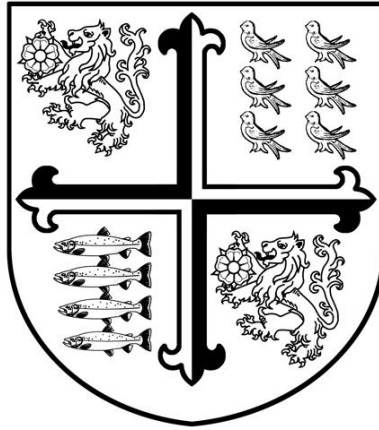




Year 10

GCSE Design Technology Exam Preparation

Exam Board: Edexcel

Exam date information:

1 exam

1 hour 45 mins

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Year 10 Design Technology Revision

Half Term 1

For the 1st ½ term, you are finishing the year 9 core content.

If you **RED** or **AMBER** sections, make a note of the specific bits which you are struggling with.

Topics	Key Concepts	R	A	G
1.03 Energy sources	<i>Knowing the processes and uses of different power sources; their applications, pros and cons:</i> a) Sources, advantages and disadvantages of energy: fossil fuels, biodiesel and biomass, tidal, wind, solar, hydroelectric b) Powering systems: batteries and cells, solar cells, mains electricity, wind power c) Factors to consider when choosing appropriate energy sources to make products and power systems: portability, environmental impact, power output, system connections, cost			
1.02 Evaluating new and emerging technology	<i>Knowing how to evaluate design decisions against topics such as:</i> a) New and emerging technologies against: budget, timescale, who the product is for, materials, manufacturing capabilities b) How potential future scenarios can occur and impact: natural disasters, medical advances, travel, global warming, communication c) Ethical perspectives: where it was made, who was it made by, who will it benefit, Fair Trade d) Environmental perspectives: materials, carbon footprint, energy usage during a life cycle analysis (LCA)			
1.01 New and emerging technology	<i>Understanding how the following is affected by new and emerging technologies; both advantages and disadvantages:</i> a) Industry: unemployment, workforce skills, demographic movement, science and technology parks b) Enterprise: crowd funding, privately owned businesses, not-for-profit c) Sustainability d) People: workforce, children, apprenticeships, wages, disabled e) Culture: population movement around the EU, social segregation f) Society: changes in shift patterns, remote working, video conferencing, Internet of Things (IoT) g) Environment: pollution, waste, transportation, packaging Quantity production: one-off, batch, mass, continuous, JIT, lean, standardised parts and components			

Revision Questions:

1.03 Energy sources

1. State one advantage and one disadvantage of using fossil fuels for energy production.
2. Explain why fossil fuels are considered a non-renewable energy source.
3. Give one advantage of using biomass as an energy source.
4. Identify one environmental disadvantage of burning biomass.
5. Describe how tidal energy generates electricity.
6. Explain one limitation of using wind power.
7. State two advantages of solar energy.
8. Explain how hydroelectric power stations generate electricity.
9. State one advantage and one disadvantage of using mains electricity in products.

1.02 Evaluating new and emerging technologies

1. Explain how medical advances could influence the development of new products.
2. State one impact of global warming on materials or product design.
3. Why is it important to consider where a product is made?
4. What is Fair Trade, and how does it benefit producers?
5. Identify one factor considered in a life cycle analysis (LCA) and explain its importance.

1.01 New and emerging technologies

1. What is meant by crowdfunding as a type of enterprise?
2. How does a not-for-profit organisation differ from a privately owned business?
3. What is meant by sustainability in a business context?
4. Why are apprenticeships important for the workforce?
5. How can businesses support disabled employees in the workplace?
6. What is meant by population movement around the EU, and how can it affect culture?
7. How has remote working changed traditional shift patterns?
8. What is the difference between batch production and mass production?

Half Term 2

For the duration of year 10, you are revising topics from year 9 core content, as well as learning new timber content.

If you **RED** or **AMBER** sections, make a note of the specific bits which you are struggling with.

