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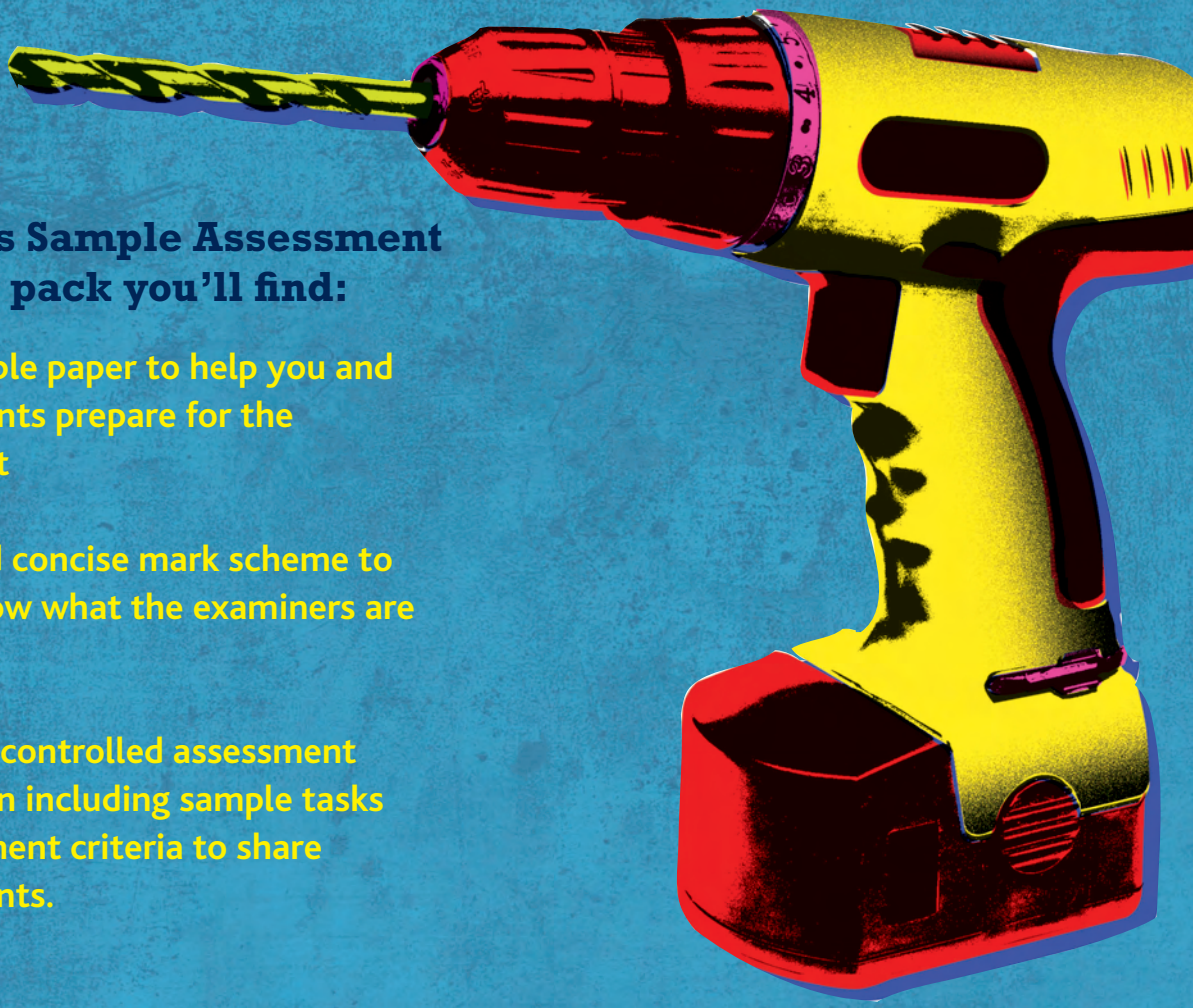
Sample Assessment Materials

Edexcel GCSE in Design and Technology: Resistant Materials Technology (2RM01)



Inside this Sample Assessment Materials pack you'll find:

- An accessible paper to help you and your students prepare for the assessment
- A clear and concise mark scheme to let you know what the examiners are looking for
- Supported controlled assessment information including sample tasks and assesment criteria to share with students.

A PEARSON COMPANY

Welcome to the GCSE 2009 Design and Technology: Resistant Materials Technology Sample Assessment Materials

These sample assessment materials have been written to accompany the specification. They have been developed to give you and your students a flavour of the actual exam paper and mark scheme so they can experience what they will encounter in their assessments. They feature:

- **An accessible paper** using a mixture of question styles. We've worked hard to ensure the paper is easy to follow with an encouraging tone so that the full range of students can show what they know.

- **A clear and concise mark scheme** outlining what examiners will be looking for in the assessments, so you can use the sample paper with students to help them prepare for the real thing.

- **Supported controlled assessment,** including sample controlled assessment tasks to show you the sort of activity students will undertake. Used in conjunction with the guidance in the Teacher's Guide, these tasks will help you manage the controlled assessment in your centre and help students achieve their best.

Our GCSE 2009 Design and Technology: Resistant Materials Technology qualification will be supported better than ever before. Keep up to date with the latest news and services available by visiting our website: **www.edexcel.com/gcse2009**

Contents

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Edexcel GCSE

Design and Technology: Resistant Materials Technology

Unit 1: Creative Design and Make Activities

Sample Controlled Assessment Material

Paper Reference
5RM01/01

You do not need any other materials.

