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## Sample Assessment Materials

# Edexcel GCSE in Design and Technology: Graphic Products (2GR01)

**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 assessment criteria to share with students.


A PEARSON COMPANY

# Welcome to the GCSE 2009 Design and Technology: Graphic Products 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: Graphic Products 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: Graphic Products

## Unit 1: Creative Design and Make Activities

Sample Controlled Assessment Material

Paper Reference
**5GR01/01**

**You do not need any other materials.**

*Turn over* ▶

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N 3 5 6 4 8 A

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## Delivery of the controlled assessment

You will design and make a **graphics 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 graphic products are:

1. **Packaging**, eg

   - Perfume packaging including bottle / container and box / outer packaging
   - A sports drinks bottle and label

2. **Point-of-sale display**, eg

   - A counter display for a new computer game including DVD case cover
   - A leaflet holder and leaflet promoting activities at a local leisure centre

3. **Pop-up mechanisms**, eg

   - A pop-up book for young children to help them learn numbers or the alphabet etc
   - A pop-up musical greetings card for a special occasion

4. **Concept design**, eg

   - A next generation games console
   - A personal hand-held GPS navigation system

5. **Interior design**, eg

   - A new specialist D&T room for your school
   - A contemporary loft apartment

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 ingredients and/or component parts, processes and techniques. | 1–2 |
| | Final design proposal includes details of some ingredients and/or component parts, processes and techniques. | 3–4 |
| | Final design proposal includes technical details of all ingredients 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.<br>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: Graphic Products
## Unit 2: Knowledge and Understanding of Graphic Products

Sample Assessment Material

**Time: 1 hour 30 minutes**

Paper Reference

**5GR02/01**

**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** The drawing below shows a package for holding eggs.

It is made from a soft plastic material.

A suitable plastic material from which to make the package is:

☒ **A** expanded polystyrene (PS)

☒ **B** polypropylene (PP)

☒ **C** poly vinyl chloride (PVC)

☒ **D** polyethylene terephthalate (PET)

**(Total for Question 1 = 1 mark)**

**2** Which of the following materials is a composite material?

☒ **A** Cartridge paper

☒ **B** Carbon fibre

☒ **C** Steel

☒ **D** Corrugated board

**(Total for Question 2 = 1 mark)**

**3** Which of the following materials is a softwood?

- ☒ **A** Jelutong
- ☒ **B** Balsa
- ☒ **C** Pine
- ☒ **D** Medium density fibreboard (MDF)

**(Total for Question 3 = 1 mark)**

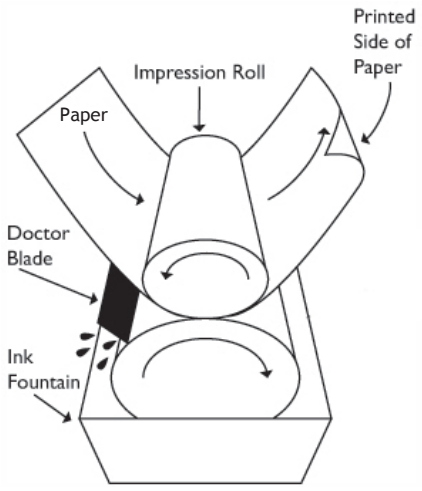
**4** Polymorph is a modern material.

Polymorph is used for:

- ☒ **A** painting
- ☒ **B** drawing
- ☒ **C** printing
- ☒ **D** modelling

**(Total for Question 4 = 1 mark)**

**5** The drawing below shows a method of printing.

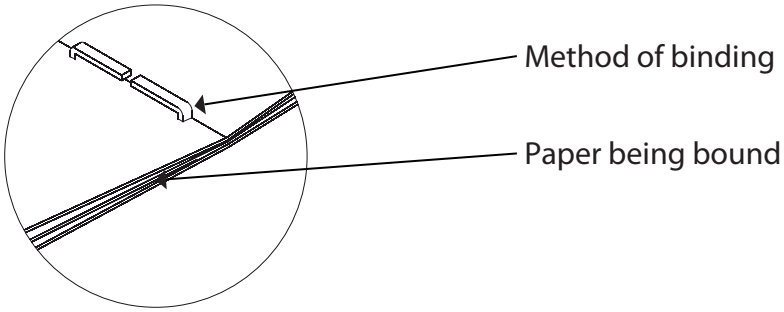



The name of the printing method is:

- ☒ **A** gravure
- ☒ **B** offset lithography
- ☒ **C** screen printing
- ☒ **D** photocopying

**(Total for Question 5 = 1 mark)**

**6** The drawing below shows a commercial method of binding paper.




The name of the binding method is:

☒ **A** hard binding

☒ **B** saddle wire stitching

☒ **C** perfect binding

☒ **D** comb binding

**(Total for Question 6 = 1 mark)**

**7** A printing company produced 1000 leaflets for a client.

This scale of manufacture is called:

☒ **A** one-off

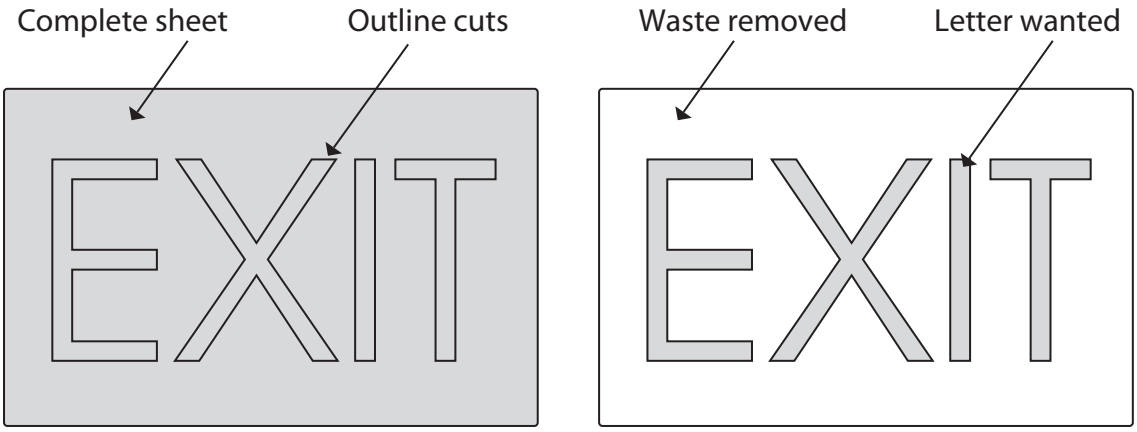
☒ **B** batch

☒ **C** mass

☒ **D** rapid prototyping (RPT)

**(Total for Question 7 = 1 mark)**

**8** The drawing below shows a vinyl sign during production.




When vinyl signs are produced using computer aided manufacture (CAM), the surrounding waste material has to be removed before the sign can be applied.

The name for the process of removing the waste material is called:

☒ **A** trimming

☒ **B** cleaning

☒ **C** weeding

☒ **D** cutting

**(Total for Question 8 = 1 mark)**

**9** Epoxy resin is an adhesive that is made by mixing two chemicals.

One chemical is called the resin.

The other chemical is called the:

☒ **A** mixer

☒ **B** fixer

☒ **C** PVA

☒ **D** hardener

**(Total for Question 9 = 1 mark)**

**10** Biofuels can be used as a source of power for engines in motor transport.

Biofuels can be manufactured by converting which of the following materials:

☒ **A** crude oil

☒ **B** biological waste

☒ **C** biomass

☒ **D** petrol

**(Total for Question 10 = 1 mark)**

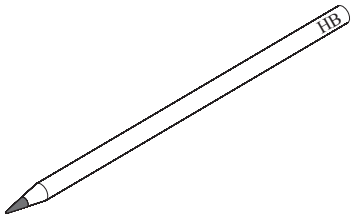
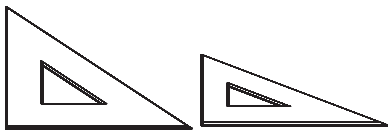
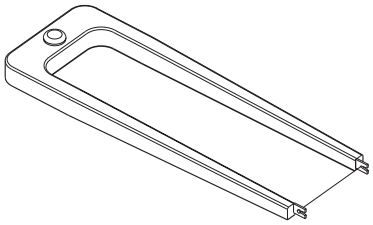
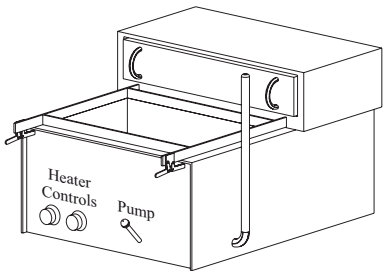
**(Total = 10 marks)**

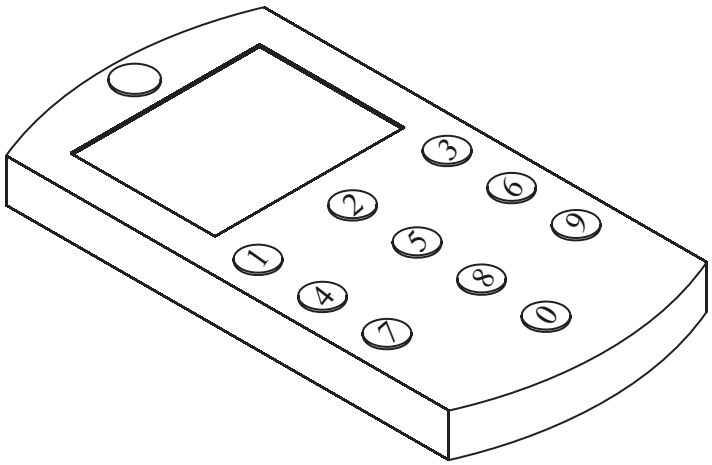
**11** (a) The table below shows some tools and equipment.