Topics	Key Concepts	R	A	G
7.2 Sources of timber	To know about different woods and timbers that can be used for products and be able to apply that knowledge and understanding to be able to discriminate between them and select appropriately: a) Hardwoods: jelutong, birch, ash b) Softwoods: larch c) Manufactured boards: chipboard d) Sources and origins – where timbers are resourced; their geographical origin: Alpine forests – pine, cedar, larch, European forests – oak, beech, ash, birch, Amazonian forests – mahogany e) Physical characteristics: knots, colour, grain structure, density f) Social footprint: trend forecasting, impact of logging on communities, ease and difficulty of recycling and disposal g) Ecological footprint: sustainability, deforestation, habitat destruction and loss, processing, transportation, wastage, pollution			
7.3 Selection of timber	To understand about the different factors that effect how a designer chooses a timber to use in their products: a) Aesthetic factors: form, colour, texture b) Environmental factors: sustainability, genetic engineering, seasoning, upcycling c) Availability factors: use of stock materials, use of specialist materials, environmental impact of hurricanes, storms and disease d) Cost factors: quality of material, manufacturing processes necessary, treatments e) Social factors: use for different social groups, trends/fashion, popularity f) Cultural and ethical factors: avoiding offence, suitability for intended market, the consumer society, the effects of mass production, built-in product obsolescence			
1.17 Communication techniques	Being able to use/draw, reference and explain the reasons to use the following techniques: a) Freehand sketching (2D and/or 3D) b) Annotated sketches c) Cut and paste techniques d) Digital photography/media e) 3D models f) Isometric and oblique projection g) Perspective drawing h) Orthographic and exploded views i) Assembly drawings j) System and schematic diagrams			
1.15 Designs and design companies	Knowing the work and styles of past and present designers and design companies for: a) Alessi b) Apple c) Heatherwick Studio d) Joe Casely-Hayford e) Pixar f) Raymond Loewy g) Tesla h) Zaha Hadid			

Revision Questions:

7.2 Sources of timber

1. Why is jelutong often used for modelling and carving applications?
2. State one property of ash that makes it suitable for tool handles or sports equipment.
3. Give one advantage of using larch in outdoor construction.
4. What is chipboard made from, and why is it considered a cost-effective material?
5. Identify one type of timber that comes from Amazonian forests and state a typical use.
6. From which type of forest would you obtain birch, and in which general region are these forests found?
7. What does the presence of knots in timber indicate, and how can this affect strength?
8. How does grain structure affect the workability of wood?
9. Give one way that logging can impact local communities positively or negatively.
10. Explain one environmental issue caused by deforestation linked to timber production.

7.3 Selection of timber

1. How does colour affect a product's appeal?
2. What is meant by texture in product design?
3. What does sustainability mean in relation to materials?
4. What is seasoning of timber and why is it important?
5. How can storms or disease affect material availability?
6. What is meant by stock materials?
7. How do manufacturing processes affect the cost of a product?
8. How do trends and fashion influence product design?
9. Why is it important to avoid offence in product design?
10. What is built-in product obsolescence?

1.17 Communication techniques

1. What is one advantage of using freehand sketching when developing early design ideas?
2. What two key types of information should be included when annotating a design sketch?
3. How can cut and paste techniques help when developing design concepts?
4. Give one way digital photography can be used to support design development.
5. Why are 3D models useful when communicating a design idea to a client or user?
6. What is the main purpose of using isometric projection in design drawings?
7. How does perspective drawing improve the realism of a design idea?
8. What is the difference between an orthographic drawing and an exploded view?
9. What is shown in an assembly drawing and why is it important?
10. What is a system or schematic diagram used to represent in design and technology?

1.15 Designers and design companies

1. What type of products is Alessi best known for?
2. Give one characteristic of Alessi's design style.
3. Name one key feature often associated with Apple product design.
4. Who is a famous designer associated with Apple?
5. What type of design work does Heatherwick Studio produce?
6. What industry is Joe Casely-Hayford known for?
7. What is the style in which Joe Casely-Hayford designs?
8. What design shape is Raymond Loewy well known for?
9. Why are Tesla cars so successful?
10. What was Zaha Hadid famous for designing?

Half Term 3

Continuing with year 10 content and revising year 9 content revision.

If you **RED** or **AMBER** sections, make a note of the specific bits which you are struggling with.

