AQA Product Design Practice Papers 2017

Pre-release context for Section A:
'A children's day nursery'

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Contents

Teacher's Introduction

In the run-up to the summer examinations, the importance of preparing for the examination becomes greater. With this in mind, the pack contains two practice examination papers covering the AQA GCSE Product Design (4555) specification – with Section A in each based on the summer 2017 pre-release design context:

- *'A children's day nursery'*

Each paper follows the structure of a typical AQA examination paper and as such can be used either for a mock examination, using the full paper, or as revision material, by setting question(s) individually.

Alongside each question paper there is a mark scheme, which includes indicative answers for each question. Combining these together can provide students with an invaluable insight into what is required of them when they sit the examination during the summer.

Name	

ZigZag Education supporting

AQA GCSE Design Technology
Product Design – Unit 1 [45551]

Practice Paper 1
Pre-release Context: A children's day nursery

Time: 2 hours

Instructions

- Use black ink or black ballpoint pen. Use pencil and coloured pencils only for drawing.
- Fill in the box at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this answer book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 120.
- The question in Section A relates to the pre-release context.
- You are reminded of the need for good English and clear presentation in your answers.
- Quality of written communication will be assessed in Question 3(b).

Section A

Answer **all** questions in the spaces provided

Section A content intentionally hidden from inspection copy

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Section B

Answer **all** questions

Question 2 is about materials.
You are advised to spend about 18 minutes on this question.

2 a) For each type of paper and card listed below, describe its typical c
example of an application for which it is often used.

An example has been completed for you.

	Type	Cha[illegible]tics	
	Foam board	*Pa[illegible] surfaces covering polystyrene centre. Rigid.*	*Mo*
(i)	*Cartridge paper*		
(ii)	*Corrugated cardboard*		
(iii)	*Layout paper*		
(iv)	*Duplex board*		

2 b) (i) State a standard component that is commonly used with pap
example of what it is used for.

Component .....

Use .....

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(ii) Explain why a manufacturer might b... e-manufactured com
them.

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Question 3 is about anthropometric data.
You are advised to spend about 20 minutes on this question.

3 A designer is designing a suitcase similar to that shown below.

3 a) (i) State what is meant by 'anthropometric data'.

.....

(ii) Give three examples of anthropometric data that could be us
suitcase.

For each, explain how it could influence the design.

Anthropometric data	How it could in

3 a) (iii) When designing using anthropometric data, explain why the r
percentile is important.

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b) Discuss how t' e could be redesigned to reduce its impa

Q of written communication (QWC) will be assessed in this q

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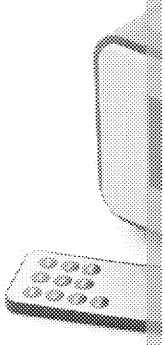
Question 4 is about product evolution and manufacturing.
You are advised to spend about 16 minutes on this question.

4 Radios have evolved substantially over the years.

Vintage radio



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4 a) Identify three features that have changed between the two design
For each, explain the reasons for the change.

Feature 1 .....

Why it has changed .....

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.....

Feature 2 .....

Why it has changed .....

.....

.....

Feature 3 .....

Why it has changed .....

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4 b) Most modern commercial radios are made by the mass productio

Explain the differences in the tools and equipment typically used f
batch manufacture and mass production.

Question 5 is about design and design schools.
You are advised to spend about 18 minutes on this question.

5 a) Explain what is meant by an 'iterative design process'.

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b) Explain how a designer can [illegible] their work from being copied b

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c) Computer-aided design (CAD) software is often used to support th

(i) Give four examples of where CAD can be used in the design p

1 .....

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2 .....

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3 .....

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5 c) (ii) Explain one advantage and one disadvantage of using CAD t

Advantage: .....

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Disadvantage: .....

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d) Design movements can be very influential when designing a prod

(i) Name **two** design movements.

1 .....

2 .....

(ii) Compare the features of typical designs produced by the two named in (i) above.

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Question 6 is about packaging.
You are advised to spend about 19 minutes on this question.

6 a) State five functions carried out by packaging.