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

**(4)**

| Tools/Equipment | Name | Use |
|---|---|---|
|  | Pencil | |
|  | 60/30 and 45 degree set squares | |
|  | | Cutting expanded polystyrene |
|  | | Shaping plastic around moulds |

(b) The drawing below, produced by a student, shows a mobile phone.




Give **one** reason for using a 3D CAD programme to develop a design.

**(1)**

.....

.....

(c) The student then produced a block model of the mobile phone from Styrofoam.

(i) Styrofoam is a cheap material.

Give **one** property of Styrofoam that makes it suitable for the manufacture of models.

For your property, give **one** reason for your answer.

**(2)**

Property .....

.....

Reason .....

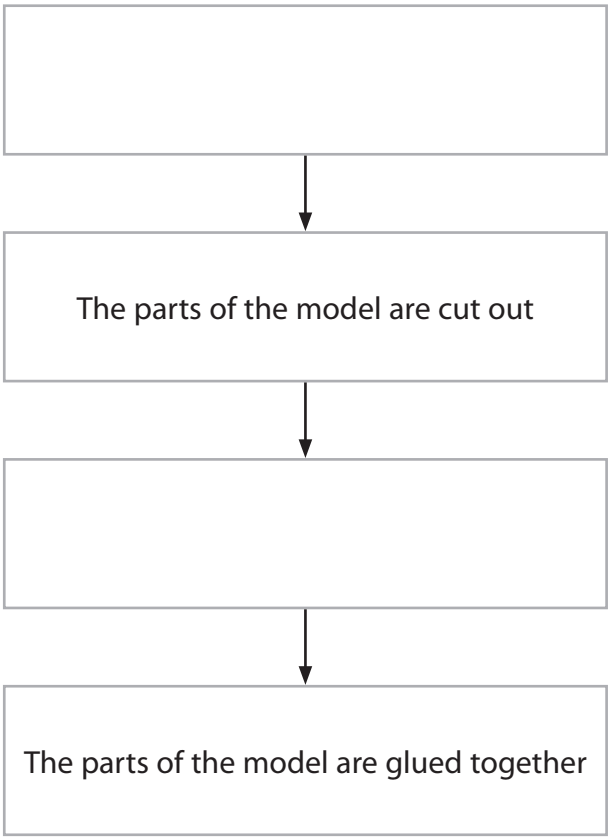
.....

(ii) Complete the diagram below to show the main stages in producing a model of the mobile phone using the block modelling technique.

Some of the stages have been done for you.

**(2)**




(iii) Jelutong and pine are both woods that can be used to make models from.

Explain **one** advantage jelutong has over pine when used to produce models. **(2)**

.....

.....

.....

.....

(d) The photograph below shows a model of the mobile phone produced on a rapid prototyping machine.

The student used e-mail to send the design file to a manufacturer.

Explain **one** disadvantage of using e-mail for communication.

**(2)**

.....

.....

.....

.....

(e) The student has selected an electronic paper display (EPD) rather than a liquid crystal display (LCD) to be used on this new mobile phone.

Give **two** advantages of using an electronic paper display.

**(2)**

1 .....

.....

2 .....

.....

(f) The model was manufactured using a 3D printing rapid prototyping machine.

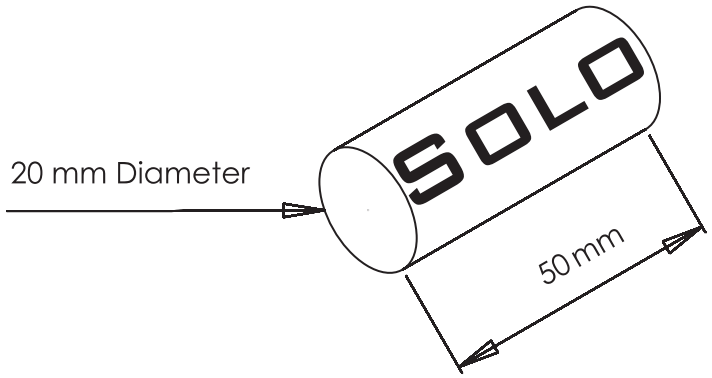
Describe how a 3D printing rapid prototyping machine manufactures a model. **(4)**

**(Total for Question 11 = 19 marks)**

**12** A manufacturer requires a point of sale to display packs of sweets.

The point of sale will be placed on a counter in a shop.