Topics	Key Concepts	R	A	G
7.4 Strengthening timber	<i>An awareness of the influence of forces and stresses that act on timber and the methods that can be employed to resist them:</i> a) Forces and stresses: compression, tension, shear, natural forces within the timber as it grows, pre-stressed construction beams b) Reinforcement/stiffening techniques: frame structures, suitable fabrication/assembly/ construction processes, lamination, use of braces and tie bars, embedding composite materials			
1.13 Material properties	<i>Understanding why materials are chosen for their purpose, including the following information:</i> a) Properties of materials b) Advantages and disadvantages of materials c) Justification of the choice of materials			
1.11 Textiles and fibres	<i>To know about different textiles and fibres that can be used for products and be able to apply that knowledge and understanding to be able to discriminate between them and select appropriately:</i> a) Natural: cotton and wool b) Synthetic: polyester and acrylic c) Woven: calico and denim d) Non-woven: felt and bonded fibres e) Knitted: warp knit and weft knit <i>Understanding properties that textiles have such as elasticity, resilience, durability</i>			

Revision Questions:

7.4 Strengthening timber

1. Define compression.
2. Define tension.
3. Define shearing.
4. How does pre-stressing construction beams work?
5. What is meant by 'embedding composite materials' into construction beams?
6. What is lamination?
7. What is the difference between a tie bar and a brace?
8. What shape is formed when adding braces and tie bars?

1.13 Material properties

Define the following terms:

1. Toughness
2. Hard
3. Malleable
4. Ductile
5. Stable
6. Stiff
7. Compressive strength
8. Tensile strength

1.11 Textiles and fibres

1. Explain why cotton is suitable for summer clothing but not ideal for waterproof garments.
2. Describe the main use of wool and why it is used for that purpose.
3. Explain one advantage of polyester over cotton for outdoor clothing.
4. Compare acrylic with wool, giving one similarity and one difference.
5. Compare calico and denim in terms of strength and typical uses
6. Explain how the interlacing of warp and weft threads affects the properties of woven fabrics.
7. Explain why felt does not fray when cut.
8. Describe one advantage and one disadvantage of bonded fabrics.
9. Compare warp knit and weft knit fabrics in terms of stretch and structure.
10. Explain why knitted fabrics are suitable for garments that need flexibility.

Half Term 4

Continuing with year 10 content and revising year 9 content revision.

If you **RED** or **AMBER** sections, make a note of the specific bits which you are struggling with.

Topics	Key Concepts	R	A	G
7.5 Stock forms and sizes	<i>To apply knowledge and understanding of the advantages, disadvantages and applications of the following forms/sizes of materials for:</i> a) Stock forms/types: regular sections, mouldings, dowels, sheets b) Sizes: PAR/PSE, cross-sectional area, diameter, board sizes			
7.6 part 1 Manufacturing processes	<i>Understanding the processes; how and why they're used in industry for the following:</i> a) Processes that can be used to cut and shape materials: routing, sawing, use of a mortise, use of a bag press			
1.10 Polymers	<i>To know about different polymers that can be used for products and be able to apply that knowledge and understanding to be able to discriminate between them and select appropriately:</i> a) Thermoforming: acrylic HIPS, biopol b) Thermosetting: urea formaldehyde, polyester resin Understanding properties that polymers have such as insulation of heat and electricity, toughness			
1.09 Papers and boards	<i>To know about different papers and boards that can be used for products and be able to apply that knowledge and understanding to be able to discriminate between them and select appropriately:</i> a) Papers: copier, cartridge, tracing b) Boards: corrugated, folding boxboard, solid white board Understanding properties that papers and boards have such as flexibility, printability and biodegradability			

Revision Questions:

7.5 Stock forms and sizes

1. What is a regular section of timber? Give one advantage.
2. What is a moulding and give one common use.
3. What is a dowel?
4. State one advantage and one disadvantage of sheet materials.
5. What does PAR and PSE stand for?
6. Explain one advantage of PAR timber.
7. Give one advantage of using standard board sizes.

7.6 part 1 Manufacturing processes

1. What is routing in timber manufacturing?
2. What is a mortise?
3. What is a bag press?
4. Explain how a bag press works.
5. Give one reason why a bag press is used in manufacturing.
6. Compare routing and sawing in terms of their use.

1.10 Polymers

1. Explain why acrylic is commonly used as a glass substitute.
2. Give one reason why HIPS is suitable for packaging products.
3. What is one environmental advantage of using biopol?
4. Describe what happens to thermoforming polymers when they are heated.
5. Give one property of urea formaldehyde that makes it useful for electrical fittings.
6. Explain why polyester resin is used in products such as boat hulls.

