

GENERAL CERTIFICATE OF SECONDARY EDUCATION

DESIGN AND TECHNOLOGY: GRAPHICS

J303

Unit A535: Sustainability and technical aspects of designing and making

Candidates answer on the question paper
 A calculator may be used for this paper

OCR Supplied Materials:
 None

Duration: 1 hour 30 minutes

- Other Materials Required:**
- Pencil
 - Ruler (cm/mm)

Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions in sections A **and** B.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.
- Do not write in Bar Codes.

INFORMATION FOR CANDIDATES

- Your quality of written communication is assessed in questions marked with an asterisk (*).
- The number of marks for each question is given in brackets [] at the end of the question or part question.
- Dimensions are in millimetres unless stated otherwise.
- The total number of marks for this paper is **80**.
- This document consists of **16** pages. Any blank pages are indicated.

For Examiner's Use		
	Max	Mark
1	1	
2	1	
3	1	
4	1	
5	1	
6	1	
7	1	
8	1	
9	1	
10	1	
11	1	
12	1	
13	1	
14	1	
15	1	
16	20	
17	15	
18	15	
19	15	
TOTAL	80	

Section AAnswer **all** questions.On questions 1-5 **circle** your answer.

- 1 Toxic materials should be:
- (a) Reused
 - (b) Refused
 - (c) Recycled
 - (d) Reanimated
- [1]**
- 2 When designers respond to cultural needs they ensure:
- (a) The manufacturing process is completed quickly
 - (b) That materials used are inexpensive
 - (c) The products marketability is considered
 - (d) That different values and beliefs are considered
- [1]**
- 3 Companies can pay to exceed their carbon dioxide emission limit. This is known as:
- (a) Carbon off-setting
 - (b) Cash capping
 - (c) Cash off-setting
 - (d) Carbon capping
- [1]**
- 4 The term solar energy means:
- (a) Energy produced by motion
 - (b) Energy from beneath the earth's surface
 - (c) Energy from the sun
 - (d) Energy produced from wind
- [1]**
- 5 The term built in obsolescence means designing and making a product so that:
- (a) It becomes outdated and must be replaced
 - (b) It is built cheaply
 - (c) It is environmentally friendly
 - (d) It is built quickly
- [1]**

6 What is Secondary Recycling?

..... [1]

7 Name **one** sustainable energy source.

..... [1]

8 What does LCA stand for?

..... [1]

9 What type of product might the symbol below appear on?



..... [1]

10 Name **one** benefit to a worker supported by the Ethical Trade Initiative.

..... [1]

Decide whether each of the following statements is **true** or **false**.
Tick (✓) the box to show your answer.

	True	False	
11 Manufacturers must protect the safety of users of products	<input type="checkbox"/>	<input type="checkbox"/>	[1]
12 Aluminium cans are not 100% recyclable	<input type="checkbox"/>	<input type="checkbox"/>	[1]
13 Recycled paper is sustainable	<input type="checkbox"/>	<input type="checkbox"/>	[1]
14 Designers must be aware of cultural differences	<input type="checkbox"/>	<input type="checkbox"/>	[1]
15 Recycling is suitable for all plastics	<input type="checkbox"/>	<input type="checkbox"/>	[1]

16 Fig. 1 shows a cardboard drink carton.

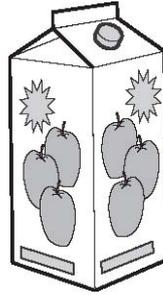


Fig.1

(a) State **one** benefit the shape of the carton gives to the retailer.

.....
..... [1]

(b) Give **one** advantage to the consumer that a carton has when compared to a glass bottle.

.....
..... [1]

(c) Cartons have a low carbon footprint. Explain the term carbon footprint.

.....
.....
.....
.....
..... [2]

(d) The carton is made from a laminate of cardboard, polythene and aluminium foil.

Give **two** reasons why aluminium foil is used in the laminate.

1.....

.....

.....

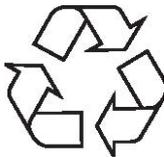
2.....

.....

..... [2]

(e) The table below shows three symbols often found on drinks containers.

Tick (✓) the symbol which would be likely to appear on a cardboard drinks carton.

		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[1]

(f) In the context of the 6Rs explain the meaning of the term Reuse.

.....

.....

.....

.....

..... [2]

- (g) The manufacturer needs a symbol that will appear on the drink carton to encourage people to wash and squash the carton before recycling.

The cartons of drink will be sold in many different countries.

- (i) Give **two** specification points for this symbol.