Turn over ▶

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Delivery of the controlled assessment

You will design and make a **resistant materials product**.

In order to complete this task you will undertake the following **design** activity:

Stages	Tasks	Suggested times
1. Investigate	1.1 Analysing the brief	1 hour
	1.2 Research	3 hours
	1.3 Specification	1 hour
2. Design	2.1 Initial Ideas	5–6 hours
	2.2 Review	1 hour
	2.3 Communication	Evidenced throughout
3. Develop	3.1 Development	5–6 hours
	3.2 Final design	1–2 hours

In order to complete this task you will undertake the following **make** activity:

Stages	Tasks	Suggested times
4. Plan	4.1 Production plan	1–2 hours
5. Make	5.1 Quality of manufacture	16 hours
	5.2 Quality of outcome	
	5.3 Health and Safety	Evidenced throughout
6. Test and evaluate	6.1 Testing and evaluation	1–2 hours

Controlled conditions
Development of the student's design folder and manufacture of the product(s) must take place under controlled conditions. Students will be supervised by a teacher at all times.

Students' work must be collected in at the end of the lesson and handed back at the beginning of the next lesson. Students must produce their work individually.

Feedback control
Teachers are allowed to provide regular, formative feedback throughout the creative design process. Student progression should be supported by the centre's own Assessment for Learning (AFL) strategies.

Demonstrations of practical activities are allowed in order to develop knowledge, understanding and skills and to identify health and safety issues relating to specific tools, equipment and processes.

Collaboration control
Where group work is carried out, evidence of individual contributions must be clearly identified and recorded.

Resources
Access to resources is determined by those available to the centre.

Quality of written communication
Quality of written communication (QWC) will be assessed throughout the student's design folder. This will assess students on their ability to organise information clearly and coherently, using specialist vocabulary when appropriate.

Tasks
Suggested resistant materials products are:

1. **Storage**, eg
   - A small lockable box/container for holding personal objects such as jewellery or other valuable items.
   - A bathroom cabinet with storage for cosmetics and medicines.
2. **Lighting**, eg
   - An adjustable lamp for use when doing homework.
   - A nightlight for young children who are afraid of the dark.
3. **Furniture**, eg
   - A novelty seating unit for use in children's nurseries.
   - An occasional table suitable for use in waiting rooms.
4. **Toys and games**, eg
   - An educational toy to help with counting and shape recognition.
   - A mobile cart/buggy that can carry other toys from place to place.
5. **The Garden**, eg
   - A grabbing device for picking up small pieces of garden debris.
   - A trolley to transport heavy objects around the garden.

Centres can contextualise the task(s) to best suit their specific circumstances, which includes the availability of and access to resources.

Task taking
All work, with the exception of research, must be done under informal supervision. Research may be completed under limited supervision.

Initial research
Students can undertake research to locate sources outside of the classroom without supervision. They can locate as many sources to take into the write up phase as they wish.

Design and make tasks
The student must complete the following under classroom supervision:
- write up of their portfolio
- making of their product

However, Students are allowed to us the following to help them with completing their task:

- their initial research they have undertaken outside of the classroom to produce focused selective research for their portfolio
- sources the centre provides.

A student can bring in additional research notes at any time provided the write up of their research is done under the same supervised conditions.

Task marking
Marking of the tasks will be carried out by teachers and moderated by Edexcel

Assessment criteria

For these tasks teachers must mark students' work using the assessment criteria specified below. Teachers should check that students' work is their own and is not copied from source material without any attempt by students to put the material into their own words.

Design activity (50 marks)

Investigate (15 marks)		
Sub-sections	**Descriptor**	**Mark range**
a) Analysing the brief	Level of response not worthy of credit.	0
	Analysis is superficial leading to unclear design needs.	1
	Analysis is limited with some design needs clarified.	2
	Analysis is detailed with most design needs clarified.	3
b) Research	Level of response not worthy of credit.	0
	Research is superficial and does not focus on the design needs identified in the analysis. Analysis of existing products is insufficient to aid the writing of specification criteria.	1-2
	Research is general, focusing on some of the design needs identified in the analysis. Product analysis is used to inform the writing of some specification criteria.	3-4
	Research is selective and focuses on the design needs identified in the analysis. The performance, materials, components, processes, quality and sustainability issues of relevant existing products are explored in sufficient detail to aid the writing of specification criteria.	5-6
c) Specification	Level of response not worthy of credit.	0
	Specification points are superficial and not justified.	1-2
	Some specification points are realistic and measurable. Some specification points are developed from research but are not justified.	3-4
	Most specification points are realistic, technical, measurable and address some issues of sustainability. Specification fully justifies points developed from research.	5-6

Design (20 marks)		
Sub-sections	**Descriptor**	**Mark range**
d) Initial ideas	Level of response not worthy of credit.	0
	Alternative design ideas are similar and simplistic. Ideas are superficial and limited research is used. Limited specification points are addressed.	1-4
	Alternative design ideas are realistic and workable. Ideas are detailed and relevant research is used. Ideas address most specification points.	5-8
	Alternative design ideas are realistic, workable and detailed. Ideas demonstrate detailed understanding of materials, processes and techniques and are supported by research information. Ideas address all key specification points.	9-12
e) Review	Level of response not worthy of credit.	0
	General and subjective comments against some specification points. Limited use of user group feedback.	1-2
	Objective evaluative comments, against most specification points, that consider user group feedback and issues of sustainability.	3-4
f) Communication	Level of response not worthy of credit.	0
	Use of a range of communication techniques, including ICT where appropriate, with sufficient skill to convey an understanding of design ideas.	1-2
	Use of a range of communication techniques and media, including ICT and CAD where appropriate, with precision and accuracy.	3-4

