

Name .....

my **revision** notes

AQA GCSE (9–1)

# DESIGN AND TECHNOLOGY

TIMBERS, METALS  
AND POLYMERS



Ian Fawcett  
Debbie Tranter  
Pauline Treuherz

 **HODDER**  
EDUCATION  
LEARN MORE

- Practice **ALL** question for **ALL** principles. This will ensure you have covered all of the Specification
- Use additional paper where needed.
- Bullet point are fine but do use PEE (Point Example explain) to ensure you get full marks.
  - 8 mark question = 4 points explained

### CTP 3.1.1 New and Emerging Technologies

## Now test yourself

TESTED

- 1 Explain the benefits of using automation in a factory. [4 marks]
- 2 Explain the term 'virtual retailing'. [2 marks]
- 3 Give an example of where technology push has produced a new product. [2 marks]
- 4 Why do designers need to consider the needs of everyone in society when designing a product? [4 marks]
- 5 Explain the term JIT production. [2 marks]

### CTP 3.1.2 Energy Generation and storage

## Now test yourself

TESTED

- 1 Explain a way of producing electricity in a series of stages. [5 marks]
- 2 Discuss the problems associated with the use of biomass as a renewable energy source. [2 marks]
- 3 List three ways to store energy, and describe one in detail. [3 marks]

### CTP 3.1.3 Developments in New Materials

## Now test yourself

TESTED

1

- 1 Give the name of a suitable protective coating for aluminium. [1 mark]
- 2 Explain the advantages of using corn starch polymers for food packaging. [4 marks]
- 3 What is meant by the term 'smart material'? [2 marks]
- 4 Explain why carbon fibre reinforced plastic is used to manufacture the body of a Formula One racing car. [4 marks]
- 5 Give the name of a technical textile and suggest a suitable use. [2 marks]

### CTP 3.1.4 Systems Approach to Designing

## Now test yourself

1

- 1 Name three input devices. [3 marks]
- 2 Explain how an LDR works. [2 marks]
- 3 State what the input device would be in a system designed to alert a person to an intruder in their home. [1 mark]
- 4 Describe how a microcontroller is used in an electronic system. [2 marks]
- 5 Name three output devices. [3 marks]

### CTP 3.1.5 Mechanical Devices

## Now test yourself

5

- 1 Give an example of an object that moves in an oscillating motion. [1 mark]
- 2 Give an example of a second-order lever. [1 mark]
- 3 Explain what is meant by torque. [2 marks]
- 4 Explain how a cam and follower mechanism works and the types of motion it transmits. [3 marks]
- 5 Describe the speed of motion and size of torque in a pulley and belt system that has a small driver pulley and a larger driven pulley. [2 marks]

### CTP 3.1.6 Material Categories

## Now test yourself

TESTED

- 1 Give the name of a paper/board used for packaging and the properties which make it suitable. [2 marks]
- 2 For a mechanical and a physical property of your choice, give a definition of each and an example of a material that has that property. [4 marks]
- 3 List three features of a coniferous tree. [3 marks]
- 4 Name a suitable polymer for a water bottle. [1 mark]
- 5 Explain why most aircraft are made using aluminium. [3 marks]
- 6 What is the source of synthetic fibres? [1 mark]
- 7 Give three reasons why fibres are often blended before being made into a fabric. [3 marks]