1.09 Papers and boards

1. Explain why copier paper is suitable for everyday printing tasks.
2. Give one reason why cartridge paper is preferred for drawing and sketching.
3. Describe one key property of tracing paper and explain its use.
4. Compare copier paper and tracing paper, giving one difference in their properties.
5. Explain how the structure of corrugated board increases its strength.
6. Give one reason why folding boxboard is commonly used for packaging.
7. Describe one property of solid white board that makes it suitable for high-quality packaging.
8. Compare corrugated board and solid white board, giving one difference in their uses.

Half Term 5

Continuing with year 10 content and revising year 9 content revision.

If you **RED** or **AMBER** sections, make a note of the specific bits which you are struggling with.

Topics	Key Concepts	R	A	G
7.6 part 2 Manufacturing processes	<i>Understand the following terms, as well as advantages and disadvantages of:</i> a) Scales of production: one off, batch, mass, continuous b) Techniques for quantity production: marking-out methods, jigs, fixtures, templates, patterns, sub-assembly, computer-aided manufacturing (CAM), quality control, working within tolerance, efficient cutting to minimise waste			
7.7 part 1 Equipment and processes	<i>Understand the following tools and equipment – functions + advantages of:</i> a) Hand tools and machinery b) Digital design and manufacture c) Shaping tools: drilling, cutting, planning, chiselling, turning, abrading, carving, use of rasps/surforms			
1.08 Metals	<i>To know about different metals that can be used for products and be able to apply that knowledge and understanding to be able to discriminate between them and select appropriately:</i> a) Ferrous: mild steel, stainless steel, cast iron b) Non-ferrous: copper, aluminium, brass c) Understanding properties that metals have such as ductility, malleability, hardness			
1.06 Electronic components	<i>Know the different electronic component functions and their advantages:</i> a) Sensors and their input to a circuit: light-dependent resistors (LDRs), thermistors b) Control devices and components: switches, transistors, resistors c) Outputs: buzzers, light-emitting diodes (LEDs)			

Revision Questions:

7.6 part 2 Manufacturing processes

1. What is meant by one-off production?
2. What is batch production?
3. Explain one advantage of batch production.
4. What is mass production?
5. Give one disadvantage of mass production.
6. What is continuous production?
7. What is a jig and why is it used?
8. What is the difference between a template and a pattern?
9. What is meant by sub-assembly in manufacturing?
10. Explain one benefit of using CAM in production.
11. What is meant by working within tolerance and why is it important?

7.7 part 1 Equipment and processes

1. State one advantage of using machinery in manufacturing.
2. What is meant by digital design in manufacturing?
3. Give one advantage of using CAD/CAM systems.
4. What is the purpose of planing timber?
5. Explain the function of chiselling in joinery.
6. Give one advantage of using abrading tools.
7. Name 2 abrading tools.
8. What is the purpose of turning timber?

1.08 Metals

1. Explain why mild steel is widely used in construction, despite being prone to corrosion.
2. Give one property of stainless steel and explain a use of it.
3. Compare cast iron with mild steel, giving one difference in properties and one difference in typical use.
4. Explain how the properties of copper make it suitable for both plumbing and electrical uses.
5. Explain why aluminium is often used in aircraft manufacture instead of steel.
6. Compare brass with copper, giving one advantage and one typical application.

1.06 Electronic components

1. What does an LDR do in a circuit?
2. How does a thermistor respond to changes in temperature?
3. What is the function of a switch in a circuit?
4. What is the purpose of a resistor in a circuit?
5. Give one advantage of using LEDs as an output.
6. When might a buzzer be used in a product?

Half Term 6

Continuing with year 10 content and revising year 9 content revision.

If you **RED** or **AMBER** sections, make a note of the specific bits which you are struggling with.

Topics	Key Concepts	R	A	G
7.7 part 2 Equipment and processes	<i>To understand the following terms and uses of the following:</i> a) Fabricating/constructing: lamination, veneering, screws, nails b) Joints: butt, dowel, lap, housing, mitre, mortise and tenon, dovetail c) Wastage d) Addition			
1.04 part 1 Composite materials	<i>Knowing how to distinguish between modern materials; knowing their applications, advantages and disadvantages of the following composites:</i> a) Concrete b) Plywood c) GFRP d) CFRP e) Reinforced polymers f) Robotic materials			
1.04 part 2 Technical textiles	<i>Knowing how to distinguish between modern materials; knowing their applications, advantages and disadvantages of the following technical textiles:</i> a) Agrotextiles b) Geotextiles c) Construction textiles d) Sports textiles e) Protective textiles f) Domestic textiles g) Environmentally friendly textiles			

