

Accuracy and Process Orders

Finishes

Finishes are used to improve the **aesthetics** and **durability** of products

Material Type	Finishes Used
Papers and Boards	<ul style="list-style-type: none"> • Paints • Varnishes • Laminating • Plastic coating • Wax coating
Timbers and Boards	<ul style="list-style-type: none"> • Paints • Varnishes • Wax and Polish • Staining • Oil
Metals and Alloys	<ul style="list-style-type: none"> • Painting • Lacquering • Electroplating • Galvanizing • Polishing • Plastic Coating • Powder Coating
Plastics	<ul style="list-style-type: none"> • Polishing • Painting • Decals (stickers)

Standard Components

Standard components are parts or components manufactured in the 1000s+ They are readily available, don't require specialist knowledge or tools to replace them and are universally recognised

Material Type	Components used
Papers and Boards	<ul style="list-style-type: none"> • Staples • Clips • Split pins
Timbers and Boards	<ul style="list-style-type: none"> • Nails • Screws • Panel Pins • Hinges
Metals and Alloys	<ul style="list-style-type: none"> • Nuts and bolts • Screw • Rivet • Washer
Plastics	<ul style="list-style-type: none"> • Plastic hinges

Tolerances

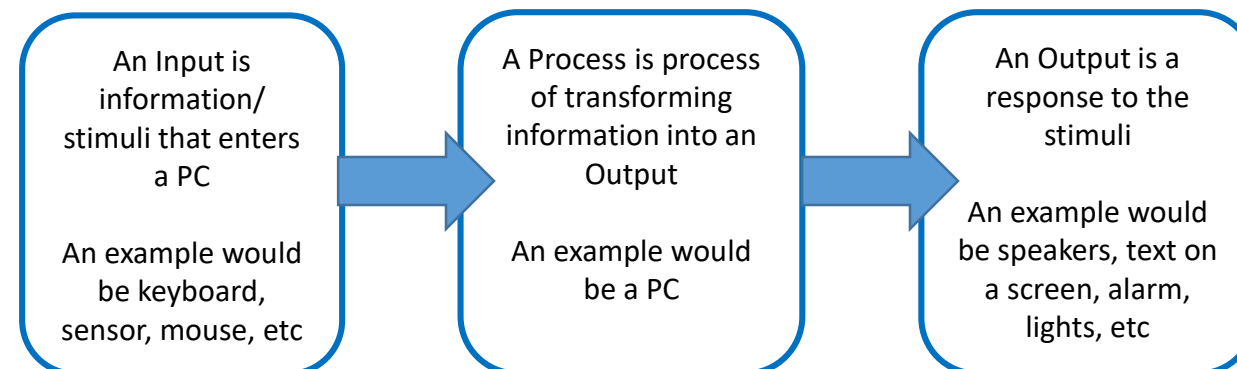
- The total amount a specific dimension or property is permitted to vary This can apply to hole depth, length, angle, thickness, weight and elasticity A gauge can be inserted into a gap or hole to check if the sizes fall within tolerance
- If parts do not fit within the specified tolerances they are discarded or recycled

Quality Control and Quality Assurance

- QC is **product** oriented Quality control is where products are regularly tested (during and after manufacture) to ensure they meet the defined set of quality criteria
- QA is **process** oriented Quality assurance is ensuring that the processes used to test the product have been done correctly and consistently You can test a product all you like, but if the tests are wrong/ inconsistent with each other than the results are invalid
- Below are examples of Quality Assurance symbols:



Process Orders



Scales of Production	
Revised	
Exam Question	
Revised again	

Production Methods	
Revised	
Exam Question	
Revised again	

Tolerances	
Revised	
Exam Question	
Revised again	

Research and Investigation	
Revised	
Exam Question	
Revised again	

Developing and Communicating Ideas	
Revised	
Exam Question	
Revised again	

Paper and Boards	
Revised	
Exam Question	
Revised again	

Finishes	
Revised	
Exam Question	
Revised again	

Standard Components and Stock Forms	
Revised	
Exam Question	
Revised again	

Prototyping and Development	
Revised	
Exam Question	
Revised again	

Briefs and Specs	
Revised	
Exam Question	
Revised again	

Plastics	
Revised	
Exam Question	
Revised again	

Woods and Boards	
Revised	
Exam Question	
Revised again	

Properties of materials	
Revised	
Exam Question	
Revised again	

New and Smart Materials	
Revised	
Exam Question	
Revised again	

Process and Manufacture

Designing Products

Materials

Approaches to Design

People, Society and Culture	
Revised	
Exam Question	
Revised again	

Work of Others	
Revised	
Exam Question	
Revised again	

Design Strategies	
Revised	
Exam Question	
Revised again	

Industry and Enterprise	
Revised	
Exam Question	
Revised again	

Energy and Mechanisms

Mechanical Systems	
Revised	
Exam Question	
Revised again	

Maths and Science

Energy	
Revised	
Exam Question	
Revised again	

Angles	
Revised	
Exam Question	
Revised again	

Environment	
Revised	
Exam Question	
Revised again	

Energy Generation and Storage	
Revised	
Exam Question	
Revised again	

Process Orders	
Revised	
Exam Question	
Revised again	

Forces	
Revised	
Exam Question	
Revised again	

Environment	
Revised	
Exam Question	
Revised again	

Decimals	
Revised	
Exam Question	
Revised again	

Area and Volume	
Revised	
Exam Question	
Revised again	

Charts and Graphs	
Revised	
Exam Question	
Revised again	

Ratios, Fractions and Percentages	
Revised	
Exam Question	
Revised again	



Revision Questions for Section One

Well, that's Key Ideas in Design and Technology all wrapped up — time to see how much you can remember.

- Try these questions and tick off each one when you get it right.
- When you've done all the questions for a topic and are completely happy with it, tick off the topic.

Technology in Manufacturing (p.2-3)

- 1) a) Explain what is meant by a Just-in-Time system.
b) State one disadvantage of using a JIT system.
- 2) Describe what is meant by a flexible manufacturing system.
- 3) Describe one way in which smart technology can be used in manufacturing.

Production Systems — CAD/CAM (p.4-5)

- 4) What do CAD and CAM stand for?
- 5) What is meant by machines being 'computer numerically controlled'?
- 6) Give an example of a CNC machine.
- 7) Describe the difference between CAM machines that carry out subtraction and CAM machines that carry out addition of material.
- 8) Give an example of a material that a 3D printer can print with.
- 9) Describe how using CAD/CAM can save on shipping costs for a business.

Product Sustainability and Social Issues (p.6-9)

- 10) a) Define the term 'sustainability'.
b) State two factors that influence the sustainability of a product.
- 11) Describe what the carbon footprint of a product is.
- 12) What is meant by 'Design for Disassembly'?
- 13) What is the purpose of a life cycle assessment?
- 14) Which of the following is not one of the 6 Rs?
A: Repair B: Reassess C: Rethink D: Recycle
- 15) Give two ways that firms can help keep their employees safe.

Products in Society (p.10-11)

- 16) Briefly describe what is meant by the following terms:
a) Co-operative b) Virtual retail
- 17) Tim is designing a mobile phone. Give two ways how technology push could affect his design.
- 18) Why should people's views be considered when products are designed for a particular culture?

Powering Systems (p.12-13)

- 19) List one advantage and one disadvantage of nuclear power.
- 20) Briefly describe the main steps involved in generating electricity from a fossil fuel power station.
- 21) A company is considering ways to reduce its energy bills. It is considering building either a single wind turbine nearby, or installing solar panels on top of their main factory.
a) Suggest two reasons why residents living near the turbine may prefer the use of solar power.
b) Suggest one reason why the company may choose a wind turbine over solar panels.

Revision Questions for Section Two

Section Two is done and dusted — try these questions to see how much you can remember.

- Try these questions and tick off each one when you get it right.
- When you've done all the questions for a topic and are completely happy with it, tick off the topic.

Properties of Materials (p.18-19)

- 1) Describe what is meant by the following properties: a) Fusible b) Malleable c) Ductile
- 2) Absorbent materials soak up moisture. State two other properties of absorbent materials.
- 3) Metal is used for radiators. Suggest one property that makes metal suitable for this use.

Paper, Board and Timber (p.20-21)

- 4) What is the difference between paper and board?
- 5) a) State one example of a hardwood.
b) For the hardwood you gave in part a), give an example of how it is used.

Metals, Alloys and Polymers (p.22-23)

- 6) What is a non-ferrous metal? Give an example of one.
- 7) Explain why stainless steel is useful for making products that are used outdoors.
- 8) Give two differences between thermoforming and thermosetting plastics.
- 9) Give a property of melamine formaldehyde that makes it suitable for laminating worktops.

Textiles and Manufactured Boards (p.24-27)

- 10) Give two examples of synthetic fibres, and state a property of each one.
- 11) Name the piece of equipment used for weaving.
- 12) Suggest why chipboard shouldn't be used to make bathroom furnishings.

Electronic Systems (p.30-33)

- 13) Name the three blocks that make up a system.
- 14) a) Give three examples of types of variable resistor.
b) For each resistor named in a), give the external factor that it can detect changes in.
- 15) Give two advantages of using microcontrollers in a system.
- 16) Name two output devices and state the type of output signal that they produce.