# Core Technical Principles

## Exam practice

- 1 Which of these statements is true?
  - a) Cotton fibres are very flammable.
  - b) Polyester is an absorbent fibre.
  - c) Polyester fibres are very elastic.
  - d) Wool fibres come from a plant.[1 mark]
- 2 Give the correct definition for the term 'hardness'.
  - a) The ability to withstand bending
  - b) The ability to withstand impact
  - c) The ability to withstand scratching
  - d) The ability to withstand twisting[1 mark]
- 3 Which of the following explains why corrugated card is used in packaging?
  - a) It is aesthetically pleasing.
  - b) It is inexpensive.
  - c) It is lightweight.
  - d) It is waterproof.[1 mark]
- 4 Which of the following fibres is thermoplastic?
  - a) Cotton
  - b) Polyamide
  - c) Silk
  - d) Wool[1 mark]
- 5 Which of the following is not a type of weave?
  - a) Plain
  - b) Satin
  - c) Twill
  - d) Weft[1 mark]
- 6 Describe a way to enhance the properties of paper/card. [1 mark]
- 7 State two reasons why polyamide fabrics are used for car seatbelts. [2 marks]
- 8 Name two staple fibres. [2 marks]
- 9 State two reasons why wool fabrics can be unpopular with consumers. [2 marks]
- 10 State two reasons why elastane fibres are used in swimwear fabrics. [2 marks]
- 11 State two reasons why fabrics made from a blend of cotton and polyester fibres are dangerous when set alight. [2 marks]
- 12 Name the four types of mechanical motion. [4 marks]
- 13 Describe what is meant by the term 'finite resource'. [1 mark]
- 14 Give two advantages of using corn starch polymers. [2 marks]
- 15 What is a composite material? [2 marks]
- 16 Name two electronic/mechanical input devices. [2 marks]
- 17 Draw a parallel motion linkage. [2 marks]
- 18 Give the properties of balsa and suggest a possible use. [3 marks]
- 19 Give a definition of the term 'ferrous metal'. [1 mark]
- 20 Give the properties of stainless steel and suggest a possible use. [3 marks]
- 21 Which one of the following is a thermoforming polymer?
  - a) Acrylic (PMMA)
  - b) Epoxy resin
  - c) Polyester resin
  - d) Phenol formaldehyde[1 mark]



## STP Metals

## Now test yourself

- 1 Use notes and sketches to describe the life cycle of an aluminium can. [6 marks]
- 2 Name two methods of permanently joining metal together. [2 marks]
- 3 Name two non-permanent methods of joining metal together. [2 marks]
- 4 Explain what is meant by the term 'tolerance' when machining metal. [2 marks]
- 5 Use notes and sketches to describe how to powder coat metal. [6 marks]

### Typical mistake

If a question specifically asks for advantages and disadvantages, make sure you answer both parts of the question.

Example: 'Discuss the advantages and disadvantages to the environment of manufacturing and using metal-based products.'

Even if you give a very detailed answer explaining the disadvantages of manufacturing and using metal-based products, you will not gain full marks unless you have also covered the advantages in your answer.

## STP Polymers

## Now test yourself

TESTED

- 1 Name the main source of polymers. [1 mark]
- 2 Use notes and sketches to describe the process of fractional distillation. [4 marks]
- 3 Name the two categories of polymers. [2 marks]
- 4 Explain why polyethylene terephthalate (PET) is used in the manufacture of drinks bottles. [2 marks]
- 5 Use notes and sketches to describe the process of injection moulding. [4 marks]

### DMP 3.3.1 Investigation, Primary and Secondary Data

## Now test yourself

- 1 Give three examples of primary research. [3 marks]
- 2 Explain the difference between ergonomics and anthropometrics. [2 marks]
- 3 What information is given in a manufacturing specification to allow a third party to manufacture the product? [3 marks]
- 4 Name the three categories of human factors considered by a designer. [3 marks]
- 5 Why might a design brief change throughout the process? [2 marks]

### DMP 3.3.2 Environmental, Social and Economic Challenge

## Now test yourself

TESTED

- 1 Explain how global warming is changing the Earth. [4 marks]
- 2 Give examples of products that would carry the fair trade logo. [2 marks]
- 3 Explain the importance of using FSC materials in a new product. [3 marks]
- 4 How does fair trade support workers? [3 marks]
- 5 Discuss the role a designer plays in minimising the impact on the environment. [6 marks]

### DMP 3.3.3 The Work of Others

## Now test yourself

- 1 For a designer of your choice, list ten facts. [5 marks]
- 2 Which designers have worked for the design company Alessi and what design are they most famous for producing? [2 marks]
- 3 Sketch and explain a product by a designer from the list above. [3 marks]
- 4 What do the terms postmodernism, pop art and cubism mean? [3 marks]
- 5 For a designer of your choice, discuss the reasons that their work is considered iconic. [4 marks]