Revision Questions:

7.7 part 2 Equipment and processes

1. What is lamination and why is it used?
2. What is veneering? Give one reason it is used in products.
3. Give one advantage of using screws instead of nails.
4. State one use of nails in construction.
5. What is a butt joint and where might it be used?
6. Describe the function of a mortise and tenon joint.
7. Explain what is meant by wastage in manufacturing.
8. Give one way manufacturers can reduce wastage.
9. What is meant by addition in manufacturing processes?

1.04 Modern materials

Composite materials

1. Explain one advantage and one disadvantage of using concrete in construction.
2. What is meant by *reinforced concrete*, and why is reinforcement added?
3. Describe how plywood is manufactured.
4. State one reason why plywood is stronger than solid wood of the same thickness.
5. Give two properties of GFRP.
6. Explain why CFRP is commonly used in high-performance products such as sports equipment or vehicles.
7. What is a reinforced polymer?
8. What are robotic materials, and give one example of how they might be used.

Technical textiles

1. Identify one function of agrotextiles used in farming.
2. What is the purpose of geotextiles in construction or civil engineering?
3. State two requirements materials must meet when used in the construction industry.
4. Explain why lightweight materials are important in sports product design.
5. Give one property required of materials used for protective equipment and explain why it is important.
6. Where will you find domestic textiles in use? Give an example.
7. What is meant by an environmentally friendly material, and give one example.

Answers to all of the revision Qs

1.03 Energy sources

1. *Advantage:* Reliable and can generate large amounts of energy. *Disadvantage:* Produces carbon dioxide, contributing to climate change.
2. They are non-renewable because they take millions of years to form and cannot be replaced within a human timescale.
3. Biomass is renewable because it comes from plants or organic matter that can be regrown.
4. Burning biomass releases carbon dioxide and can contribute to air pollution if not managed sustainably.
5. Tidal energy uses the movement of water caused by tides to turn turbines, which generate electricity.
6. Wind power is unreliable because it depends on wind availability, which is not constant.
7. Renewable energy source, produces no pollution during use, abundant in hot countries.
8. Water stored behind a dam is released to flow through turbines, which spin generators to produce electricity.
9. *Advantage:* Provides a constant and reliable power supply. *Disadvantage:* Requires connection to a power source (not portable) and can be dangerous if mishandled.

1.02 Evaluating new and emerging technologies

1. Medical advances can lead to new products such as prosthetics or wearable health devices that improve quality of life and monitor health.
2. Designers may use more sustainable and environmentally friendly materials and processes.
3. It is important because products made in different countries may involve poor working conditions or low wages, so designers must consider ethical sourcing.
4. Fair Trade ensures producers receive fair wages and safe working conditions, improving their quality of life and supporting sustainable practices.
5. Factor: Energy use. Importance: Reducing energy use during a product's life cycle lowers environmental impact and carbon emissions.

1.01 New and emerging technologies

1. Crowdfunding is raising small amounts of money from many people, usually online, to fund a business or project.
2. A not-for-profit organisation reinvests profits into its causes, while a privately owned business aims to make profit for its owners.
3. Sustainability means operating in a way that meets present needs without harming future resources or the environment.
4. They provide practical training and skills development, helping people gain employment.
5. By making reasonable adjustments such as accessible facilities, adapted equipment, and flexible working arrangements.
6. It refers to people moving between EU countries, which can increase cultural diversity and exchange of ideas.
7. It allows more flexible working hours and reduces the need for fixed shifts or commuting.
8. Batch production makes items in groups, while mass production produces large quantities continuously.

7.2 Sources of timber

1. It is soft, lightweight, and easy to carve, with a fine, even grain.
2. It is tough and has some flexibility.
3. Naturally durable and resistant to decay.
4. It is made from wood chips and resin, and is cost-effective because it uses waste materials and is cheap to produce.
5. Mahogany – used for high-quality furniture.

6. European forests, found in Europe.
7. Knots show where branches grew, and they can weaken the wood and make it less stable.
8. Straight grain is easier to cut and shape, while irregular grain is harder to work with.
9. It can create jobs (positive) or displace communities and damage livelihoods (negative).
10. It leads to loss of habitats and biodiversity.