Develop (15 marks)		
Sub-sections	**Descriptor**	**Mark range**
g) Development	Level of response not worthy of credit.	0
	Developments from alternative design ideas are minor and cosmetic. Simple modelling is used to test an aspect of the final design proposal against a design criterion.	1-3
	Developments are appropriate and use details from alternative design ideas to change, refine and improve the final design proposal. Modelling using traditional materials and/or 3D computer modelling is used to test some aspects of the final design proposal against relevant design criteria.	4-6
	Development is used to produce a final design proposal that is significantly different and improved compared to any previous alternative design ideas. Modelling to scale using traditional materials or 2D and/or 3D computer simulations is used to test important aspects of the final design proposal against relevant design criteria. User group feedback is used in final modifications.	7-9
h) Final design	Level of response not worthy of credit.	0
	Final design proposal includes limited consideration of materials and/or component parts, processes and techniques.	1-2
	Final design proposal includes details of some materials and/or component parts, processes and techniques.	3-4
	Final design proposal includes technical details of all materials and/or component parts, processes and techniques.	5-6

Make activity (50 marks)

Plan (6 marks)		
Sub-sections	**Descriptor**	**Mark range**
a) Production plan	Level of response not worthy of credit.	0
	Superficial production plan that outlines some stages of manufacture with limited reference to quality control.	1-2
	Limited production plan that considers the main stages of manufacture with some reference to appropriate forms of quality control.	3-4
	Detailed production plan that considers all stages of manufacture in the correct sequence including specific forms of quality control.	5-6

Make (38 marks)		
Sub-sections	**Descriptor**	**Mark range**
b) Quality of manufacture	Level of response not worthy of credit.	0
	Tools, equipment and processes, including CAD/CAM where appropriate, are selected with guidance. Limited understanding of the working properties of materials when selecting to manufacture a product. The task is undemanding. A limited range of skills and processes is used that show little attention to detail in their use.	1-8
	Tools, equipment and processes, including CAD/CAM where appropriate, are selected with some guidance. Some understanding of the working properties of materials when selecting to manufacture a product. The task offers some challenge. A range of skills and processes is used demonstrating attention to detail in their use.	9-16
	Tools, equipment and processes, including CAD/CAM where appropriate, are selected for specific uses independently. An appropriate understanding of the working properties of materials when selecting to manufacture a product. The task is challenging. A wide range of skills and processes is used with precision and accuracy.	17–24
c) Quality of outcome	Level of response not worthy of credit.	0
	Product includes the manufacture of some good quality component parts that remain either unassembled or poorly assembled and finished. Completed product functions poorly.	1-4
	Product includes the manufacture of good quality component parts that are generally well assembled and finished. Completed product functions adequately.	5-8
	Product includes the manufacture of high-quality component parts, accurately assembled and well finished. Completed product is fully functional.	9-12
d) Health and safety	Level of response not worthy of credit.	0
	Demonstrate an awareness of safe working practices for most specific skills and processes.	1
	Demonstrate a high level of safety awareness throughout all aspects of manufacture.	2

Test and evaluate (6 marks)		
Sub-sections	**Descriptor**	**Mark range**
e) Testing and evaluation*	Level of response not worthy of credit.	0
	One or more simple tests carried out to check the performance and/or quality of the final product. Evaluative comments are subjective and reference a few specification points superficially. Use of basic language and the response lacks clarity and organisation. Spelling, punctuation and the rules of grammar used with limited accuracy.	1-2
	A range of tests carried out to check the performance and/or quality of the final product. Evaluative comments are objective and reference most specification points. Use of some design and technology terms and some focus and organisation. Spelling, punctuation and the rules of grammar used with some accuracy. Some spelling errors may still be found.	3-4
	A range of tests carried out to check the performance and/or quality of the final product with justifications. Objective evaluative comments, including user group evaluation, consider the most relevant, measurable specification points in detail, including sustainability issues. Use of a range of appropriate design and technology terms and good focus and organisation. Spelling, punctuation and the rules of grammar used with considerable accuracy.	5-6

* Opportunity for students to be assessed on quality of written communication: strand (iii) — organise information clearly and coherently, using specialist vocabulary when appropriate.

Write your name here

Surname	Other names

Centre Number | Candidate Number

Edexcel GCSE

Design and Technology: Resistant Materials Technology

Unit 2: Knowledge and Understanding of Resistant Materials Technology

Sample Assessment Material

Time: 1 hour 30 minutes

Paper Reference

5RM02/01

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** the questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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Answer ALL the questions.

For each question 1 to 10, choose an answer A, B, C or D. Put a cross in the box indicating the answer you have chosen ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 Which of the following is a softwood.

