DTBase©

Design & Technology
Edexcel GCSE

Natural and Manufactured Timbers

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 one of the following is a softwood?

A Beech

B Pine

C Balsa

Q2. Which timber is a very lightweight hardwood that is often used for making model planes?

A Balsa

B Oak

C Cedar

Q3. Which manufactured timber is made from thin veneers glued together at 90 degrees to each other?

A Medium density fibreboard

B Mahogany

C Plywood

Q4. Which property describes a timber that resists scratches and dents?

A Toughness

B Hardness

C Durability

Q5. Which property describes a timber that can absorb knocks and impacts without breaking?

A Toughness

B Hardness

C Flexibility

Q6. What type of tree do softwoods come from?

A Deciduous trees

B Fruit trees

C Coniferous trees

Q7. For each of the products below, give a property of the material it is made from that makes the material suitable for the product.

Q7a. Cedar roof tile. **(1 mark)**

Q7b. Mahogany dining room chair. **(1 mark)**

Q7c. Balsa wood toy plane. **(1 mark)**

Q7d. Beech cooking spoon. **(1 mark)**

Q7e. Laminated plywood salad servers. **(1 mark)**

Q8. Oak floorboards are tough.

Q8a. Explain one other property of oak that makes it a suitable choice of material for the floorboards. **(2 marks)**

Q8b. The oak floorboards cost £57.60 and cover an area of 1.44 m^2. Calculate how much the oak floorboards cost per m^2. **(2 marks)**

Q9. A wall mounted book holder is manufactured from mahogany.

Q9a. Name one other appropriate hardwood that could be used to make the wall mounted book holder. **(1 mark)**

Q9b. Explain one working property of mahogany that makes it an appropriate choice of material for the wall mounted book holder. **(2 marks)**

Q10. A vegetable growing frame is manufactured from a softwood.

Q10a. Name one softwood that can be used to manufacture the vegetable growing frame. **(1 mark)**

Q10b. Explain one reason for manufacturing the vegetable growing frame from a softwood rather than a hardwood. **(2 marks)**

Q11. Describe the difference between deciduous and coniferous trees. **(2 marks)**

Q12. The frame of a solar powered model boat is manufactured from balsa wood.

Explain two benefits of using balsa wood for the frame of the model boat. **(4 marks)**

1

2

Q13. State the full meaning of MDF. **(1 mark)**

Q14. Describe the structure of each of the manufactured timbers below.

Q14a. Plywood. **(2 marks)**

Q14b. Medium density fibreboard (MDF). **(2 marks)**

Q15. Explain one advantage of using manufactured timbers. **(2 marks)**

Q16. The curved seat of a child's ride-on buggy is manufactured from plywood.

Explain two working properties of plywood that make it an ideal material for the curved seat. **(4 marks)**

1

2

Q17. A desk tidy is made from 15 mm MDF. The side panels are veneered with beech and have slots for adjustable shelves.

Explain two reasons for using MDF for the desk tidy. **(4 marks)**

1

2

Answers

Q1. B
Q2. A
Q3. C
Q4. B
Q5. A
Q6. C

Q7a.

Any one property (1 mark): resistant to water/waterproof; fungus/insect resistant; durable/weather resistant/rot resistant.

Q7b.

Any one property (1 mark): hard; tough; straight/close grained; slightly flexible; compressive strength.

Q7c.

Any one property (1 mark): low density; lightweight/light; soft.

Q7d.

Any one property (1 mark): hard; tough; fine grain/close grain/even texture; non-toxic/food safe; good heat resistance/thermal insulator.

Q7e.

Any one property (1 mark): flexible/flexibility/bendable; good tensile/compressive strength; moisture/water resistance; elasticity; tough/impact resistance.

Q8a.

Any one other property (1 mark) and a linked justification (1 mark):

- Oak is hard (1), therefore it will withstand abrasive wear from being walked on/furniture being moved on it (1)
- Oak is durable/hardwearing (1), therefore it will be able to withstand abrasive wear/damage from being walked on (1)

Q8b.