1

.....

2

..... [2]

- (ii) Use a sketch and notes to show a design for the symbol that encourages customers to wash and squash the carton.

Section B

Answer **all** questions.

17 Fig.2 shows a box for a set of crayons.

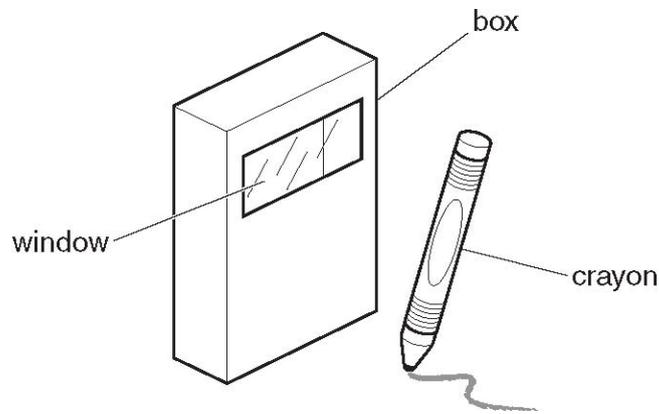


Fig.2

(a) Name **one** suitable material for the box.

..... [1]

(b) Give **one** reason why a window is included in the box.

..... [1]

(c) Tick (✓) a suitable method of making the window in the box.

Die cutting	Embossing	Laminating
-------------	-----------	------------

[1]

(d) A foil triangle shape is to be applied to the front of the box. Describe the process of foil application.

.....

 [3]

(e) Complete Fig.3 by sketching an equilateral triangle on the front of the box.

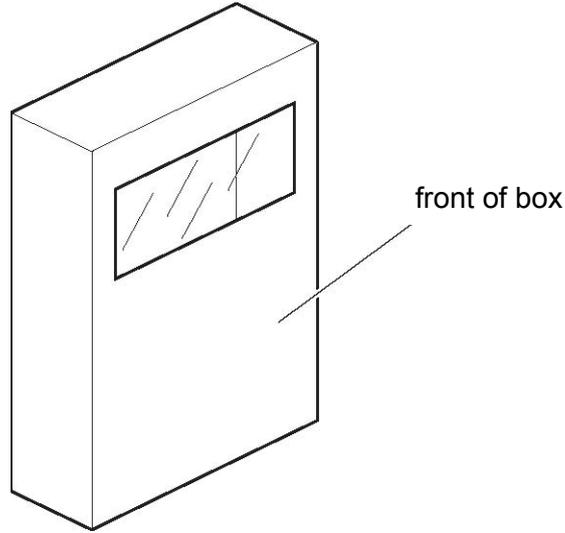


Fig.3

[2]

(f) Complete Fig.4 to show the development (net) required to make the box.

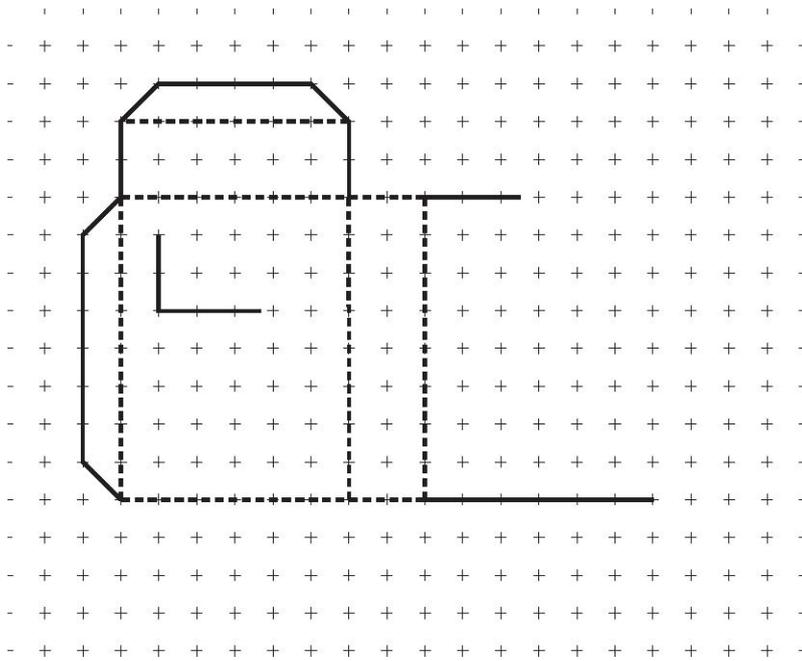


Fig.4

[5]

(g) Photochromic inks will be used on the outside of the box. Explain how photochromic inks work.