☒ **A** Chipboard

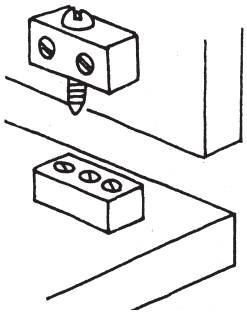
☒ **B** Pine

☒ **C** Oak

☒ **D** Ash

(Total for Question 1 = 1 mark)

2 What type of fitting is shown in the diagram below?



☒ **A** A knock up fitting

☒ **B** A knock down fitting

☒ **C** A knock in fitting

☒ **D** A knock out fitting

(Total for Question 2 = 1 mark)

3 Which of the following joining methods requires the use of heat?

☒ **A** Brazing

☒ **B** Housing joint

☒ **C** Mortise and tenon

☒ **D** Butt joint

(Total for Question 3 = 1 mark)

4 Which of the following is a forming process?

- ☒ **A** Casting
- ☒ **B** Drilling
- ☒ **C** Sawing
- ☒ **D** Planing

(Total for Question 4 = 1 mark)

5 Which of the following is a type of renewable energy?

- ☒ **A** Oil
- ☒ **B** Gas
- ☒ **C** Solar
- ☒ **D** Coal

(Total for Question 5 = 1 mark)

6 Which of the following is the most suitable adhesive for joining two pieces of acrylic?

- ☒ **A** PVA
- ☒ **B** Epoxy resin
- ☒ **C** Tensol cement
- ☒ **D** Contact adhesive

(Total for Question 6 = 1 mark)

7 Which of the following is the correct definition of hardness?

- ☒ **A** The ability to be drawn or stretched out
- ☒ **B** The ability to withstand abrasive wear and indentation
- ☒ **C** The ability to withstand weathering and deterioration and corrosion
- ☒ **D** The ability to withstand sudden and shock loading

(Total for Question 7 = 1 mark)

8 Which of the following metals is alloyed with carbon to make mild steel.

☒ **A** Zinc

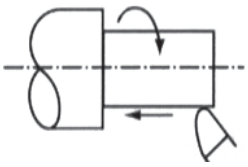
☒ **B** Copper

☒ **C** Aluminium

☒ **D** Iron

(Total for Question 8 = 1 mark)

9 The diagram below shows a metal turning process.



The name of this metal turning process is:

☒ **A** knurling

☒ **B** parting off

☒ **C** parallel turning

☒ **D** facing off

(Total for Question 9 = 1 mark)

10 Annealing is a heat treatment process.

The purpose of the annealing process is to:

☒ **A** make the outside surface of the metal harder than the inside core

☒ **B** increase the brittleness of an item

☒ **C** restore the initial structure of the material by relieving internal stresses

☒ **D** make the item harder by heating it up and dipping it in cold water

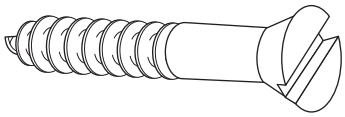
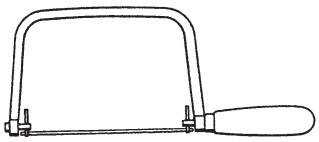
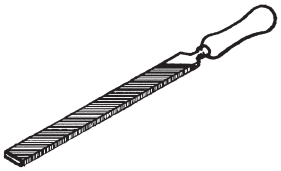
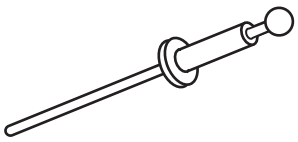
(Total for Question 10 = 1 mark)

(Total = 10 marks)

11 (a) The table below shows some tools and components.

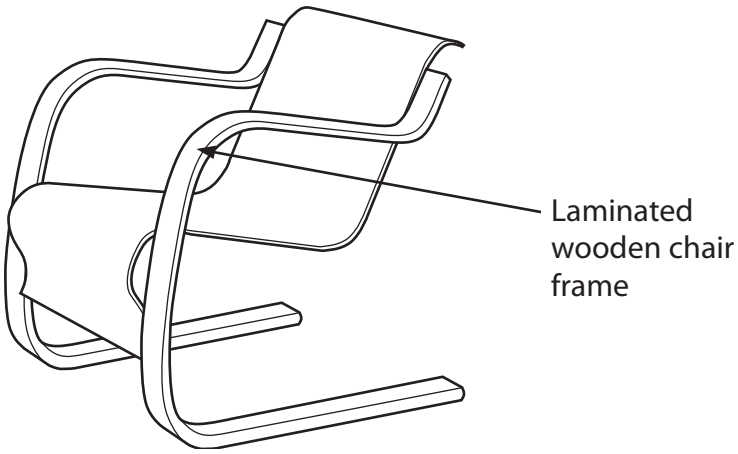
Complete the table below by giving the missing names and uses.

(4)

Tool/Component	Name	Use
	Countersink screw	
	Coping saw	
		Removing waste metal
		Joining thin sheets of metal

(b) The drawing below shows a chair with a laminated wooden frame.

The laminated chair frame is made from thin pieces of plywood.



Give **two** properties of plywood.

(2)

1 .....

2 .....

(c) Show, using sketches and/or notes, the construction of plywood.

(3)

(d) The chair frame could also be manufactured from mild steel.

Explain **two** advantages of making the chair frame from mild steel instead of plywood.

(4)

1 .....

.....

.....

.....

2 .....

.....

.....

.....

(e) The environment is an important consideration for manufacturers in today's society.

Give **two** types of pollution that should be carefully controlled by the manufacturer of the wooden chair frame.

(2)

1 .....

2 .....

(f) Sawdust is a form of waste that is produced during the manufacture of the wooden chair frame.

Describe **two** different ways in which the sawdust can be recycled or reused.

(4)

1 .....

.....

.....

.....

2 .....

.....

.....

.....

