**Design & Technology**

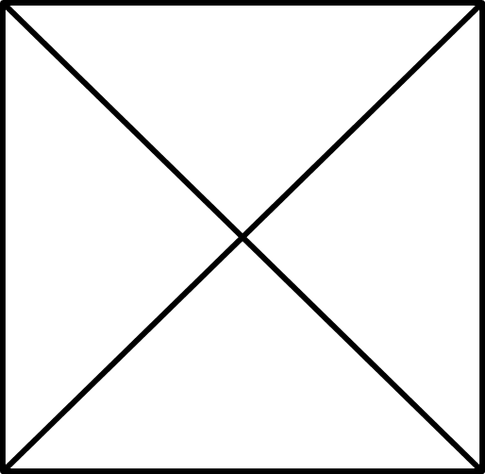
**A-Level**

**Wood Processes**

**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
* Use a cross in the box to mark you 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.** Flat-pack furniture reduces the cost of the product for who?

Shape, square

Description automatically generated

**A** Customer

Shape, square

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**B** Manufacturer

Shape, square

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**C** Customer and manufacturer

**Q2.** What is an advantage of using steam bending over laminating?

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**A** Lighter

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**B** Less wasteful

Shape, square

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**C** Complex shapes can be produced

**Q3.** What is a disadvantage of lamination?

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**A** Laminated wood is hard to recycle

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**B** Not economical

Shape, square

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**C** Heavy than solid wood

**Q4.** What might we use a turning lath to manufacture?

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**A** A table leg

Shape, square

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**B** A violin

Shape, square

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**C** A cabinet

**Q5.** What is horizontal milling typically used for?

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**A** Making holes

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**B** Cutting slots

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**C** Marking patterns

**Q6.** What machine would typically be used to make a cabinet door?

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**A** CNC lathe

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**B** CNC miller

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**C** CNC router

**Q7.** What type of wood joint is used to make heavy duty furniture?

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**A** Half lap joint

Shape, square

Description automatically generated

**B** Dowel joint

Shape, square

Description automatically generated

**C** Mortise and tenon

**Q8.** What adhesive is commonly used for woods?

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**A** PVA

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**B** Epoxy resin

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**C** Superglue

**Q9.** The figure shows a chair that uses a laminate construction for the frame.

**A picture containing seat, furniture, chair

Description automatically generated**

**Q9a**. Give **four** advantages of using a laminate construction, compared to a solid

wood construction, for the frame of the chair **(4 marks)**

**Q9b**. Give **two** disadvantages of using a laminate construction, compared to a solid wood construction, for the frame of the chair. (2 marks)

**Q10.** Lathes and milling machines are commonly found in workshops. The figure shows a diagram of a centre lathe for turning metal.

**Diagram, engineering drawing

Description automatically generated**

Name the **four** parts of the lathe indicated with the letters A, B, C and D. (4 marks)

**Q11**. The figure shows two views of a prototype of a bridge.

A picture containing diagram

Description automatically generated

The curved beam has been produced by laminating.

**Q11a**. Give **two** benefits of using lamination to manufacture the curved beam. (2 marks)

The curved beam was laminated using an adhesive.

**Q11b**. Explain **two** reasons why PVA (polyvinyl acetate) adhesive was used. (4 marks)

**Q12**. Describe the production of mechanical pulp (4 marks)

**Q13**. Describe the production of chemical pulp (4 marks)

**Answers**

**Q1.** C

**Q2.** B

**Q3.** A

**Q4.** A

**Q5.** B

**Q6.** C

**Q7.** C

**Q8.** A

**Q9a.**

* Able to use cheaper centre layers/only need to use more expensive material on outer layer(s) (1)
* More stable/do not warp/misshape (1)
* More complex/curved shapes can be achieved easily/easily bent to shape (1)
* Increased integral strength/good strength to weight/no short grain/ no knots/knots removed (1)
* A wide range of different surface laminates is possible/ a range of designs is possible (1)
* Easy-clean laminates can be used (1)
* Flexible/allows for natural spring/suspension/give in the frame (1)
* Shapes not limited by size of solid timber (1)
* Less waste produced/use up all/most of the timber (1)

**Q9b.**

* High set up costs for industrial production (1)
* Only suitable for batch/high volume production (1)
* Thin construction means specialised fixing need to be used (1)
* Edges may need covering (1)
* Delamination (1)

**Q10.**

A - Chuck (1)  
B - Tool post / tool mount (1)  
C - Saddle / Carriage / Apron (1)

D - Tail stock (1)

**Q11a.**

* Sections have increased strength / adhesive is generally stronger than timber (1)
* Thinner / shorter sections can be used / do not need 4m long lengths (1)
* Sections can be bent more easily (1)
* Laminated curved sections require less wood than cutting
* the beam from solid timber (1)
* Less prone to natural faults (splits, knots, waney-edge) (1)
* Beams are more stable (1)
* Beams can be made as deep as needed / not limited by
* timber sizes (1)
* Formers can be re-used to produce identical beams (1)
* The beam resists natural tendency to straighten (1)

**Q11b.**

* Provides a strong joint (1) so bridge can withstand a lot of weight / last a long time / be durable (1)
* Dries quickly (1) which reduces manufacturing time (1)
* Does not dry instantly (1) which allows time for positioning laminates / clamping in the former (1)
* Water resistant version could be used (1) so suitable for outdoors / close proximity to water (1)
* Requires no mixing / can be used straight out of the bottle (1) reducing waste / time (1)
* Dries clear /does not discolour the wood (1) so cannot be seen / will not detract from aesthetics / beams do not require cleaning / colouring / staining (1)
* Cheap (1) reducing overall costs (1)
* Non-toxic (1) so safe to use/no need for PPE/ more environmentally friendly (1)

**Q12.**

* Logs / coniferous wood saturated with water (1)
* Logs are debarked (1)
* Logs ground down to form a pulp (1)
* Pieces of 1-2 mm produced (1)
* Heat can be used to help improve process. (1)
* Larger pieces are re-circulated (1)
* Pulp is bleached (1)

**Q13.**

* Logs (hardwood & softwood) are debarked (1)
* Logs are cut into (20mm) chips (1)
* Chips are pounded into fragments (1)
* Chips are screened (for size) (1)
* Pulp treated with acid or alkaline / bleach (1)
* Treated in tanks / digesters under pressure. (1)
* Lignin dissolved away (1)
* Fibres filtered out (1)
* Fibres washed (1)