1 .....

2 .....

3 .....

4 .....

5 .....

6 b) The following labels are printed on boxes.
State the meaning of each of the symbols shown.

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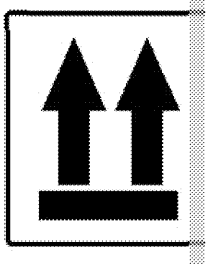

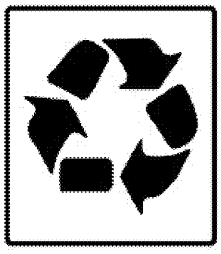

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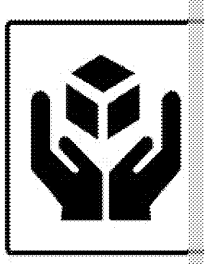

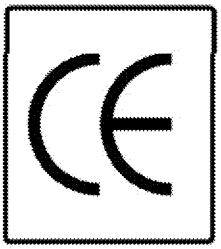

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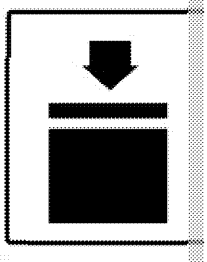

Name	

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AQA GCSE Design Technology
Product Design – Unit 1 [45551]

Practice Paper 2
Pre-release Context: A children's day nursery

Time: 2 hours

Instructions

- Use black ink or black ballpoint pen. Use pencil and coloured pencils only for drawing.
- Fill in the box at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this answer book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 120.
- The question in Section A relates to the pre-release context.
- You are reminded of the need for good English and clear presentation in your answers.
- Quality of written communication will be assessed in Question 6(b).

Section A

Answer **all** questions in the spaces provided

Section A content intentionally hidden from inspection copy

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Section B

Answer **all** questions

Question 2 is about health and safety.
You are advised to spend about 8 minutes on this question.

2 a) Explain why it is important to consider health and safety issues wh

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b) Su ne tool that you are familiar with from the following list. Ci

Sewing machine *Pillar drill* *Electric food mixer* *Solde*

List **three** potential hazards of using the tool. For each, give a co the risk.

Hazard 1 .....

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Control measure .....

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Hazard 2 .....

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Control measure .....

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Hazard 3 .....

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Control measure .....

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Question 3 is about manufacturing.
You are advised to spend about 30 minutes on this question.

3 Your school has been asked to organise and run a Christmas event fo
Each class has been asked to make something for the event, using a t

Choose one of the products from the list below by circling your choice

Decorated cakes *Lighting* *Cale*

Ornaments to hang from a tree *Ceramic ca*

You have been asked to design the produ[illegible] our class will make.
feature relevant to Christmas and sh[illegible]d be suitable to be manufactur

a) Use notes and/o[illegible]ches to show your product in the box below

Y[illegible] b[illegible]asked to describe how the product will be manufactur

b) (i) Name a suitable main material for your product.

.....

3 b) (ii) Explain why the material you have chosen is suitable for your

.....

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.....