7.3 Selection of timber

1. Colour can attract attention, create mood, and influence consumer choice.
2. Texture refers to the surface feel or finish of a material (e.g. smooth, rough, glossy).
3. Using materials in a way that does not deplete resources or harm the environment long-term.
4. Drying wood to remove moisture; it prevents warping and increases strength.
5. They can damage forests or crops, reducing supply and increasing cost.
6. Materials that are readily available in standard sizes and forms.
7. More complex processes increase production time and cost.
8. Designers create products that match current styles to attract consumers.
9. To ensure products are acceptable and respectful to different cultures and beliefs.
10. Designing products to wear out or go out of date quickly so consumers replace them.

1.17 Communication techniques

1. It is quick and flexible, allowing lots of ideas to be generated and explored rapidly.
2. Materials, dimensions, sizes, functionality, parts that can't be seen etc.
3. They allow designers to combine existing images or ideas to quickly create new concepts and explore different styles.
4. It can be used to record research, existing products, or stages of model development for reference.
5. They allow the client to see and understand the shape, size, and form of the design more clearly. They help clearly check aesthetics and functionality.
6. To show a 3D representation of a design without perspective distortion.
7. It shows depth and distance, making the design look more realistic as it would appear in real life.
8. An orthographic drawing shows separate 2D views (front, side, top), while an exploded view shows how parts fit together by separating them.
9. It shows how all parts fit together and is important for guiding the construction or manufacturing process.
10. It represents how a system works, showing inputs, processes, and outputs using symbols.

1.15 Designers and design companies

1. Kitchenware and household products.
2. Creative, decorative, and often playful design style.
3. Minimalist design (simple, sleek appearance).
4. Jonathan Ive.
5. Architecture, product design, and large-scale structures, as well as smaller products i.e. perfume bottles.
6. Fashion design.
7. Mixing cultural influences from Africa with typical British tailored pieces.
8. Teardrop shape (for aerodynamics).
9. Powerful electric cars which don't compromise on form or function.
10. Futuristic architecture (buildings with flowing, curved shapes).

7.4 Strengthening timber

1. A pushing force that squashes or shortens a material.
2. A pulling force that stretches a material.
3. A force that causes parts of a material to slide past each other.
4. The beams are put under tension for an amount of time (stretched), they are then released which makes them bow slightly. Once they are then used on site, the loads will be applied which then levels out the timber.

5. When a composite material i.e. carbon fibre, is put into a material to strengthen it and make it much more durable.
6. Gluing together thin layers of wood to form a thicker, stronger material.
7. Braces are bars which are added to a structure, to split it into smaller shapes whereas a tie bar is a rod which is held under tension to support a frame. So both support a structure but tie bars are several rods tied into place.
8. Triangle shapes, as triangles are the strongest structural shape. It is called triangulation.

1.13 Material properties

1. Ability to withstand sudden shock/stress.
2. Ability to withstand indentation, scratching, penetration of the surface.
3. (metals only) Being deformed in all directions with fracturing.
4. (metals only) Being able to be drawn out and twisted into wiring.
5. Ability to keep its shape.
6. Resists bending.
7. Withstanding being squashed.
8. Withstanding being stretched/pulled apart.

1.11 Fibres and textiles

1. Cotton is suitable for summer clothing because it is breathable and absorbent, allowing sweat to evaporate and keep the body cool. However, it is not waterproof as it absorbs water easily and takes a long time to dry.
2. Used for jumpers and warm clothing as it is a good heat insulator.
3. Polyester is more suitable for outdoor clothing because it is water-resistant and dries quickly, unlike cotton which absorbs moisture.
4. Acrylic is similar to wool in that it is warm and lightweight. However, it is synthetic and less breathable than wool.
5. Calico is lightweight and less durable, making it suitable for items like test garments or craft work. Denim is much stronger and more durable due to its twill weave, making it ideal for jeans and workwear.
6. The interlacing of warp and weft threads creates a strong and stable fabric with little stretch. This structure increases durability but reduces flexibility.
7. Felt does not fray because it is made by matting fibres together rather than weaving them, so there are no threads to come undone.
8. One advantage is that bonded fabrics are quick and cheap to produce. A disadvantage is that they are often weak and not very durable.
9. Weft knit fabrics are stretchy in all directions and can unravel easily, whereas warp knit fabrics are more stable, less stretchy, and do not ladder as easily.
10. Knitted fabrics are suitable for flexible garments because their looped structure allows them to stretch and move with the body, improving comfort.