### DMP 3.3.4 Design Strategies

## Now test yourself

TESTED

- 1 Describe three ways in which designers find inspiration to produce their design ideas. [3 marks]
- 2 Discuss the benefits of using the client throughout the design and manufacture process. [4 marks]
- 3 Explain how using a collaborative approach to design can be beneficial. [2 marks]

### DMP 3.3.5 Communication Of Ideas

## Now test yourself

- 1 What views are shown in an orthographic drawing? [3 marks]
- 2 Why are perspective drawings more useful than isometric? [1 mark]
- 3 List five common modelling materials and reasons they are useful. [5 marks]
- 4 Describe how CAD can be used to produce a prototype. [2 marks]

## DMP 3.3.6 Prototype Development

## Now test yourself

- 1 Describe how commercial manufacture makes use of CAD and CAM. [6 marks]
- 2 Explain the benefits of prototyping using 3D printers. [3 marks]
- 3 Explain why evaluating prototypes is an important part of the design and make process. [4 marks]
- 4 Why are prototypes tested? [3 marks]

### DMP 3.3.7 Selection of materials and components (TIMBERS)

## Now test yourself

- 1 Name a suitable timber for garden furniture. [1 mark]
- 2 What is meant by the terms PSE and PAR? [2 marks]
- 3 Explain why it is difficult to work wood to very fine tolerances. [3 marks]
- 4 Use notes and sketches to show how you would use a vacuum bag to produce a laminated, curved piece of wood. [4 marks]
- 5 Name one method of changing the colour of wood. [1 mark]

## Now test yourself

TESTED

- 1 Name a suitable timber for garden furniture. [1 mark]
- 2 What is meant by the terms PSE and PAR? [2 marks]
- 3 Explain why it is difficult to work wood to very fine tolerances. [3 marks]
- 4 Use notes and sketches to show how you would use a vacuum bag to produce a laminated, curved piece of wood. [4 marks]
- 5 Name one method of changing the colour of wood. [1 mark]

## Exam practice

- 1 State two ways that cultural factors can have an influence on the design of textile products. [2 marks]
- 2 State two places where a part of a textile product must be manufactured to a fine tolerance. [2 marks]
- 3 Explain the importance of the fabric grain line in ensuring that a textile product is made to a high quality. [3 marks]
- 4 Explain what is meant by a sub-assembly line. [3 marks]
- 5 Give two reasons why interfacing is used in trouser waistbands. [2 marks]
- 6 Resist-dyeing techniques such as tie-dye and batik are used to add interest to textile products. Use notes and/or sketches to explain one of these techniques in detail. [5 marks]
- 7 Name a manufacturing system that would be used to make fashion tops to be sold in a high street chain store during the summer season. Explain why the system would be the most appropriate. [3 marks]
- 8 Name the most appropriate type of:
  - a) sewing machine needle for sewing knitted fabrics
  - b) hand-sewing needle for threading elastic through a casing. [2 marks]
- 9 Garments need to be shaped so that they fit the human body. Name and describe one method of giving shape to a product. [5 marks]
- 10 State three points to be considered when deciding on the type of seam to use when making a textile product. [3 marks]
- 11 Explain how using templates/patterns and jigs increases accuracy in production. [3 marks]
- 12 Name three ways in which the aesthetics of paper and card be enhanced? [3 marks]
- 13 State two properties of a timber used to make a child's toy. [2 marks]
- 14 What do the initials PBS stand for? [1 mark]
- 15 State two reasons wood is given a finish. [2 marks]
- 16 Which of the following is a suitable metal for a water tap?
  - a) Steel
  - b) Aluminium
  - c) Lead
  - d) Brass [1 mark]
- 17 Describe what is meant by a datum point. [1 mark]
- 18 Explain the process of anodising aluminium. [4 marks]
- 19 Which of the following is a suitable polymer for a kitchen worktop?
  - a) Acrylic (PMMA)
  - b) Melamine formaldehyde (MF)
  - c) Urea formaldehyde (UF)
  - d) High-density polyurethane (HDPE) [1 mark]
- 20 Use notes and sketches to describe the process of blow moulding a polymer water bottle. [4 marks]
- 21 How is polymer-based patio furniture protected from the sunlight? [1 mark]