

Design & Technology

Eduqas GCSE

Natural and manufactured timber

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 type of tree do softwoods come from?

- A** Deciduous
- B** Coniferous
- C** Tropical

Q2. Which hardwood contains tannic acid that corrodes steel screws?

- A** Oak
- B** Beech
- C** Balsa

Q3. Which softwood is naturally resistant to rot and insects and is used for outdoor cladding?

- A** Pine
- B** Cedar
- C** Mahogany

Q4. Which manufactured board is made from an odd number of veneers glued with the grain at 90° to each other?

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

Q5. What is the standard sheet size of manufactured boards?

- A** 2440 × 1220mm
- B** 1000 × 1000mm
- C** 841 × 1189mm

Q6. Which finish prevents rot and insect attack and often gives a green or brown tint?

- A** Wax polish
- B** Varnish
- C** Preservative (e.g. tanalising)

Q7. A toothbrush is made from beech wood. Beech is a hardwood that comes from deciduous trees.

Q7a. Identify two characteristics of a deciduous tree. **(2 marks)**

Q7b. Describe the difference between deciduous and coniferous trees. **(2 marks)**

Q7c. Describe why beech wood is a suitable material for the toothbrush. **(2 marks)**

Q8. This question is about sawn timber.

Q8a. Timber is sold in a variety of stock forms. Identify one stock form. **(1 mark)**

Q8b. Timber is identified using a range of discriminators. Describe the discriminators of wood that are considered when products are newly designed. **(3 marks)**

Q9. Describe the structure of each of the manufactured boards shown in the table below. **(6 marks)**

Manufactured board	Description of structure
Plywood	
Chipboard	
Medium Density Fibreboard	

Q10. A radiator cover is made from MDF.

Q10a. State the full meaning of MDF. **(1 mark)**

Q10b. Discuss the reasons why MDF is such a versatile material in the construction of products such as the radiator cover. **(4 marks)**

Q10c. Explain, using an example, how the aesthetic qualities of MDF can be improved. **(2 marks)**

Q11. This question is about furniture made from timber.

Q11a. An oak veneered desk has solid oak parts. State a surface finish that could be applied to the oak parts of the desk. **(1 mark)**

Q11b. Give one advantage of using oak veneered manufactured board for the top of the desk instead of solid oak. **(1 mark)**

Q11c. Give two reasons why birch plywood is a suitable material for the manufacture of a stool. **(2 marks)**

Q12. A bookcase is sold as flat pack furniture.

Q12a. State the name of a suitable softwood for the construction of the carcass of the bookcase. **(1 mark)**

Q12b. Evaluate why the designer selected a softwood for the carcass and a manufactured board for the back of the bookcase. **(6 marks)**

Answers

Q1. B

Q2. A

Q3. B

Q4. C

Q5. A

Q6. C

Q7a.

One mark for each characteristic, for example:

- Deciduous trees have broad, flat leaves
- They drop their leaves during part of the year (usually autumn in the UK)
- They need warm temperatures or tropical climates to grow well
- Most deciduous trees are slow growing

Q7b.

One mark for each difference that references deciduous and coniferous trees.

Two marks only if the answer is described, not just stated. Examples:

- Deciduous trees take longer to grow
- Deciduous trees have broad leaves which fall off in autumn/winter
- Coniferous trees have needle-like leaves which are very thin and narrow
- Generally coniferous trees are softer than deciduous trees

Q7c.

1 mark for a property, characteristic or finish of beech and 1 mark for relating it to the toothbrush. For example: beech is an attractive wood (1), aiding the aesthetic of the product (1). Beech has high abrasion resistance (1) and is very hard and tough (1), ensuring the toothbrush lasts (1). Beech has good strength (1), a close grain (1) and a fine, even texture (1). Better water resistance can be achieved by applying a coating (2).

Q8a.

One mark for any of: plank, board, strip, square, moulding, sheet, dowel.

Q8b.

One mark each for up to two discriminators identified. Full marks for an appropriate description. For example: a designer would consider both the colour (1) and the grain (1) of timber when designing a product that needs an aesthetic appearance to stand out (1). Discriminators:

- Aesthetic: colour, grain, texture, finish, knots
- Mechanical: weight, durability, ease of working, strength, hardness, elasticity, dimensional stability, moisture content
- Environmental: supply chain, able to be recycled
- Economic: cost, supply chain

Q9.

One mark for a structural characteristic of each board (maximum three) and an additional mark for describing it accurately. No marks for referring to cost.

- Plywood: veneers laid at 90° to each other and glued; made of an odd number of layers (3, 5, 7, 9)
- Chipboard: wood chips bonded together with resin; larger chips in the core, getting smaller towards the surface; may have a laminated finish
- MDF: fine wood fibres compressed and bonded together with resin; a flat, smooth surface; can be made from waste/recycled timber

Q10a.

Medium Density Fibreboard (1). Only acceptable answer.

Q10b.

Answers must relate to two properties of MDF. 1 mark for each property and 1 mark for a justification, up to 4 marks. A maximum of three marks for three properties without supporting comments. This question is about construction, not finish. Points include:

- Made of fine particles (1), so there is no grain and it has a smooth face (1)
- Thicker, denser and heavier than hardboard (1); can be cut, drilled, machined and filed without damaging the surface (1)
- No knots, so easier to machine and finish
- Very stable, so it doesn't warp or buckle like natural timbers

- A good electrical insulator
- Can be dowelled together, traditional joints can be cut, and it can be glued with PVA

Q10c.

1 mark for an appropriate finish and 1 mark for explaining why it is suitable. For example: MDF can be painted any colour with acrylic or enamel paint (1), and priming is not always needed, which speeds up finishing (1). Other finishes: varnish, natural oils, wood stains, wood veneers.

Q11a.

Wax, Danish oil or varnish (accept trade names) (1).

Q11b.

1 mark for any of: veneer on manufactured board is cheaper than solid oak; veneer is available in wider sections so fewer joints are needed; veneered boards are lighter than solid planks; veneered boards are more structurally stable than solid oak.

Q11c.

1 mark per reason, two required:

- Birch is a hardwood that is strong and durable (1)
- Birch can be cut into strips and laminated to improve its strength (1)
- Birch can be steam bent into different shapes (1)
- Birch can be finished in different ways, e.g. varnished, stained or painted (1)

Q12a.

Scots pine, parana pine (accept pine), or western red cedar (1).

Q12b. (6 marks)

Answers must evaluate both the softwood and the manufactured board for full marks.

Softwood

- Advantages: easy to work; sustainable as the trees grow fast; cheaper than hardwoods and readily available; can take a range of finishes
- Disadvantages: lower density, so weaker and less durable; poor fire resistance unless treated; can be knotty; less environmentally friendly unless FSC sourced

Manufactured board

- Advantages: available in large sheets; less likely to twist and warp; cheaper, so products cost less to make; uses less solid wood; smooth surface with no grain, easy to paint and finish
- Disadvantages: formaldehyde-based glues can be harmful; not as strong or durable as solid wood; can be attacked by insects without treatment; plywood can't be exposed to moisture for long; the surface can peel if not finished well

Band	Marks	Descriptor
3	5 to 6	A coherent answer with detailed, relevant knowledge and understanding when evaluating why the designer selected a softwood for the carcass and a manufactured board for the back. Relevant examples and well-developed, substantiated judgements in a logically structured response.
2	3 to 4	Some coherence, with partial knowledge and understanding. Mostly relevant examples and partly substantiated judgements in a generally well structured response.
1	1 to 2	Basic knowledge and understanding. Limited relevant examples or judgements, with little structure.
0	0	Incorrect or irrelevant answers.