The drawing below shows one pack of sweets.




**Design specification**

The specification for the point of sale display is that it should:

- be freestanding
- hold at least ten of the packs of sweets
- allow customers to remove the sweets
- allow the point of sale display to be refilled
- display the name of the product 'Solo' when filled
- display a graphic or text to encourage sales
- be manufactured using appropriate materials
- be manufactured using processes suitable for batch production.

In the boxes opposite, use sketches and, where appropriate, brief notes to show **two different** design ideas for the point of sale display 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**

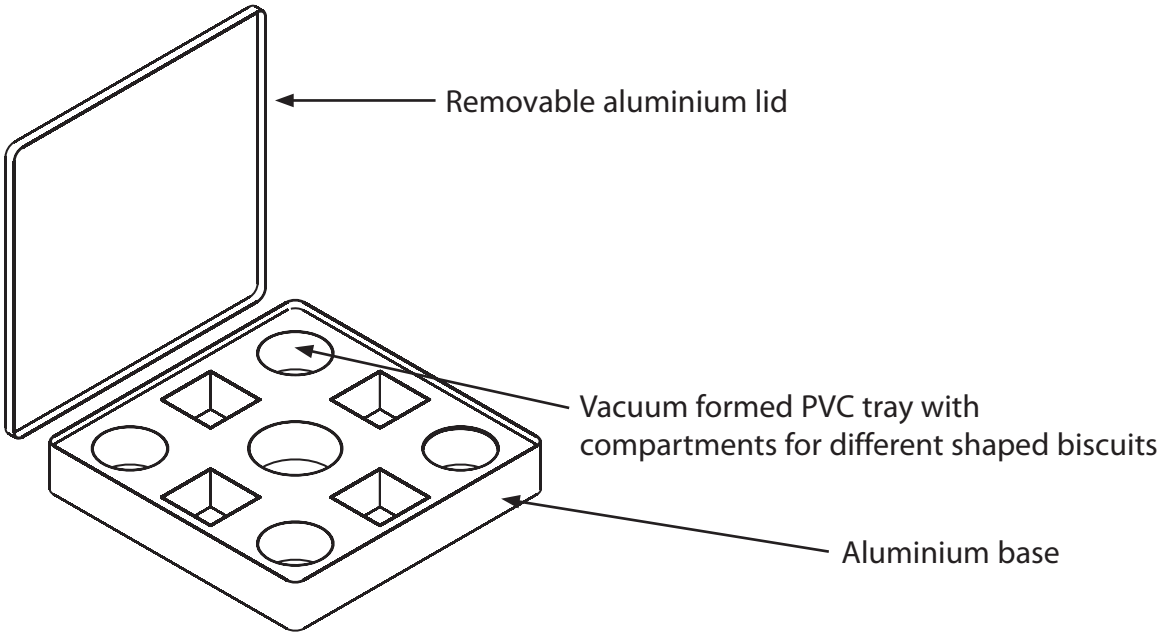
**(8)**

**Design idea 2**

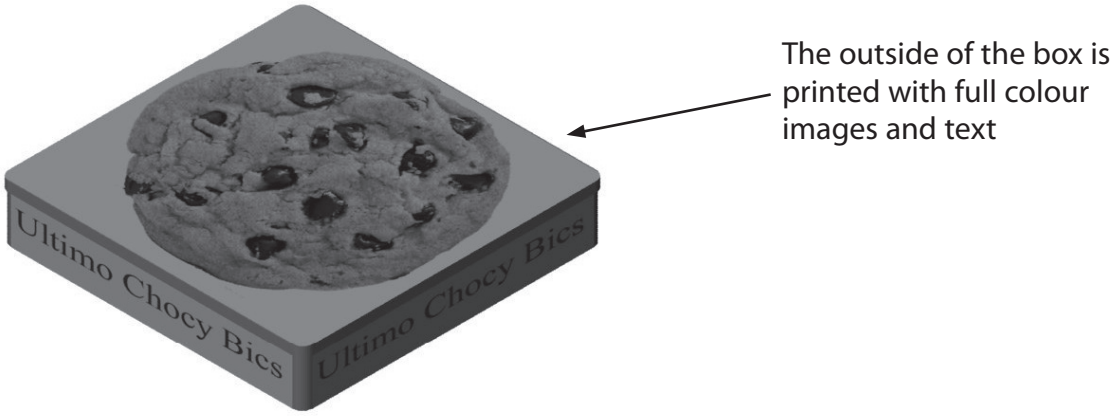
**(8)**

**(Total for Question 12 = 16 marks)**

**13** The drawings below show an aluminium box used to package chocolate biscuits.




The drawing above shows the box opened.