(Total for Question 11 = 19 marks)

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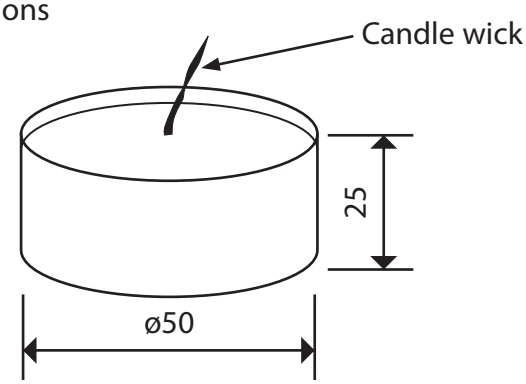
12 You have been asked to design a tea light candle holder.

The specification for the tea light candle holder is that it must:

- hold three tea light candles
- enable easy changing of the tea light candles
- have a stable base
- not mark the surface it sits on
- catch any spilt wax
- enable safe lighting of the tea light candles
- be made from flame proof materials
- be manufactured using appropriate processes

ADDITIONAL INFORMATION

Tea light candle dimensions



All dimensions in millimetres

In the boxes opposite, use sketches and, where appropriate, brief notes to show **two different** design ideas for the tea light candle holder that meet the specification points above.

Candidates are reminded that if a pencil is used for diagrams/sketches it must be dark (HB or B).

Coloured pens, pencils and highlighter pens must **not** be used.

Write your answers in the boxes provided opposite.

Design idea 1

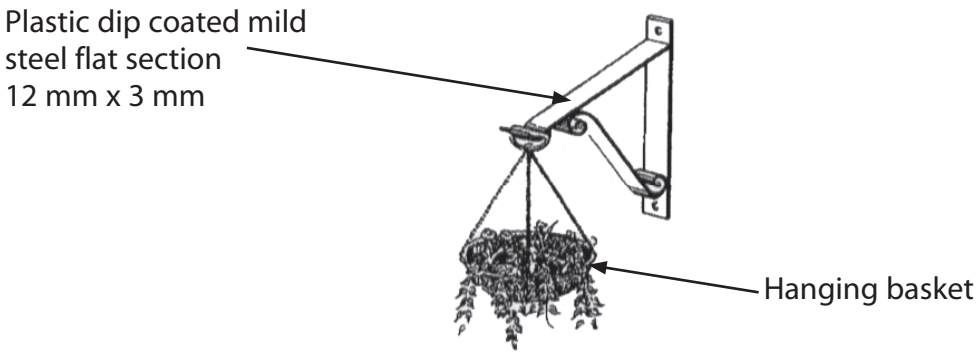
(8)

Design idea 2

(8)

(Total for Question 12 = 16 marks)

13 The drawing below shows a hanging basket bracket.



(a) Give **two** properties of mild steel which make it suitable for the hanging basket bracket.

(2)

1 .....

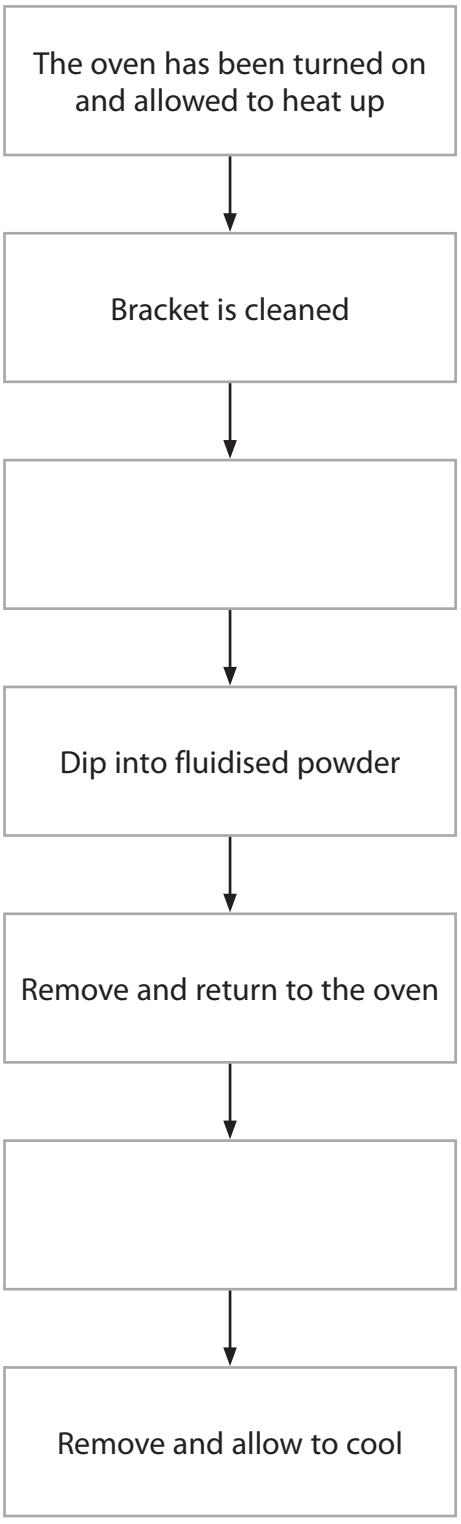
2 .....

(b) The surface of the hanging basket bracket has been plastic dip coated.

Complete the flow chart below to show the main stages in the plastic dip coating process.

Some of the stages have been done for you.

(2)



(c) Instead of using dip coating, the hanging basket bracket could have been given a paint finish containing carbon nanotubes.

Describe **one** advantage of using a paint finish containing carbon nanotubes on the hanging basket bracket.

(2)

(d) Explain why the hanging basket bracket is successful in meeting the following specification points:

(i) Support the weight of the hanging baskets.