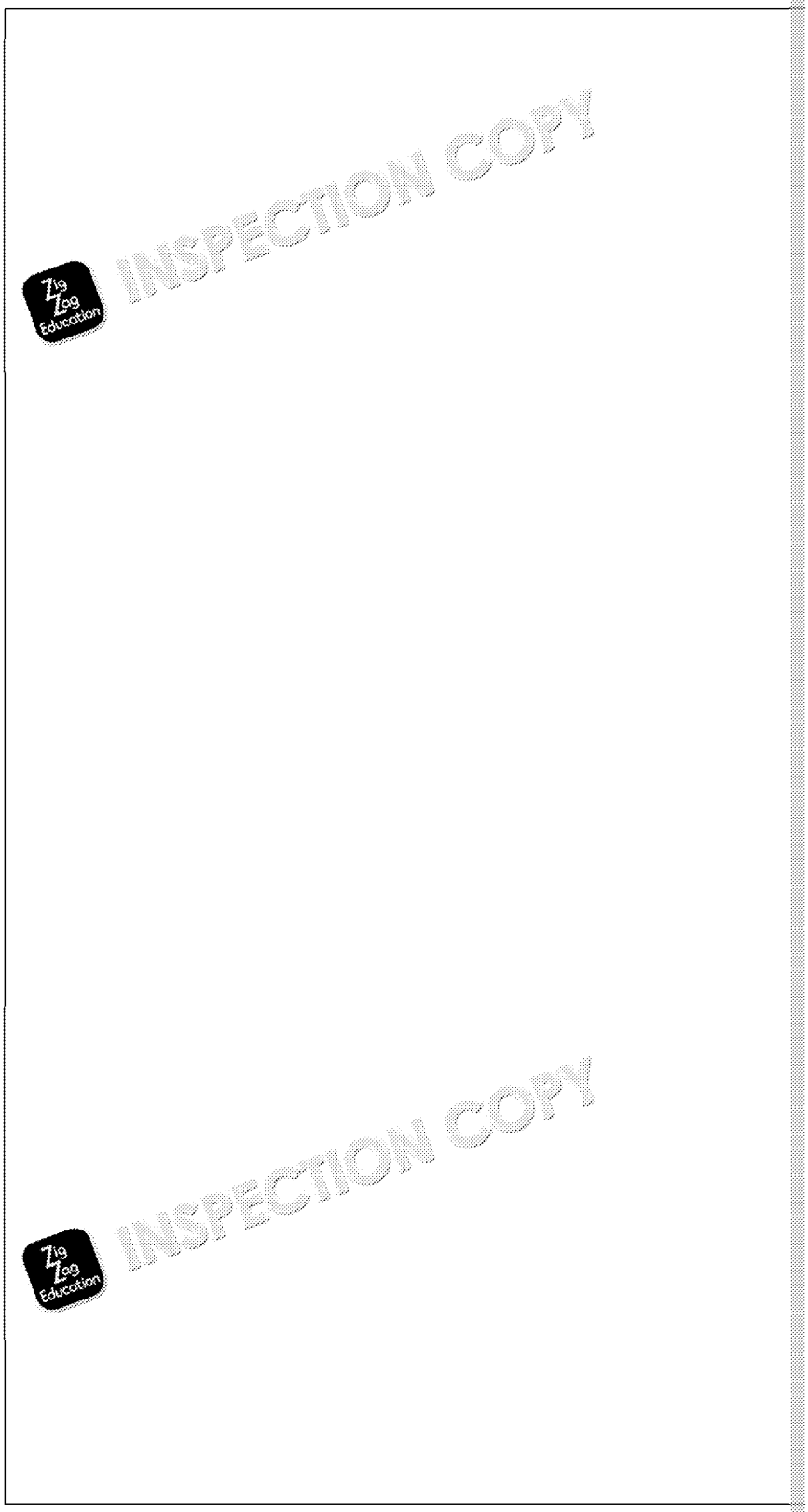
c) In the box below and on the following page, produce a flow chart to be made. You should include quality control actions where needed

3 d) Students will manufacture the product in teams. Each team will m
batches of 20.

In the box below, draw a layout to show how the production of yo

Marks will be awarded for:

- identification of tools and equipment
- layout and order of the processes



Question 4 is about design and the environment.
You are advised to spend about 12 minutes on this question.

4 A designer has been asked to design a replacement for the bench sho
commuters at a train station.

a) The design brief states that the design must consider the six Rs.

Choose four words from the list below.

Reuse	*Recycle*	*Reduce*
Rethink	*Repair*	*Refuse*

Explain how each of these four words might affect the design of t

Word 1 .....

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Word 2 .....

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W .....

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Word 4 .....

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4 b) (i) Explain what is meant by anthropometric data when designin

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(ii) Give **two** examples of where anthropometric data could be u seating.

1 .....

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2 .....

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Question 5 is about manufacturing systems.
You are advised to spend about 20 minutes on this question.

5 a) For each of the following types of production, give an example of a used to make:

Production Type	Example of typical p
One-off	
Batch	
Mass	

5 b) (i) Give **one** advantage and **one** disadvantage of using CAD/CA off product.