.....

.....

..... [2]

18 Fig.5 shows an electronic template for a business card. The client's design is imported into the three spaces on the template and then printed.



Fig.5

(a) Complete the list to show **two** more decisions a client would have to make when selecting lettering for the business card.

1 Choose a suitable colour for the lettering.

2

3..... [2]

(b) Name **two** more types of contact detail that could be added to the business card.

1.....

2..... [2]

(c) Explain why copyright issues must be considered before selecting an image for the business card.

.....

.....

.....

..... [2]

(d) The image on the business card is to be coated with UV varnish.

(i) State what the letters UV stand for:

U..... **V**..... [1]

(ii) Give **two** reasons why UV varnish has been used on the business card.

1

2 [2]

19 Fig.6 shows a display stand for jewellery.

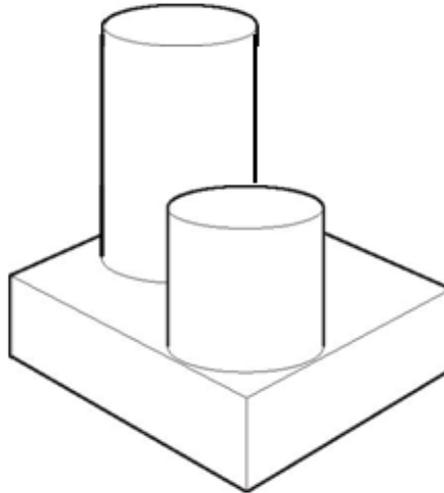


Fig.6

(a) The display stand is made from three pieces of Styrofoam. The three pieces are cut from a large block, then shaped, smoothed and glued together.

(i) Name **one** physical property of Styrofoam that makes it suitable for the display stand.

..... [1]

(ii) Name **one** suitable adhesive that could be used to join the Styrofoam blocks.

..... [1]

(iii) Describe **one** quality control check that could be carried out when making the Styrofoam display stand.

.....
.....
..... [2]

- (b) Complete the freehand orthographic drawing of the display stand shown in Fig.7.
Do **not** show hidden detail.

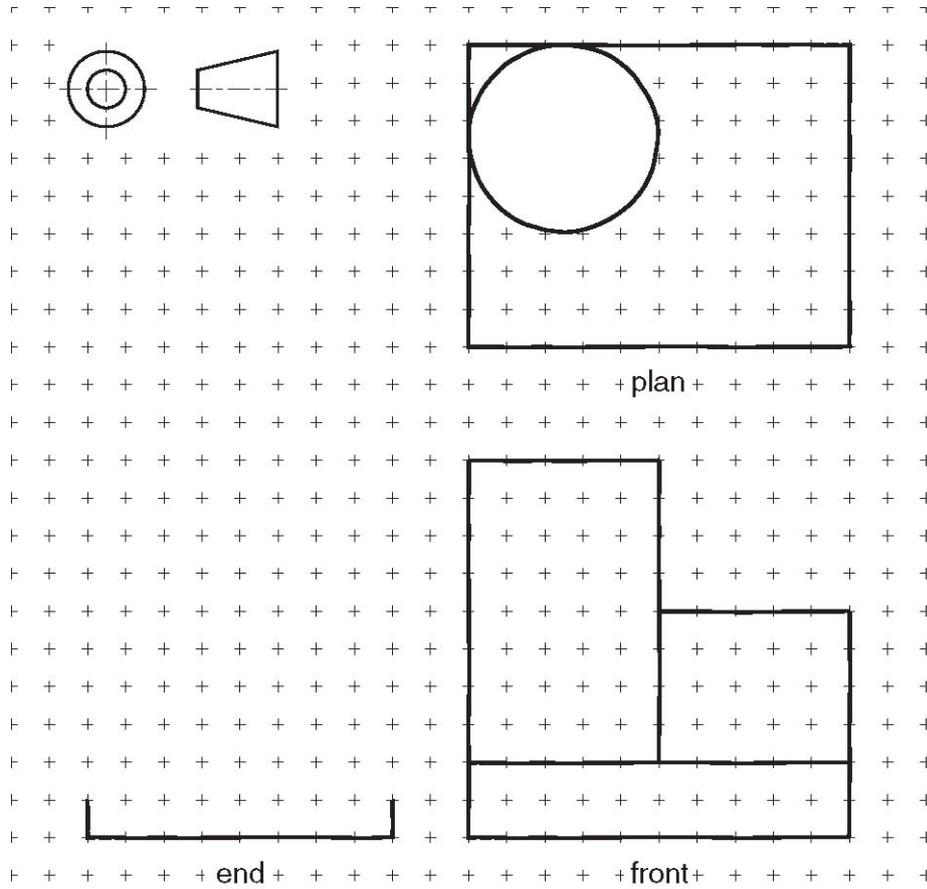


Fig.7

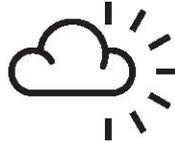
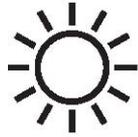
[5]

- (c) A mechanical display is to be used in a primary school to show the weather for the day. It will be made from one A3 size sheet of card.