(2)

(ii) Be easy to attach the basket to the bracket.

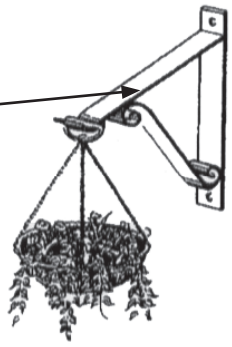
(2)

*(e) Brackets A and B below show two different types of hanging basket bracket.

Hanging basket bracket cast from aluminium

Bracket A

Plastic dip coated mild steel flat section



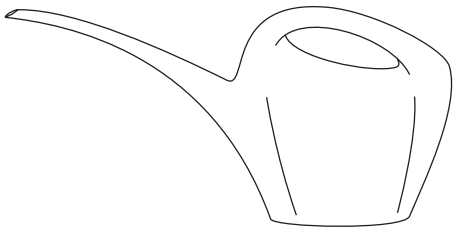
Bracket B

Evaluate bracket A compared to bracket B in this situation.

(6)

(Total for Question 13 = 16 marks)

14 The picture below shows a plastic watering can made from polyethene.



(a) Give **two** properties of polyethene that makes it suitable for making the plastic watering can.

For each property, justify your answer.

(4)

Property 1 .....

Justification .....

.....

Property 2 .....

Justification .....

.....

(b) Polyethene is a thermoplastic.

Describe **one** characteristic of a thermoplastic.

(2)

.....

.....

.....

.....

(c) A retailer who sells the plastic watering can uses an EPOS (electronic point of sale) system.

(i) Give **three** pieces of product information that can be collected by the retailer when using an EPOS system.

(3)

1 .....

.....

2 .....

.....

3 .....

.....

(ii) Explain **two** benefits to the retailer of using an EPOS system.

(4)

1 .....

.....

.....

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2 .....

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.....

.....

*(d) Many plastics can now be recycled.

Discuss the positive impacts the recycling of plastics has had on the environment. **(6)**

(Total for Question 14 = 19 marks)

TOTAL FOR PAPER = 80 MARKS

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Sample mark scheme

Question Number	Correct Answer	Mark
1.	B	**(1)**

Question Number	Correct Answer	Mark
2.	B	**(1)**

Question Number	Correct Answer	Mark
3.	A	**(1)**

Question Number	Correct Answer	Mark
4.	A	**(1)**

Question Number	Correct Answer	Mark
5.	C	**(1)**

Question Number	Correct Answer	Mark
6.	C	**(1)**

Question Number	Correct Answer	Mark
7.	B	**(1)**

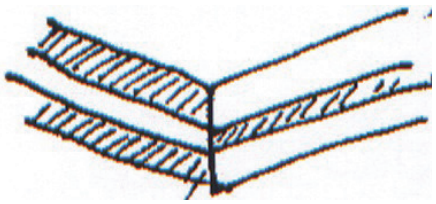
Question Number	Correct Answer	Mark
8.	D	**(1)**

Question Number	Correct Answer	Mark
9.	C	**(1)**

Question Number	Correct Answer	Mark
10.	C	**(1)**

Question Number	Answers	Mark
11. (a)	**Use** • Making joints/joining/fixing things together (1) **Use** • Cutting thin material/curves (1) **Name** • File (1) (*only answer*) **Name** • Rivet/pop rivet (1) **1x1** **1x1** **1x1** **1x1**	**(4)**

Question Number	Answers	Mark
11. (b)	**Two** properties given from: • resistance to splitting (1) • easily bent (1) • attractive surface finish/veneers (1) • good strength to weight ratio (1) *Do **not** accept the following:* • cheap **1x1** **1x1**	**(2)**