Advantage .....

.....

Disadvantage .....

.....

(ii) State three advantages of using CAD/CAM equipment to ma production.

1 .....

2 .....

3 .....

c) (i) State what is meant by 'just-in-ti' 'r uction.

.....

(ii) e dvantage and **one** disadvantage of 'just-in-time' p

Advantage .....

.....

Disadvantage .....

.....

5 d) Explain, using examples, how the use of quality circles may impro

Question 6 is about design.
You are advised to spend about 19 minutes on this question.

6 a) For each of the following design schools, give three typical charac

(i) *Arts and Crafts*

1 .....

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2 .....

.....

3 .....

.....

(ii) *Art Deco*

1 .....

.....

2 .....

.....

3 .....

.....

(iii) *Modernism*

1 .....

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2 .....

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3 .....

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6 b) Explain, using examples, how geometry and mathematics can be
designing and making products.

Quality of written communication (QWC) will be assessed in this q

Practice Paper 1 – Mark Scheme

Section A content intentionally hidden from inspection copy

2	(a)	(i)	Award up to 2 marks for c[illegible]nsities and 1 mark for a suitable a[illegible]; Tough (1); lightly t[illegible]; light cream colour (1). Drawing or p[illegible]
		(ii)	Two or [illegible] of card with a fluted inner section (1); often rec[illegible]. L[illegible] packaging (1).
		(iii)	[illegible]d (1); translucent (1). Working drawings or tracing (1).
		(iv)	White surfaces with grey fibres between (1); tough (1); lightly textu[illegible] packaging (1).
	(b)	(i)	Award 1 mark for a suitable component and 1 mark for its use; e.g. rivets or sticky tape (1), used to join paper products together (1).

		(ii)	Answers may include the following points: • It is more cost-effective to buy these parts than to invest in the them. • Suppliers can get economies of scale by making the same pro • The parts are of more consistent quality than if they were mad quantities. • It is cheaper and quicker to buy them than the cost and time o them. Award marks as follows: 1 mark — Limited or simplistic statement which mentions onl 2 marks — Sound response mentioning two points briefly or o 3 marks — Concise, detailed respo includes three bas point with additiona ex lanation and a basic point. 4 marks — Concis et response that includes two point an, t
3	(a)	(i)	Award measurements of the human body or its capabiliti
		(ii)	d 1 mark each for up to three relevant pieces of data and 1 ma explanation of its influence, e.g. grip diameter (1) to determine the s finger size (1) to determine the size of keys (1); lifting ability (1) to d weight of the suitcase (1); heights (1) to determine the length of the
		(iii)	Award marks as follows: 1 mark — Limited or simplistic statement, e.g. referring in ge 2 marks — Sound description of the 5th to 95th percentile. 3 marks — Detailed description of the 5th to 95th percentile exp by designers to ensure that products are ergonomi the majority of users.
	b		Award marks for any of the following points up to a maximum of 6 m • Use of recycled materials (1) • Use of single materials (1) so can be easily recycled without d • Use of polymers made from natural materials (1), rather than f • Reduce amount of materials required (1), e.g. by reducing wa eliminating attachments (1) • By designing it so that parts that break can be easily replaced handle or wheels (1) • Any other relevant point (1) Add marks for QWC as follows: 4 marks — Excellent QWC with no obvious errors 3 marks — Good coverage with very f ammatical errors 2 marks — Coverage but with on obvious errors 1 mark — Poor co and significant errors present
4	(a)		Award 1 mar for three features and 1 mark each for three exp chang tions to remote control (1), reduction in size (1), cha ng materials used (1); due to developments in microelectron w materials (1); changes in shape due to increased considerat factors in design (1) and fashion/market pull (1).