In the space below use sketches and notes to show **one** idea for the display.

Specification points for the display are that:

- the correct day of the week can be displayed
- the appropriate weather symbol can be displayed.



weather symbols

[6]

END OF QUESTION PAPER

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Sample Assessment Material

DESIGN AND TECHNOLOGY: GRAPHICS

A535 Sustainability and technical aspects of designing and making

MARK SCHEME

Duration: 1 hour 30 minutes

MAXIMUM MARK 80

DRAFT

This document consists of 15 pages

MARKING INSTRUCTIONS

PREPARATION FOR MARKING
SCORIS

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *scoris assessor Online Training*; *OCR Essential Guide to Marking*.
2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are posted on the RM Cambridge Assessment Support Portal <http://www.rm.com/support/ca>
3. Log-in to scoris and mark the **required number** of practice responses (“scripts”) and the **number of required** standardisation responses

YOU MUST MARK 10 PRACTICE AND 10 STANDARDISATION RESPONSES BEFORE YOU CAN BE APPROVED TO MARK LIVE SCRIPTS.

TRADITIONAL

Before the Standardisation meeting you must mark at least 10 scripts from several centres. For this preliminary marking you should use **pencil** and follow the **mark scheme**. Bring these **marked scripts** to the meeting.

MARKING

1. Mark strictly to the mark scheme.
2. Marks awarded must relate directly to the marking criteria.
3. The schedule of dates is very important. It is essential that you meet the scoris 50% and 100% (traditional 40% Batch 1 and 100% Batch 2) deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.
4. If you are in any doubt about applying the mark scheme, consult your Team Leader by telephone or the scoris messaging system, or by email.
5. Work crossed out:
 - a. where a candidate crosses out an answer and provides an alternative response, the crossed out response is not marked and gains no marks
 - b. if a candidate crosses out an answer to a whole question and makes no second attempt, and if the inclusion of the answer does not cause a rubric infringement, the assessor should attempt to mark the crossed out answer and award marks appropriately.

6. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there then add a tick to confirm that the work has been seen.
7. There is a NR (No Response) option. Award NR (No Response)
- if there is nothing written at all in the answer space
 - OR if there is a comment which does not in anyway relate to the question (e.g. 'can't do', 'don't know')
 - OR if there is a mark (e.g. a dash, a question mark) which isn't an attempt at the question
- Note: Award 0 marks - for an attempt that earns no credit (including copying out the question)
8. The scoris **comments box** is used by your team leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.**
If you have any questions or comments for your team leader, use the phone, the scoris messaging system, or e-mail.
9. Assistant Examiners will send a brief report on the performance of candidates to their Team Leader (Supervisor) via email by the end of the marking period. The report should contain notes on particular strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.
10. For answers marked by levels of response:
- a. **To determine the level** – start at the highest level and work down until you reach the level that matches the answer
 - b. **To determine the mark within the level**, consider the following:

Descriptor	Award mark
On the borderline of this level and the one below	At bottom of level
Just enough achievement on balance for this level	Above bottom and either below middle or at middle of level (depending on number of marks available)
Meets the criteria but with some slight inconsistency	Above middle and either below top of level or at middle of level (depending on number of marks available)
Consistently meets the criteria for this level	At top of level