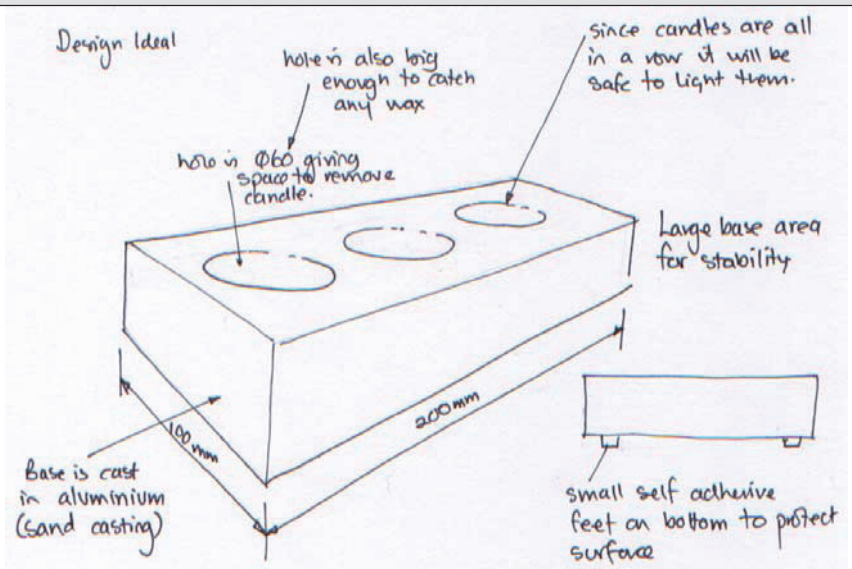
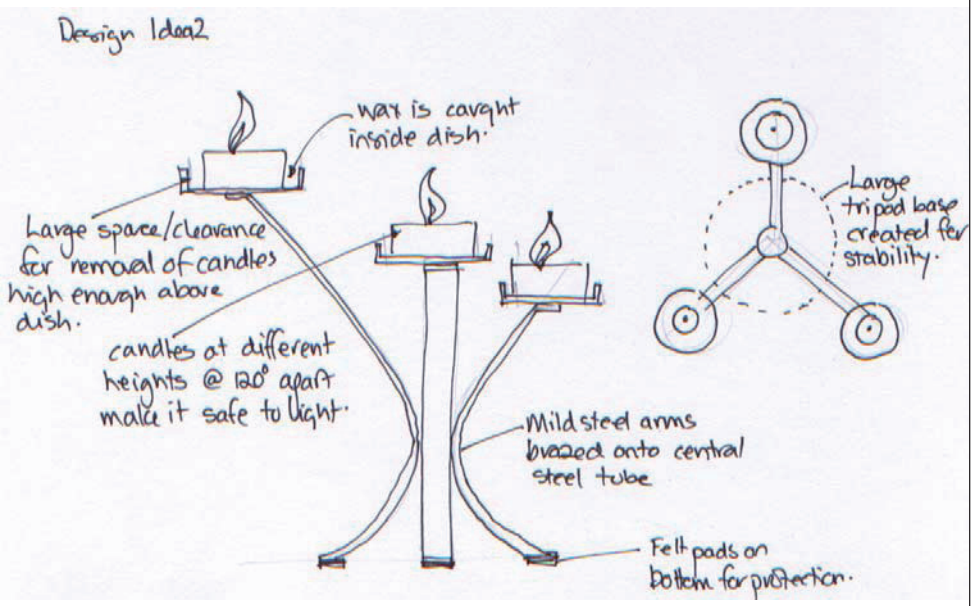
Question Number	Answers	Mark
11. (c)	Answer must convey by either notes or diagrams: • indication of an odd number of layers/lines (1) • indication of direction of outside layers/grain/core/heart (1) • use of adhesive (1)  *Do **not** accept the following:* Anything which does **not** show/indicate: • an odd number of layers • a lack of indication of direction of layers **3x1**	**(3)**

Question Number	Answers	Mark
11. (d)	**Two** advantages explained from: • will not give splinters (1) making it safer to use (1) • no glue involved (1) so it is less likely to come apart if it gets wet (1) • can be painted in any colour (1) therefore making more appealing to a wider audience/market (1) • non-absorbent (1) therefore it is easier to keep clean/more hygienic (1) • can be bent into shape without needing to use glue which takes time to set (1) therefore making it faster to manufacture (1) *Do **not** accept the following:* • quicker • cheaper • faster unless qualified **2x1** **2x1**	**(4)**

Question Number	Answers	Mark
11. (e)	**Two** types of pollution given from: • fumes/gases (1) • noise (1) • dust (1) • disposal of waste (1) **1x1** **1x1**	**(2)**

Question Number	Answers	Mark
11. (f)	**Two** ways described from: • waste burned (1) to produce heat/energy (1) • waste processed (1) to make MDF/paper/chipboard (1) • sawdust reused (1) for animal bedding/soaking up oil/burning/compost/insulation (1) • small pieces of wood (1) used for making other items (1) **2x1** **2x1**	**(4)**

Question Number	Answer	Mark
12.	**Design idea 1** 1 mark should be awarded for evidence of each point of the specification resolved in the design. When an answer does not viably answer a specification point 0 marks. For each specification point with the element viably satisfied 1 mark. Candidates may answer any specification point in either graphical form or by annotation. **No marks are awarded for the quality of communication.** • hold three tea lights: use of dimensions/configuration of candles (1) • enable easy changing of the tea light candles: access to lights/lift out/off space/space for fingers to get hold of spent candles (1) • have a stable base: square/rectangular base/tripod (1) • not mark the surface it sits on: felt lining/cork/rubber feet (1) • catch any spilt wax: trays/cups/dishes (1) • enable safe lighting of the tea light candles: position of candles relative to each other/not having to reach over other candles (1) • be made from flame proof materials: specific material named (1) • be manufactured using appropriate processes: specific process name (1)	

Question Number	Answer	Mark
	 **8x1**	**(8)**
	Design idea 2 To score a mark for design idea 2, each specification point must be resolved in second design idea but the second design idea **must be technically/conceptually different in design and construction** from the first and not a simple variation on a theme to score the mark. Use exactly the same criteria as design idea 1 to mark design idea 2.  **8x1**	**(8)**

Question Number	Answers	Mark
13. (a)	**Two** properties given from: • tough (1) • ductile/easily bent/shaped (1) • durable (1) • good tensile strength (1) *Do **not** accept the following:* • cheap • easy to weld • hardness **1x1** **1x1**	**(2)**

Question Number	Answers	Mark
13. (b)	Stages in dip coating process: • heated up/soaked at temperature/put it in the oven/allow it to get hot (1) • leave for a few seconds/allow plastic to melt/stick onto surface (1) **1x1** **1x1**	**(2)**

Question Number	Answers	Mark
13. (c)	**One** advantage described from: • paint will be harder/tougher (1) so will withstand impact/rough treatment (1) • paint will be very flexible (1) so it will not crack under bending (1) • nanotubes are chemically inert (1) so the paint will not react with other materials (1) • nanotubes emit light (1) so paint could be produced in luminescent colours (1) **2x1**	**(2)**

