) the value of the timber is so great (1) that illegal logging occurs (1)
- Mahogany is a hardwood / comes from a deciduous tree (1) so is slower growing than softwoods (1) therefore cannot be considered as an easily renewable resource / is a finite material (1)
- When produced commercially as a monocropping operation (1) the acid soil associated with the growth of mahogany (1) doesn't support ecosystems so the forests are almost devoid of wildlife / reduces biodiversity (1)