Mechanical Systems (p.34-37)

- 17) State an example of a second order lever.
- 18) A pillar drill operates using a belt drive mechanism. The driver wheel has a diameter of 32 mm and spins at a speed of 1200 rpm. The driven wheel has a diameter of 128 mm.
 - a) Calculate the velocity ratio.
 - b) Calculate the output speed of the system.
 - c) Name one other product that uses a belt drive mechanism.

Developments in New Materials (p.38-39)

- 19) Name two properties of graphene.
- 20) State two uses of glass-reinforced plastic.

Revision Questions for Section Three

Well, that's Section Three all wrapped up — time to see how much you can remember.

- Try these questions and tick off each one when you get it right.
- When you've done all the questions for a topic and are completely happy with it, tick off the topic.

Selecting Materials (p.43-44)

- 1) Give three factors that you should consider when selecting a material to use in a product.
- 2) Suggest two disadvantages of using a material that is not widely available.
- 3) Isaac is hand-crafting a one-off chair made from expensive mahogany. Suggest two reasons why Isaac needs to sell it at a high price.

Forces and Stresses (p.45-46)

- 4) Which type of force acts to squash or shorten an object?
- 5) The photo on the right shows someone abseiling down a wall. What type of force is acting on the climbing rope?
- 6) Name one type of industrial cutting machine that uses shear to cut materials.
- 7) Describe how you could apply torsion to a rod.



Scales of Production (p.47-48)

- 8) Put one-off, batch and mass production in order of scale (from smallest to largest).
- 9) What type of production is normally used to make a product prototype?
- 10) How is batch production carried out?
- 11) Suggest an example of a product that is likely to be mass produced.
- 12) Give one reason why continuous production runs non-stop.

Quality Control and Production Aids (p.49-50 & p.53-54)

- 13) A board needs to be cut with dimensions of 135×180 mm with a tolerance of ± 3 mm. Which of the following falls within the stated tolerance?
A: 38.1×177.5 mm **B:** 134.4×183.2 mm **C:** 133.9×181.8 mm **D:** 138.0×176.7 mm
- 14) What is a go/no go fixture used for?
- 15) Describe what a registration mark is used for.
- 16) a) What is a reference point?
 b) Give two ways in which reference points aid production.
- 17) What are patterns for textiles products normally made from?
A: fabric **B:** tissue paper **C:** board **D:** tracing paper
- 18) Adam is making a one-off product. Explain why using a jig won't save him time overall.

Production of Materials (p.55-58)

- 19) a) Which raw material are plastics usually made from?
 b) What is fractional distillation?
- 20) a) Which of the following is an example of a regenerated fibre?
A: cotton **B:** silk **C:** viscose **D:** polyester
 b) Name two synthetic fibres.
- 21) Give two ways in which mining metals can harm the environment.

Revision Questions for Section Four

Congrats, you've reached the end of **Section Four**. Well, nearly — just a few lovely questions to go...

- Try these questions and tick off each one when you get it right.
- When you've done all the questions for a topic and are completely happy with it, tick off the topic.

Properties of Paper and Board (p.62-63)

- 1) Why might recycled paper or board not be suitable for use in food packaging?
- 2) Give two properties that are useful for food packaging to have.
- 3) Why does the print quality not need to be high for flyers and leaflets?
- 4) Why are additives added to paper and board?
- 5) How much larger than A4 is A2?

Standard Components (p.64-65)

- 6) What are standard components?
- 7) Which of the following components is often used to attach paper or card to a display board?
a) treasury tags b) drawing pins c) plastic comb d) tabs
- 8) Lauren is choosing a binding for a book. It is a small book without many pages. It needs to be cheap to produce, and must lie flat when opened. Name a suitable type of binding.

Working with Paper and Board (p.66-67)

- 9) Describe what the following equipment could be used for:
a) Circle cutter
b) Perforation cutter
c) Scalpel
d) Guillotine
- 10) What is scoring used for?
- 11) Give one disadvantage of using die cutting.

Printing Techniques (p.68-69)

- 12) Which printing method uses a plate made of rubber or plastic?
- 13) Name the two printing techniques that are suitable for printing magazines.
- 14) Why is digital printing used for short print runs?
- 15) What colours do the letters CMYK stand for?

Paper and Board Finishes (p.70-71)

- 16) Name a product that might use the following finishes and suggest why.
a) laminating
b) foil blocking
- 17) a) What is embossing?
b) Why might it be used?
- 18) Why is varnish sometimes only applied to one side of paper?
- 19) a) Name the varnishing process that uses UV light.
b) Suggest why using UV light is useful when producing varnished products on a large scale.