4	(b)		Award marks as indicated, up to a maximum of 10 marks: One-off manufacture: • Just one product made at a time (1); as every product made th (1) often uses flexible machines (1); labour-intensive (1) Batch manufacture: • Small number of identical products manufactured in a group (templates often used to aid production (1). Uses manual proce machines (1) as time to programme CAM machines is saved b time across the batch as a whole (1). Mass production: • Very large number of products produced, with all products ide a production line (1) with high use of CAM equipment (1). Wor skills than for smaller-volume prod ( ). Expensive to init cost of equipment/machine ( ).
5	(a)		Design methodology b cyclic process of design – make – eva changes and r are made progressively by testing different ite
	(b)		wo automatically given copyright (1); designers can also pat for a registered design (1). If anyone copies work that is copy a registered design they can be sued (1).
	(c)	(i)	Award 1 mark for each suitable example up to a maximum of 4 mar design ideas (1), developing 3D models (1), virtual modelling (1), cr drawings (1), outputting files to CAM equipment (1).
		(ii)	Award 1 mark each for stating an advantage and disadvantage, and for the explanation, e.g. allows changes to be made quickly to desig cost OR the need to create new drawings (1); allows virtual modellin of making a prototype (1); software much be purchased (1) which re can be quite expensive (1); virtual models may give inaccurate resul simulations and do not use the actual material that the product will b
	(d)	(i)	Award 1 mark each for two of: Arts and Crafts Movement, Art Nouve Bauhaus, Modernism, De Stijl, Memphis, Post Modernism
		(ii)	Points that may be included in the answer include: • Arts and Crafts – Made by traditional craft techniques, expens inspired by organic shapes and patterns found in nature. • Art Deco – Much use of geometric shapes, bright and bold, al Egyptian art. • Art Nouveau – Based on organic lines of climbing plants and • Bauhaus – form follows function; minimalist design focusing o geometric, useful, designed for mass production. • De Stijl – Only essential colour and form used, geometric desi and primary colours. • Memphis – Inspired by historic forms, h, gaudy colours, in unconventional materials. • Modernism – Ergonom ig , appropriate materials, little geometric sha le to mass-produce. • Post unintentional or haphazard appearance, an rd marks as follows: 3 marks Stating some characteristics of the two design sch 4–6 marks Stating the characteristics of both design schools a contrasting features of some characteristics. 7–9 marks Comparing multiple features of both design school reasons for the differences.
6	(a)		Award 1 mark each for five of: protect, inform, contain, transport, pr
	(b)		Clockwise from the top - award 1 mark each for: keep dry, this way keep Britain tidy, conformité européenne / European standard, recy

Practice Paper 2 – Mark Scheme

Section A content intentionally hidden from inspection copy

2	(a)		ard up to two marks as follows: to identify the possible sources o ential for their occurrence (1); to reduce the risk that the machin (1) or that other people not involved in manufacturing are harmed (
	(b)		Award 1 mark for each appropriate stated hazard and 1 mark for e e.g. ejected material (1), use a machine guard (1).

3	(a)		Award marks as follows: 5–6 marks: Detailed solution including a relevant feature relat suitable for batch manufacturing. 3–4 marks: Solution has some detail, including a relevant feat theme, but might not be fully suitable for batch ma 1–2 marks: Design lacks detail, not feasible or unsuitable for b
	(b)	(i)	Award 1 mark for naming a specific material (not a material type), e polypropylene, self-raising flour.
		(ii)	Award 2 marks if the reason shows good understanding of the wor material. Award 1 mark if the reason is vague and lacking in unders properties of the material.
	(c)		Add up the marks as follows, with a maximum of 4 marks for each c **Manufacturing** 4 marks: All main stages of manufacture listed correctly and 3 marks: Most main stages of manufacture listed and corre correct order. 2 marks: Some main stages of manufacture identified, but i insufficiently detailed and in wrong order. 1 mark: A few stages of manufacture identified, or informa in wrong order. **Quality control** 4 marks: Appropriate quality control measures identified an place. 3 marks: Appropriate quality control measures identified bu correct place. 2 marks: Some appropriate quality control measures identif production, or some measures incorrect for the m 1 mark: Some quality control measures identified but inco **Flowchart** 4 marks: Process sequence indicated by arrows, flow chart used throughout, includes feedback loops for deci 3 marks: Process sequence indicated by arrows, flow chart used throughout. 2 marks: Process sequence indicated by arrows, some flow correctly used. 1 mark: Process sequence indicated by arrows, but flow c used.
	(d)		Award marks as follows: 8–10 marks A well-planned layout and feasible order of process clear with no errors or omissions. Correctly named too major stages of manufacture. Appropriate division o for the scale of production. 5–7 marks A generally correct layout and sequence of manufa may be some omissions. Correctly named tools an major stages of manufacture. Division of labour is f disproportionate for some tasks. Suitable for the sc 2–4 marks Only part of the layout or process superficially deta the quantity being produced. Some tools and equip named. Division of labour may not be feasible or m considered. 0–1 marks Limited or no response.