The drawing above shows the box closed, with the graphics on the outside.

(a) Give **two** properties of aluminium that make it a suitable material for packaging.

For each property, justify your answer.

**(4)**

Property 1 .....

Justification .....

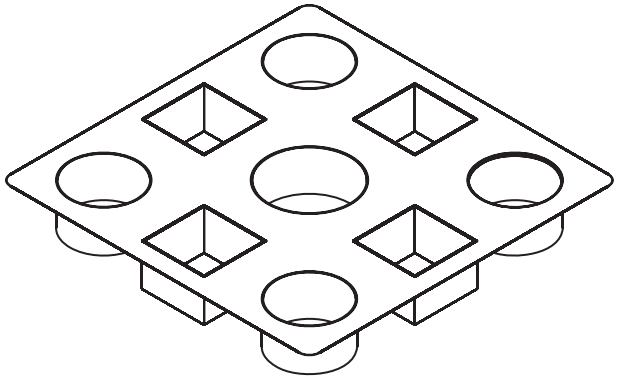
.....

Property 2 .....

Justification .....

.....

(b) The drawing below shows the vacuum formed PVC inner tray.



Explain **one** reason why the vacuum forming process is suitable for manufacturing the PVC inner tray.

**(2)**

.....

.....

.....

.....

(c) Explain why the box is successful at meeting the following specification points:

(i) Protect the biscuits.

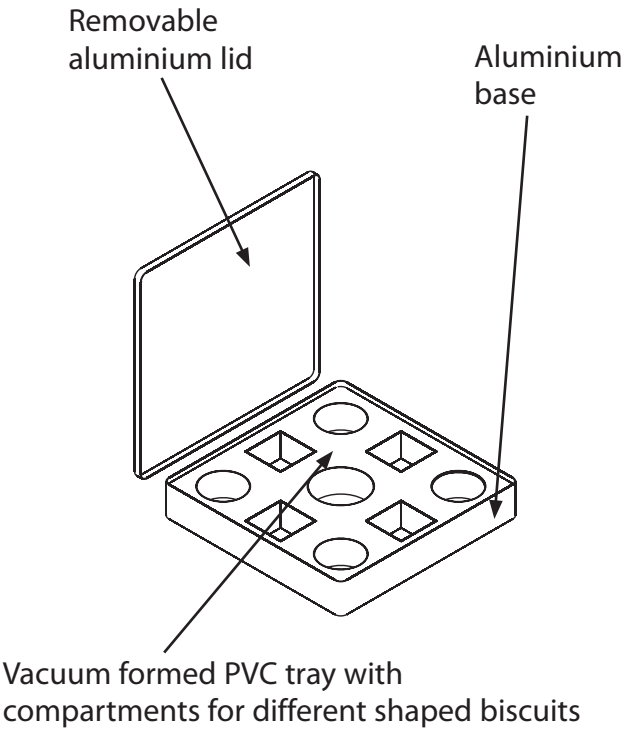
**(2)**

(ii) Promote sales of the biscuits.

**(2)**

*(d) Packaging A and B below show two different types of packaging for biscuits.


**Packaging A**




**Packaging B**

Evaluate package A compared to package B in terms of minimising waste production.

**(6)**

**(Total for Question 13 = 16 marks)**

**14** The picture below shows a mass produced fizzy drinks bottle made from PET.


(a) Name the commercial process used to mass produce the plastic bottle. **(1)**

.....

(b) Labels for bottles are often printed using offset lithography and often incorporate areas of metallic foil for added visual effect.

(i) Name the process used to apply a metallic foil for visual effect. **(1)**

.....

(ii) Explain **two** reasons for using the offset lithographic process to print a label for the bottle. **(4)**

1 .....

.....

.....

.....

2 .....

.....

.....

.....

(iii) Labels often have a bar code printed on them. These are used by EPOS systems.

Describe how an EPOS system works.

**(3)**

(c) Explain **two** advantages of using PET bottles, rather than glass bottles, for a consumer.

**(4)**

1

2

*(d) Environmental issues are a growing concern both locally and globally. The Kyoto protocol was agreed by many countries in response to a particular global environmental issue.

Discuss the global environmental issues that require the Kyoto protocol.