Revision Questions for Section Five

That's just about it for Section Five — so now's a good time to test your knowledge with some questions.

- Try these questions and tick off each one when you get it right.
- When you've done all the questions for a topic and are completely happy with it, tick off the topic.

Uses of Wood, Metals and Polymers (p.75-76)

- 1) Bill is making a traditional wooden toy using beech.
Give two properties of beech that make it a suitable material to make the toy from.
- 2) Some cooking utensils are made from stainless steel.
Give two properties of stainless steel that makes it suitable for use in cooking utensils.
- 3) Flat pack furniture is often made from MDF.
State two properties of MDF that make it a good material for flat pack furniture.
- 4) a) What is the name of the process used to soften metal?
b) Outline what happens during this process.

Stock Forms and Standard Components (p.77-80)

- 5) Give three example of timber stock forms.
- 6) Name a material that screws are often made from.
- 7) What are machine screws commonly used for?
- 8) Jack is making a door for a small kitchen cupboard. Suggest what type of hinge he could use.
- 9) Give one advantage and one disadvantage of using knock-down fittings.

Shaping Materials — Hand, Machine and Power Tools (p.81-82 & p.85-86)

- 10) Which of the following types of saw is best for cutting metals?
a) rip saw b) tenon saw c) hacksaw d) coping saw
- 11) Rob wants to remove a thin layer of wood from the bottom of a door he is fitting.
Suggest a hand tool that he could use to do this.
- 12) Give two pieces of safety advice you would give to someone using a rip saw for the first time.
- 13) Susan is making a door. Suggest the power tool that she should use to:
a) cut the door down to the right height.
b) make a groove 10 cm in from the edge of the door.

Shaping Techniques (p.87-88)

- 14) Describe what a milling machine is used for.
- 15) a) Why is press forming often carried out on metals that have been annealed?
b) Outline the process of press forming.
- 16) Name a process that could be used to fold a piece of acrylic.

Moulding, Joining, Treatments and Finishes (p.89-92)

- 17) Describe the process of vacuum forming.
- 18) What is solder made from?
- 19) What is the process used to treat timber to protect it from insect attacks and decay outdoors?
a) priming b) tanalising c) undercoating d) galvanising

Revision Questions for Section Six

Hurrah, you've reached the end of Textiles — time to see if you know your gathers from your pleats.

- Try these questions and tick off each one when you get it right.
- When you've done all the questions for a topic and are completely happy with it, tick off the topic.

Fabrics and Their Properties (p.96-97)

- 1) Name two properties of polyamide fabric which make it suitable for use in sportswear.
- 2) State a property of cotton that makes it suitable for use in cushions.
Give a reason for your answer.
- 3) Give an example application of a flame retardant treatment.
- 4) Name a treatment that could be used on a dining room carpet. Give a reason for your answer.

Standard Components and Tools (p.98-99)

- 5) A fabric is sold from a roll that is 90 cm wide. Calculate the surface area of a 3 m length.
- 6) Give one advantage and one disadvantage of each of the following components:
a) zips b) Velcro®
- 7) Which type of scissors cut a fabric in a way that helps prevent it from fraying? Explain how.

Joining and Shaping Fabrics (p.100-103)

- 8) What is a tacking stitch used for?
- 9) Describe how a sewing machine forms stitches.
- 10) Why is an overlocker used to finish edges?
- 11) a) Give an example of one process that a CAM sewing machine could carry out automatically.
b) Suggest another piece of textiles equipment that uses CAM.
- 12) State which types of seam would be most suitable in the following items of clothing and explain why.
a) baby clothes b) jeans
- 13) John wants to add decoration to his sofa cushions. Suggest a technique he could use to do this.
- 14) Give an example of where a gather can be used in clothing.
- 15) Give one advantage and one disadvantage of quilting.

Dyeing (p.104-105)

- 16) Why might a chemical dye be chosen over a natural one? Give two reasons.
- 17) What are mordants used for? Give an example of a mordant.
- 18) Name a process that allows large quantities of fabric to be dyed at once.
- 19) What type of resist might you use in batik?

Printing (p.106-107)

- 20) Why are materials with a tight weave better for printing on?
- 21) Sophie wants to block-print some letters onto her fabric.
Describe one way in which she could make her own printing block.
- 22) What is the squeegee used for in flat-bed screen printing?
- 23) Give one advantage and one disadvantage of using industrial screen-printing techniques.

Revision Questions for Section Seven

Section Seven — short but sweet. Have a go at these questions to test how much you can remember...