4	(a)		Award 1 mark each for a simple or limited statement that defines th Award a further 1 mark each for a clear explanation that relates to t the product. Examples of definitions: • Rethink – reviewing the function or functions of the product a actually needed (1); e.g. reviewing the need for seating or ce seat (1). • Reduce – redesigning the product so that less material or en its manufacture and use (1); e.g. removing the seat back, hav between materials rather than continuous material (1). • Refuse – not using a product, material or process if it is not th environment (1); e.g. using sustainab[illegible]od instead of synth • Repair – extending the life of [illegible]duct, by designing it to a maintenance (1); e.g. [illegible] bench easy to clean. • Reuse – re[illegible] the product so that its parts or compone othe[illegible] without modification (1); e.g. reusing legs from • [illegible]cycle – ensuring that the materials used to make the produ reprocessed and used to make other products (1); e.g. using
	(b)	(i)	Award 1 mark for a simple statement, such as measurements of th award a second mark for a statement relating to its use in design, s or ensuring a design is easy to use.
		(ii)	Award one mark each for stating two features, e.g. width of the sea that must be supported (1), height of the seat (1).
5	(a)		Award 1 mark each for three appropriate examples.
	(b)	(i)	Advantage: can produce shapes that are too complicated for huma achieve (1); disadvantage: cost of equipment (1).
		(ii)	Award 1 mark each for three of the following, compared to manual • Greater accuracy (1) • Repeatability (1) • Faster cutting speeds (1) • Any other appropriate response (1)
	(c)	(i)	Only enough stock, materials or components purchased to cover in needs (1).
		(ii)	Advantage: Reduces cost of storage and overstocking (1) OR allow be changed quickly (1) Disadvantage: Production can be disrupted when supply fails (1)
	(d)		Points that could be included in the answer include: • Quality circles are groups of employees • They meet to consider ways of improvi[illegible]quality or resolving organisation • Most participants are sh[illegible]flo[illegible]orkers • They use thei[illegible]understanding to analyse the problem practi[illegible]s • [illegible]kers are normally responsible for implementing the re themselves • Examples of typical recommendations Award marks as follows: 1–3 marks For describing the function and make-up of a qua 4–6 marks For describing quality circles and explaining in ge actions can result in improvements in product qua 7–9 marks For describing quality circles in detail and explaini can result in improvements in product quality, sup examples.

6	(a)	(i)	Made by traditional craft techniques (1), expensive materials (1), in shapes and patterns found in nature (1).
		(ii)	Much use of geometric shapes (1), bright and bold (1), sometimes Egyptian art (1).
		(iii)	Award marks as follows, up to a maximum of 3 marks: ergonomic d appropriate materials (1), little decoration (1), often geometric shap mass-produce (1).
	(b)		Award marks as indicated: • Geometry can be used to minimise waste during manufacture designs (1). Symmetry (or asymmetry) (1) can be used to inc appeal of a product to the consumer (1). • Mathematics can be used to calc[illegible] the properties required choice of material (1) and crit[illegible]ensions such as the wal • Allow 1 mark for [illegible] relevant example given. • Any [illegible] point. [illegible] marks for QWC as follows: [illegible]marks Excellent QWC with no obvious errors 3 marks Good coverage with very few grammatical errors 2 marks Coverage but with some obvious errors 1 mark Poor coverage and significant errors present