**(6)**

**(Total for Question 14 = 19 marks)**

**TOTAL FOR PAPER = 80 MARKS**

**Sample mark scheme**

| Question Number | Answer | Mark |
|---|---|---|
| **1.** | A | **(1)** |

| Question Number | Answer | Mark |
|---|---|---|
| **2.** | B | **(1)** |

| Question Number | Answer | Mark |
|---|---|---|
| **3.** | C | **(1)** |

| Question Number | Answer | Mark |
|---|---|---|
| **4.** | D | **(1)** |

| Question Number | Answer | Mark |
|---|---|---|
| **5.** | A | **(1)** |

| Question Number | Answer | Mark |
|---|---|---|
| **6.** | B | **(1)** |

| Question Number | Answer | Mark |
|---|---|---|
| **7.** | B | **(1)** |

| Question Number | Answer | Mark |
|---|---|---|
| **8.** | C | **(1)** |

| Question Number | Answer | Mark |
|---|---|---|
| **9.** | D | **(1)** |

| Question Number | Answer | Mark |
|---|---|---|
| **10.** | C | **(1)** |

| Question Number | Answer | Mark |
|---|---|---|
| **11. (a)** | | |

| | |
|---|---|
| Pencil | Drawing/applying colour/shading (1) |
| 60/30 and 45 degree set squares | Technical drawing/marking/measuring 60/30/45 degrees/isometric/orthographic drawings (1) |
| Hot wire cutter (1) | Cutting expanded polystyrene |
| Vacuum former (1) | Shaping plastic around moulds |

**1x1**
**1x1**
**1x1**
**1x1**

**(4)**

| Question Number | Answer | Mark |
|---|---|---|
| **11. (b)** | **One** reason given from:<br>• no material costs (1)<br>• electronic transfer of data possible (1)<br>• errors can be undone (1)<br>• designs can be edited/changed (1)<br>• animations are possible (1)<br>• views can be changed (1)<br>• colour schemes can be trialled without the work involved with traditional models (1)<br>• more accurate than hand drawing (1)<br>**1x1** | **(1)** |

| Question Number | Answer | Mark |
|---|---|---|
| **11. (c) (i)** | **One** property and linked reason given from:<br><br>• **Property:** Styrofoam is soft/easy to shape (1)<br>• **Reason:** this makes production quick requires less modeller skill (1)<br><br>• **Property:** Styrofoam has a uniform/grain free composition (1)<br>• **Reason:** this reduces the finishing required (1)<br><br>• **Property:** Styrofoam is lightweight (1)<br>• **Reason:** this will make the model easy to transport (1)<br>**1x1**<br>**1x1** | **(2)** |

| Question Number | Answer | Mark |
|---|---|---|
| **11. (c) (ii)** | Correct **two s**tages identified:<br>• marking out (1)<br>• sanding/finishing (1)<br>**2x1** | **(2)** |

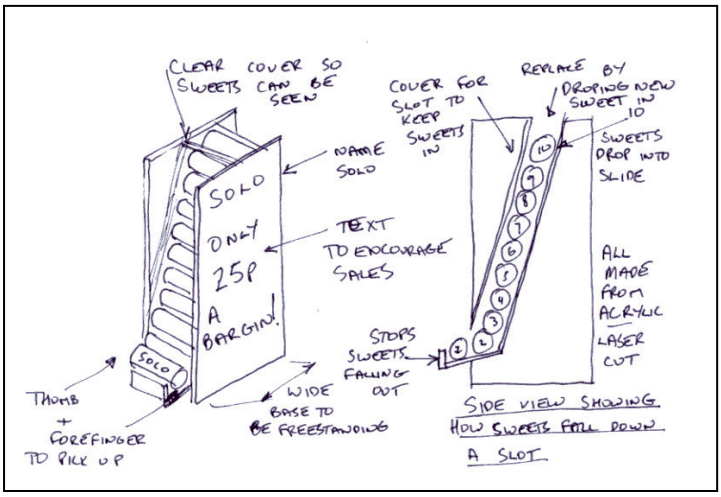
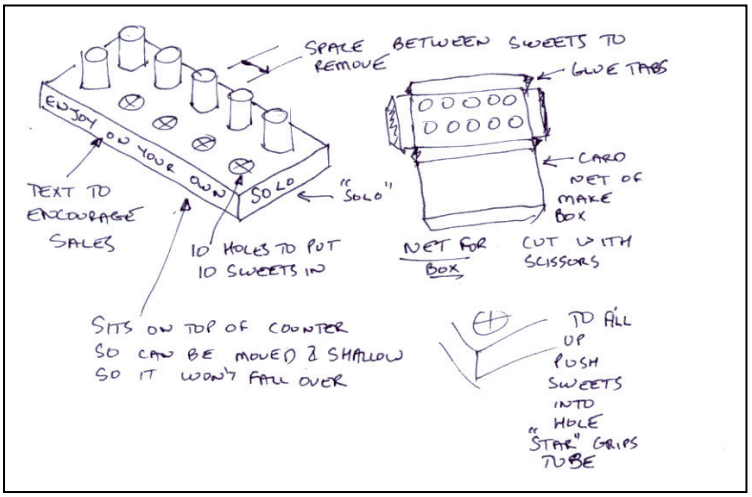
| Question Number | Answer | Mark |
|---|---|---|
| **11. (c) (iii)** | **One** advantage explained from:<br>• jelutong has a finer straighter grain structure (1) this makes it smoother when cut/shaped (1)<br>• jelutong is more stable (1) this makes any applied finishes less likely to crack (1)<br>**2x1** | **(2)** |