7.5 Stocks forms and sizes

1. A regular section is timber cut into a standard shape (e.g. square or rectangular). Advantage: Easy to measure, cut and join accurately.
2. A moulding is shaped timber with a decorative or functional profile. Use: Skirting boards or decorative trims in furniture/rooms.
3. A cylindrical piece of wood.
4. Advantage: Large surface area and consistent quality.
Disadvantage: Edges may be weak or unattractive.
5. PAR: Planed All Round, PSE: Planed Square Edge
6. It has smooth, finished surfaces on all sides, so it is ready to use and requires less preparation.
7. They reduce waste and cost because they are mass-produced and readily available.

7.6 part 1 Manufacturing processes

1. Routing is a process that uses a rotating cutting tool to shape, hollow, or cut patterns into timber.
2. A mortise is a rectangular hole cut into timber to form part of a mortise and tenon joint.
3. A bag press is a machine that uses air pressure in a sealed bag to press materials together.
4. The material is placed inside a flexible airtight bag, and air is removed to create a vacuum. This pressure evenly presses the material into shape or bonds layers together.
5. It applies even pressure across the surface, making it ideal for laminating curved or complex shapes.
6. Routing is used for shaping, detailing, and creating grooves, while sawing is mainly used for cutting timber to size or length.

1.10 Polymers

1. Acrylic is transparent and has a glass-like appearance, but it is lighter and more impact-resistant than glass, making it safer and less likely to shatter.
2. HIPS is lightweight, easy to form, and has good impact resistance, making it suitable for protective packaging.
3. Biopol is biodegradable, so it can break down naturally in the environment, reducing plastic waste.
4. When heated, thermoforming polymers soften and can be moulded into shape. When cooled, they harden again and keep their new form.
5. Urea formaldehyde is a good electrical insulator and is heat-resistant.
6. Polyester resin is strong, lightweight, and can be reinforced with fibres such as fibreglass.

1.09 Papers and boards

1. Copier paper is smooth, lightweight, and allows ink or toner to transfer clearly without smudging, making it suitable for high-volume everyday printing.
2. Cartridge paper is thicker and more absorbent than standard paper, which makes it suitable for drawing as it can handle different media such as pencil, ink, or light paint.
3. Tracing paper is translucent, allowing light to pass through it so designs underneath can be seen clearly, making it useful for copying drawings.
4. Copier paper is opaque and designed for printing, whereas tracing paper is translucent and designed for copying images.
5. Corrugated board has a fluted layer sandwiched between flat layers, which increases stiffness and strength while remaining lightweight.
6. Folding boxboard is lightweight, easy to cut and crease, and has a smooth surface for printing, making it ideal for packaging such as cartons.
7. Solid white board has a high-quality, smooth white surface which allows for high-quality printing and an attractive finish for premium packaging.
8. Corrugated board is mainly used for protective packaging like boxes due to its strength, whereas solid white board is used for retail packaging where appearance and print quality are important.

7.6 part 2 Manufacturing processes

1. Production of a single, unique product.
2. Producing a set number of identical products at one time.
3. It allows some variation between batches while still being more efficient than one-off production. Tools can be reused, saving time and cost. Machinery and labourers are flexible so that they can alter between batches.
4. Producing 1000s of identical products, often using assembly lines.
5. High initial setup costs / lack of product variety.
6. Production that runs constantly, 24/7, with no interruption.
7. A jig is a tool that guides a cutting or shaping tool i.e. a cutting jig, bending jig, drilling jig. It ensures accuracy, consistency, and speeds up production.
8. A template is used to mark out shapes onto material. A pattern is a set of templates.
9. Making smaller parts separately before assembling them into a final product.

10. CAM allows machines to produce parts accurately and repeatedly with minimal human error, improving efficiency.

11. Tolerance is the acceptable variation in dimensions. The minimum and maximum that a product has to be within. It is important to ensure parts fit together correctly and function properly.