Question Number	Answers	Mark
13. (d) (i)	**One** explanation from: • the triangulated shape will provide a structure (1) strong enough to take the weight under tension/compression (1) • the use of mild steel when welded (1) will provide a frame strong enough to take the weight (1) **2x1**	**(2)**

Question Number	Answers	Mark
13. (d)(ii)	**One** explanation from: • eyelet/ring on hanging basket (1) is easily hooked over the scrolled/formed end of the bracket (1) • the bracket has a lip on the end (1) which means that the basket will not slip off the end once in place (1) **2x1**	**(2)**

Question Number	Answer	Mark
13. (e) **QWC (iii)**	**Evaluation to address the following issues:**	

Bracket A	Bracket B
Produced quickly through casting in one piece.	Fabricated through welding – relatively slow process.
Aluminium resists corrosion and needs no finishing.	Steel can rust, so needs protecting with a surface finish.
Aluminium is lightweight and has a good strength to weight ratio.	Steel is strong but heavy.
Aluminium can be cast into decorative shapes but needs a mould.	Steel can be decoratively shaped using scrolls, but this is a skilled and time consuming process.
The light aluminium bracket will support heavy loads because the shape is triangulated in one piece.	The steel bracket will support heavy loads because the scroll triangulates the shape, but the bracket will be heavy.
Aluminium is an expensive material.	Steel is a cheap material.

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-2	Candidate identifies the area(s) of comparison with no development OR identifies and develops one area. Shows limited understanding of the comparison. Writing communicates ideas using everyday language but the response lacks clarity and organisation. The student spells, punctuates and uses the rules of grammar with limited accuracy.
Level 2	3-4	Candidate identifies some areas of comparison with associated developments showing some understanding of the comparison. Writing communicates ideas using D&T terms accurately and showing some direction and control in the organising of material. The student uses some of the rules of grammar appropriately and spells and punctuates with some accuracy, although some spelling errors may still be found.
Level 3	5-6	Candidate identifies a range of areas of comparison with associated developments showing a detailed understanding of the comparison. Writing communicates ideas effectively, using a range of appropriately selected D&T terms and organising information clearly and coherently. The student spells, punctuates and uses the rules of grammar with considerable accuracy.

Question Number	Answers	Mark
14. (a)	**Two** properties and linked justification from: • **Property**: tough (1) • **Justification**: which means it can take knocks and bumps/can be dropped without any damage (1) • **Property**: resistant to chemicals (1) • **Justification**: which means it can be used for weed killer (1) • **Property**: soft/flexible (1) • **Justification**: which means it can flex without breaking/fracturing (1) • **Property**: self finishing (1) • **Justification**: which means it does not require any secondary finishing when being manufactured (1) • **Property**: durable (1) • **Justification**: which means it will withstand weathering and deterioration (1) • **Property:** plasticity (1) • **Justification**: which makes it easy to mould (1) • **Property**: can be re-moulded/recycled (1) • **Justification**: which means the waste can be reused/not put into landfill (1) *Do **not** accept the following:* • strong • cheap to mould • lightweight • anything related to temperature **2x1** **2x1**	**(4)**

Question Number	Answers	Mark
14. (b)	**One** characteristic described from: • thermoplastics have long tangled molecular chains (1) which means they are quite flexible/soft (1) • thermoplastics can be reheated (1) which means they can be reshaped/return to their original shape (memory)/recycled (1) • thermoplastics are not very useful where high temperatures are involved (1) because they soften and lose their rigidity at just above 100°C (1) **2x1**	**(2)**

Question Number	Answers	Mark
14. (c) (i)	**Three** pieces of product information given from: • product description (1) • sales – daily/weekly/monthly/total (1) • current stock levels (1) • product cost (1) • sales at specific checkouts/times (1) • consumer history (1) • origin of product (1) **1x1** **1x1** **1x1**	**(3)**

Question Number	Answers	Mark
14. (c)(ii)	**Two** benefits explained from: • suppliers/retailers can be quickly updated (1) about new products and services (1) • their own stock levels can be monitored (1) so that relevant parts can be reordered when certain stock levels are reached or triggered/just in time (JIT) (1) • products can be tracked (1) more easily therefore improving quality control purposes (1) • e-mail faster than post (1) therefore time saved/efficiency/competitive advantage (1) **2 x 1** **2 x 1**	**(4)**

Question Number	Answer	Mark
14. (d) **QWC (iii)**	Indicative content **Discussion to address the following issues:** • less landfill required which means that landfill sites will last longer • reduced pollution/toxic waste by not burning them/fumes given off will not result/cause damage to ozone layer/greenhouse gases • fewer natural resources (oil) required to make new virgin material which means that oil reserves will last longer • recycled plastics can be used/are used to make new products which cuts down the demand for new virgin material • less environmental damage caused by not having to drill for oil and transport it which will protect/preserve the environment	**(6)**

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-2	Candidate identifies the impact(s) with no development OR identifies and develops one impact. Shows limited understanding of the impacts. The student uses basic language and the response lacks clarity and organisation. Spelling, punctuation and the rules of grammar used with limited accuracy.
Level 2	3-4	Candidate identifies some impacts with associated developments showing some understanding of the impacts. The student uses some design and technology terms and shows some focus and organisation. Spelling, punctuation and the rules of grammar used with some accuracy. Some spelling errors may still be found.
Level 3	5-6	Candidate identifies a range of impacts with associated developments showing a detailed understanding of the impacts. The student uses a range of appropriate design and technology terms and shows good focus and organisation. Spelling, punctuation and the rules of grammar used with considerable accuracy.