| Question Number | Answer | Mark |
|---|---|---|
| **11. (d)** | **One** disadvantage explained from:<br>• it is possible to receive a virus (1) therefore compromising the IT system (1)<br>• infrastructure is expensive (1) therefore increasing costs/excluding those without the means to access infrastructure (1)<br>• the use of e-mail reduces face to face contact (1) therefore hindering the development of personal relationships (1)<br>**2x1** | **(2)** |

| Question Number | Answer | Mark |
|---|---|---|
| **11. (e)** | **Two** advantages from the following:<br>• Bright, high contrast appearance (1)<br>• Ultra-low power consumption/requires no power to maintain image (1)<br>• Paper-thin (1)<br>• Lightweight (1)<br>• Shatterproof (1)<br>• Flexible (1)<br>• Full viewing angle/readable in direct sunlight (1)<br>**2x1** | **(2)** |

| Question Number | Answer | Mark |
|---|---|---|
| **11. (f)** | Description to include **four** points given from:<br>• the 3D design programme exports a stereo lithography file (1)<br>• software for the rapid prototyping machine divides the model into layers (1)<br>• software for the rapid prototyping machine calculates tool paths for each layer (1)<br>• a layer of powder is spread onto a base (1)<br>• glue is applied to bond the layer (1)<br>• layers of powder and glue are repeated(1)<br>• the model is allowed to cure (1)<br>• excess powder is removed (1)<br>• the model is impregnated (1)<br>**4x1** | **(4)** |

| Question Number | Answer | Mark |
|---|---|---|
| **12.** | **Design idea 1**<br><br>1 mark should be awarded for evidence of each point of the specification resolved in the design.<br><br>When an answer does not viably answer a specification point 0 marks.<br><br>For each specification point with the element viably satisfied 1 mark.<br><br>Candidates may answer any specification point in either graphical form or by annotation.<br><br>**No marks are awarded for the quality of communication.**<br><br>• the design will be freestanding (1), eg evidence could be a design with a wide base, in relation to the height (50%)<br><br>• that the design will hold ten packs of sweets (1), eg evidence could be ten packs drawn in place, or a size indicated that would hold ten packs<br><br>• how one pack of sweets could be removed (1), eg evidence could be a drawing of a hand picking up a pack, or a section of the standing above the POS<br><br>• how at least one pack could be inserted into the POS (1), eg evidence could be a drawing of a hand inserting a pack, or notes explaining how to refill<br><br>• name 'Solo' being indicated on the POS (1)<br><br>• evidence of text, other than 'Solo' or graphics being drawn on the POS (1), eg there is a drawing of the pack of sweets, or a retail price indicated<br><br>• one material being indicated that is appropriate for the part of the design (1), eg a net is labelled as being made from card<br><br>• one batch manufacturing process being indicated that is appropriate for the part of the design (1), eg a net is labelled as being cut using scissors | |

| Question Number | Answer | Mark |
|---|---|---|
| |  <br>**8x1** | **(8)** |
| | **Design idea 2**<br><br>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.<br><br>Use exactly the same criteria as design idea 1 to mark design idea 2.<br><br>The display of the name 'Solo' (bullet point 5) does not have to be technically conceptually different for the second idea.<br><br>  <br>**8x1** | **(8)** |

| Question Number | Answer | Mark |
|---|---|---|
| **13. (a)** | **Two** properties and **linked** justification from:<br>• **Property:** aluminium is non toxic (1)<br>• **Justification:** this means it will not hurt the user (1)<br><br>• **Property:** aluminium is non reactive/inert (1)<br>• **Justification:** this means it will not affect the flavour of the contents/deteriorate in appearance (1)<br><br>• **Property:** aluminium is lightweight (1)<br>• **Justification:** this means it will be easy to carry/cheaper to transport/store (1)<br><br>• **Property:** aluminium is malleable/soft/ductile (1)<br>• **Justification:** this means it can be formed into shaped (1)<br><br>• **Property:** aluminium has a surface receptive to print (1)<br>• **Justification:** this means graphics can be applied directly (1)<br><br>• **Property:** aluminium can be considered to have an attractive appearance (1)<br>• **Justification:** this means the interior of the box requires no extra finishing (1)<br>**2x1**<br>**2x1** | **(4)** |