- Try these questions and tick off each one when you get it right.
- When you've done all the questions for a topic and are completely happy with it, tick off the topic.

Properties of Components in Systems (p.112-113)

- 1) a) What is a photosensitive material?
- b) What is used to modify the photosensitive material during PCB production?
- 2) Explain why using aluminium in motor vehicles can be better than using steel.
Your answer should include two different properties of aluminium.
- 3) Suggest one property of rubber that makes it useful in washing machine drive belts.
- 4) Name the process that makes the surface of aluminium harder.
- 5) Give one property that you would expect a nickel-chromium alloy to have that makes it suitable for use as a heating element in a kettle. Explain your answer.

Standard Components in Systems (p.114-115)

- 6) What is an integrated circuit (IC)?
- 7) What is the role of a fixed resistor in an electrical circuit.
- 8) Work out the resistance and tolerance of a resistor with bands that are coloured in the order: orange, white, brown, and silver.
- 9) What does DIL stand for?
- 10) Suggest one advantage of a PIC having flash memory.
- 11) Springs can be sold in varying lengths. Suggest two other features that springs can be sold by.
- 12) Give two specific characteristics that different types of gears can be sold by.

Cutting, Drilling and Soldering (p.116-117)

- 13) Name three materials that laser cutters can cut.
- 14) Suggest a downside of using laser cutters.
- 15) a) Why are holes made in PCBs?
- b) Name the piece of equipment used for this purpose.
- 16) When manually soldering, suggest a piece of equipment you would use to melt the solder?

PCB Production and Surface Treatment (p.118-119)

- 17) a) Describe how a PCB mask is made.
- b) Describe how the mask is used in the photo-etching process of PCBs.
- 18) Karthik is looking to assemble 10 identical printed circuit boards on a tight budget.
He's using components that need to be pushed through holes.
Describe why he should assemble the PCBs by hand rather than using a machine.
- 19) a) Give two things that a PCB lacquer protects against.
- b) Some lacquers are fluorescent. This allows the lacquer to be viewed under UV light. Describe how using fluorescent lacquers is useful in the quality control of PCBs during their manufacture.
- 20) Give one example of a lubricant.
- 21) Give two examples of mechanical systems that may need lubrication.

Revision Questions for Section Eight

Phew — Designing and Making was a mammoth of a section. Here's some revision questions, just for fun...

- Try these questions and tick off each one when you get it right.
- When you've done all the questions for a topic and are completely happy with it, tick off the topic.

Designers, User Needs, Design Briefs and Specifications (p.123-128)

- 1) Give an example of a designer who designed household items.
- 2) Suggest how a can opener could be made suitable for infirm elderly people.
- 3) What information should a design brief include?
- 4) Give one example of a type of market research.
- 5) List two things you can find out about a product during product analysis.

Market Research and Product Analysis (p.129-132)

- 6) Describe a potential drawback of asking open questions on a questionnaire.
- 7) Give three things that should be considered when analysing a product.
- 8) What is the term for assembling parts separately and then adding them to the product later?

Design Strategies and Developing a Design Idea (p.135-138)

- 9) Which design strategy focuses on breaking down the design process into several different stages?
 a) Iterative design b) User-centred design c) Systems approach
- 10) Iterative design is a circular process. Explain what is meant by this.
- 11) Give one reason why it's important to collaborate with the client early on in the design process.
- 12) a) What is meant by modelling? b) Why is modelling useful when developing a design?
- 13) Once a final design has been developed, what is the next stage in the design process?

Drawing Techniques (p.139-142)

- 14) What is freehand drawing?
- 15) What do perspective drawings try to show?
- 16) Give one feature of schematic diagrams that makes them easy to read and understand.
- 17) The dimensions of a wooden box are 60 × 100 × 20 mm. Jo is doing a scale drawing of the box using a scale of 1:4. What should the dimensions of the drawing be?

Manufacturing Specifications, Prototypes, Using Materials Efficiently and Safety (p.145-152)

- 18) a) What is a manufacturing specification?
 b) Give three things that a manufacturing specification should include.
- 19) On a work order flowchart, how would you show where quality control should take place?
- 20) Give two reasons why it's useful to make prototypes using the manufacturing specification.
- 21) a) What is meant by marking out?
 b) Suggest a piece of equipment that you could use to mark out on wood.
- 22) Explain what it means if a shape tessellates.
- 23) Suggest a piece of protective clothing or equipment that you would use when:
 a) handling hot materials b) using cutting machinery
- 24) a) What two things should be written down in a risk assessment?
 b) Suggest why risk assessments are carried out on the product during the design process.