- Correct working: 57.60 ÷ 1.44 (1)
- Correct answer: £40 or £40.00 (1)
- Award full marks for the correct answer without working.

Q9a.

Any one other hardwood (1 mark): oak; beech; ash; birch; jelutong; any other appropriate hardwood. Do not accept balsa or mahogany.

Q9b.

Any one working property (1 mark) and a linked justification (1 mark):

- It is hard/durable (1), which means it will withstand wear as books are placed in and taken out of the holder (1)
- It is tough (1), which means it can be knocked/bumped/dropped without being damaged (1)
- It has a close/tight grain (1), which means it does not damage the book when it is lifted in or out (1)

Q10a.

Any one softwood (1 mark): pine; cedar; larch; redwood; spruce.

Q10b.

Any one reason (1 mark) and a linked reason for its use (1 mark):

- Softwoods are faster/quicker growing (1), which means there will be a greater supply of timber/more sustainable (1)
- Softwoods are cheaper (1), which means the overall cost of the frame will be lower/more likely to sell (1)
- Softwoods are less dense than hardwoods/have a more open grain (1), therefore they are easier to machine/cut (1)

Q11.

1 mark for each difference that references deciduous and coniferous trees. Two marks can only be awarded if the answer is described, not just stated:

- Deciduous trees take longer to grow
- Deciduous trees have broad leaves which fall off during autumn/winter

- Coniferous trees have needle-like leaves which are very thin and narrow
- Generally, coniferous trees are softer than deciduous trees

Q12.

Any two benefits (1 mark each) and a linked justification of each (1 mark each), up to 4 marks:

- It is lightweight (1), making it easier to power with the solar cell (1)
- It is soft (1), which means it is easy to cut with a sharp knife/sand to a smooth curve/work with (1)
- It has a low density/is buoyant (1), which means it will float on the water/not sink (1)

Q13.

Medium density fibreboard (1). This is the only acceptable answer.

Q14a.

Up to 2 marks: veneers laid at 90 degrees to each other and glued together (1); made up of an odd number of layers, e.g. 3, 5, 7 or 9 (1).

Q14b.

Up to 2 marks: made from fine wood fibres (1) compressed and bonded together with resin (1). Accept: has a flat, smooth surface; made from waste/recycled timber.

Q15.

2 marks for one point explained in detail, or 1 mark for one simple point, for example:

- They produce large, flat boards
- They ensure the whole tree is used and there is no waste, e.g. knots and surface defects do not have to be avoided
- They produce boards of a consistent thickness, which are better for making accurate products, e.g. flat-pack furniture
- They produce flat boards that are less likely to warp
- Some have a smooth surface finish which can be painted to give a high quality finish

Q16.

Any two working properties (1 mark each) and a linked justification of each (1 mark each), up to 4 marks:

- Plywood is flexible/has elasticity (1), which means it can be bent/flexed over the former/mould to make the seat shape (1)
- Plywood has good compressive/bidirectional strength (1), which means it can hold the weight of a small child/will not break when formed into the curved shape (1)
- Plywood has good resistance to splitting (1), which means there is little risk of the edges causing harm through splinters/de-lamination (1)

Q17.

Any two reasons (1 mark each) and a linked justification of each (1 mark each), up to 4 marks. Do not credit "cheap" or "lightweight" on their own:

- MDF does not warp/cup/twist (1), therefore it will stay flat/in shape (1)
- MDF is available in large sheets (1), therefore bits of wood do not need to be stuck together to make a panel big enough for the side panel (1)
- MDF has a smooth, flat surface/can have a veneer added (1), therefore it can be finished in a number of ways to increase its aesthetic appeal (1)
- MDF is relatively cheap/cost effective (1), therefore it keeps the overall cost of the product down (1)
- MDF is easily machined/quite soft (1), therefore the slots for the adjustable shelves can be cut on a router (1)
- MDF is readily available (1) and can be purchased in large volumes for mass production (1)
- MDF has no grain (1), therefore it does not give rise to splinters (1)