| Question Number | Answer | Mark |
|---|---|---|
| **13. (b)** | **One** reason explained from:<br>• vacuum forming shapes thermoplastic materials (1) therefore it is suitable because PVC is a thermoplastic (1)<br>• vacuum forming produces hollow shapes (1) therefore it is suitable because the inner tray is hollow (1)<br>• vacuum forming can be an automatic process (1) therefore it is suitable because it will reduce costs/increase production speed (1)<br>• vacuum forming produces accurate/consistent mouldings (1) therefore it is suitable because the inner tray will fit the package/hold the biscuits (1)<br>**2x1** | **(2)** |

| Question Number | Answer | Mark |
|---|---|---|
| **13. (c) (i)** | **One** explanation from**:**<br>• the box is rigid (1) this means it will act as a barrier to impact damage from the outside (1)<br>• the box is air/water resistant (1) this means it will prevent air/water coming into contact with the contents (1)<br>• the box has a lid (1) this will stop the contents falling out/foreign objects getting in (1)<br>• the inner tray has separate sections for the biscuits (1) this will stop them colliding with each other (1)<br>**2x1** | **(2)** |

| Question Number | Answer | Mark |
|---|---|---|
| **13. (c) (ii)** | **One** explanation from**:**<br>• the box is printed in full colour/has images on it (1) this will attract attention (1)<br>• the box displays the name 'ultimo' (1) this makes people think of ultimate a word that implies high quality, making people think the product is desirable (1)<br>**2x1** | **(2)** |

| Question Number | Answer | Mark |
|---|---|---|
| **13. (d)**<br>**QWC (iii)** | **Evaluation to address the following issues:**<br><br>**Package A** / **Package B**<br>one-trip/single-use package therefore will simply be thrown away after use. / Can be re-used for similar/different purposes, ie biscuit tin/storage of letters or photos.<br>Promotes a 'throw away' culture which adds to environmental concerns, ie landfill/litter. / Gives consumer an incentive to re-use due to better quality materials/practical container.<br>Card can be recycled only when plastic window is removed. / Aluminium lid and base and inner plastic tray can be recycled when separated.<br>Card requires less energy to produce. / Aluminium requires lots of energy from extraction of bauxite to production of alumina.<br>Card package is lighter therefore it will be more cost effective to transport. / Aluminium (although it is a light metal) is heavier so will add to transport costs. | **(6)** |

| 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 | Answer | Mark |
|---|---|---|
| **14. (a)** | • Blow moulding (1)<br>**1x1** | **(1)** |

| Question Number | Answer | Mark |
|---|---|---|
| **14. (b) (i)** | • Hot foil/foil blocking (1)<br>**1x1** | **(1)** |

| Question Number | Answer | Mark |
|---|---|---|
| **14. (b) (ii)** | **Two** reasons explained from:<br>• offset lithography has low setup costs (1) therefore reducing the production costs of the label (1)<br>• offset lithography produces good quality/full colour prints (1) therefore allowing the labels to be aesthetically pleasing (1)<br>• offset lithography is a common process (1) therefore ensuring competitive prices/convenience (1)<br>• offset lithography is a fast process (1) therefore allowing a quick turnaround of print jobs/ready availability of labels (1)<br>**2x1**<br>**2x1** | **(4)** |

| Question Number | Answer | Mark |
|---|---|---|
| **14. (b) (iii)** | Description to include **three** points from:<br>• the bar code is scanned (1)<br>• the till sends a code to a central computer system (1)<br>• data about the product is looked up (1)<br>• data is sent back to the till (1)<br>• data about stock is updated (1)<br>**3x1** | **(3)** |

| Question Number | Answer | Mark |
|---|---|---|
| **14. (c)** | **Two** advantages explained from:<br>• PET is lighter (1) therefore making transport easier/cheaper (1)<br>• PET is less likely to shatter if dropped (1) therefore making it safer for the user (1)<br>• PET is less expensive to produce/manufacture bottles from (1) therefore decreasing the price of the product (1)<br>**2x1**<br>**2x1** | **(4)** |

| Question Number | Answer | Mark |
|---|---|---|
| **14. (d)**<br>**QWC (iii)** | **Discussion to address the following issues:**<br>• climate change/global warming are happening – this means lifestyles will have to change to fit in with new conditions<br>• greenhouse gases are being increasingly released - these trap heat<br>• activities, such as energy production/consumption, industrial processes, agriculture and waste, are sources of greenhouse gases<br>• gases released by human activity (carbon dioxide, nitrous oxide and methane) are released in large amounts these need to be reduced<br>• some gases released in small amounts have big impacts (hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride) need to be reduced/eliminated<br>• global warming is a problem where countries that cause the problems are not always the ones that will suffer the consequences<br>• the effects of cutting/planting forests are to be taken into account these may increase/decrease global warming | **(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. 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 impacts with associated developments showing some understanding of the impacts. 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 impacts with associated developments showing a detailed understanding of the impacts. 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. |