7.7 part 1 Equipment and processes

1. Faster production and increased efficiency.
2. Using computer software (CAD) to design products digitally.
3. They allow precise and accurate designs to be produced quickly. They also enable consistent, repeatable manufacturing with minimal errors.
4. To smooth and level the surface of the wood.
5. Chiselling is used to remove small amounts of wood precisely. It is commonly used to create wood joints.
6. They smooth or shape surfaces to improve finish and accuracy.
7. File, rasp, surform.
8. To make square section timber rounded, into a cylindrical shape.

1.08 Metals

1. Mild steel is widely used in construction because it is strong, tough, and relatively inexpensive.
2. Stainless steel is corrosion-resistant, which makes it useful for products like cutlery and kitchen equipment where resistance to rust and hygiene are important.
3. Cast iron is hard and resistant to compression but brittle, whereas mild steel is tougher and more flexible. Cast iron is often used for items like manhole covers or cookware, while mild steel is used for structural supports.
4. Copper is an excellent conductor of electricity, making it ideal for wiring, and it is also resistant to corrosion, making it suitable for plumbing pipes.
5. Aluminium is used in aircraft manufacture because it is lightweight and has a good strength-to-weight ratio, which reduces fuel use compared to heavier steel.
6. Brass has better corrosion resistance than copper and is harder, making it more durable. It is commonly used for fittings such as door handles or musical instruments.

1.06 Electronic components

1. An LDR changes its resistance depending on light intensity.
2. A thermistor changes its resistance with temperature. As temperature increases, its resistance decreases.
3. A switch is used to open or close a circuit, allowing current to flow or stopping it.
4. A resistor limits the flow of current in a circuit, preventing components from being damaged.
5. LEDs use very little energy and have a long lifespan, making them efficient outputs.
6. A buzzer is used to produce sound as a warning or alert, for example in alarms or timers.

7.7 part 2 Equipment and processes

1. Lamination is gluing layers of material together to make a thicker material. It is used to increase strength and reduce warping.
2. Veneering is applying a thin layer of high-quality wood to the surface of a cheaper material. It is used to improve appearance while reducing cost.
3. Screws provide a stronger, more secure joint and can be removed easily.
4. Nails are used for quickly fixing pieces of timber together.
5. A butt joint is where two pieces of wood are joined end-to-end or edge-to-edge. It is used in simple frames or basic structures.
6. It joins two pieces of timber by inserting a tenon into a mortise hole. It creates a strong, durable joint that resists movement. It is used on the frames of furniture i.e. chair legs to a frame.
7. Wastage is material that is unused or discarded during production.
8. By using efficient cutting plans or nesting to maximise material use.
9. Addition is adding material to build up a product (e.g. layering or 3D printing). It can also refer to putting parts together i.e. gluing parts, adding components etc.

1.04 part 1 Composite materials

1. *Advantage:* Very strong in compression, making it ideal for structural use.

Disadvantage: Weak in tension, so it can crack without reinforcement.

2. Reinforced concrete is concrete with steel bars or mesh embedded inside it.

The reinforcement is added to improve tensile strength and prevent cracking.

3. Plywood is made by gluing together thin layers (veneers) of wood with the grain of each layer at right angles to the next.

4. It is stronger because the cross-grain layers distribute loads evenly and reduce the chances of splitting.

5. Lightweight, High strength, corrosion resistant, durable, low cost compared to CFRP.

6. CFRP is used because it has a very high strength-to-weight ratio, making products strong but lightweight, which improves performance.

7. Cotton fabrics mixed with a polymer resin to make inflammable laminated plastic sheets.

8. Robotic materials are materials that can sense and respond to their environment. Uses: plane wings, prosthetics.

1.04 part 2 Technical textiles

1. Agrotextiles are used to protect crops, for example by controlling sunlight, temperature, or pests.

2. Geotextiles are used to separate, filter, reinforce, or drain soil, helping prevent erosion and improve stability.

3. High strength, Durability, waterproof (Materials must withstand loads and environmental conditions over time).

4. Lightweight materials reduce the effort needed to move equipment, improving speed and performance for the user.

5. Property: Impact resistance: it protects the user by absorbing or reducing forces from impacts (e.g. helmets). Heat resistance: to protect firefighters when entering burning buildings.

Chemical resistance: to protect those working with toxic waste/chemicals etc.

6. Found in the household. Vary, can range from flooring, to furnishings, cushions to curtains etc.

7. An environmentally friendly material has minimal negative impact on the environment (e.g. biodegradable or recyclable). Examples include bamboo, flax, cotton, hemp.