Section A

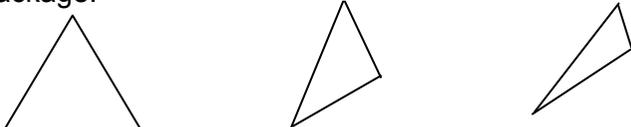
Question		Answer	Marks	Guidance
1		(b) Refused	1	These are the only acceptable answers. No mark awarded if more than one answer ringed or if a candidate's response is not clear. Accept any other method of indicating a response e.g. tick
2		(d) That different values and beliefs are considered	1	
3		(a) Carbon off-setting	1	
4		(c) Energy from the sun	1	
5		(a) So it becomes outdated and must be replaced	1	
6		Secondary Recycling is where products are recycled into different products (not the same type of product)	1	Accept variations on this answer as long as the answer relates to the product becoming a different product/thing
7		Solar power/wind power/wave power/geothermal/tidal power	1	There may be other acceptable answers
8		Life Cycle Analysis	1	This is the only acceptable answer and all three words are required for the mark.
9		Plastic products that can be recycled including plastic bottles, plastic bags etc	1	Accept 'plastics that can be recycled' or a specific named recyclable plastic product such as 'plastic washing up bottle', 'plastic shampoo bottle' and variations on this answer
10		Better working conditions/better pay/improved living standards	1	There may be other acceptable answers t.b.c
11		True	1	This is the only acceptable answer
12		False	1	This is the only acceptable answer
13		True	1	This is the only acceptable answer
14		True	1	This is the only acceptable answer
15		False	1	This is the only acceptable answer
Total			15	

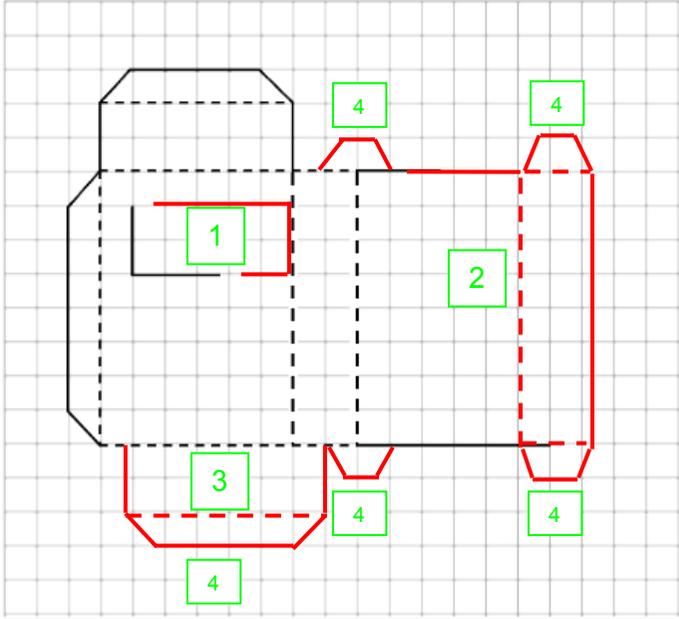
Question		Answer	Marks	Guidance
16	(a)	One benefit from: Cartons can be stacked side by side at supermarket/store Easier to stack/store Lots of cartons can be transported around the store in larger square boxes Stable shape, won't fall over	1	Do not accept: Fit's into fridge, easier to pick up, cheaper, easier to hold, easier to pour, safer on the table, less likely to spill.
	(b)	Any one point: Lighter to hold Less likely to smash/break, safer if it breaks/smashes on the floor Takes up less space than a glass bottle in recycling bin when squashed	1	Do not accept: Cheaper, easier to pour, easier to store unless relating to the carton being squashed for recycling.
	(c)	Max two marks for an accurate explanation: 'Carbon footprint' - the amount of carbon dioxide/greenhouse gases (1) produced/released into the atmosphere in the life cycle of a product (1) Answer doesn't have to relate to cartons	2	Accept variations on this answer No marks for just Carbon dioxide
	(d)	Any two reasons, one mark each: Aluminium foil would enable the product to have a longer shelf life Foil means the product doesn't have to refrigerated Preservatives are not needed, barrier to contaminants, leak proof, keeps contents cold Stops odours and/or light from reaching the product	2	Do not accept answers relating to strength
	(e)	 Mobius loop symbol – the product can be recycled	1	This is the only acceptable answer
	(f)	Two marks for an accurate explanation: After a product is finished with (1) it can be used for another purpose(s) (1)	2	This is the only acceptable answer

Question		Answer	Marks	Guidance
	(g) (i)	Any two specification points, one mark each: Be easy to understand/read Be linked with washing & squashing of the carton Simple/clear design Use 1 or 2 colours Not discriminate against race/colour/background Understood in any language	2	Accept variations on this answer
	(ii)	Sketch which shows washing or squashing the carton (1) Sketch which shows washing and squashing the carton (1) Notes relating to washing and/or squashing the carton (1)	3	

Question		Answer	Marks	Guidance
	(h)	<p>Discussion should include;</p> <ul style="list-style-type: none"> • The products have to be separated before they can be recycled this is usually done by trained staff • Cost are increased as they have to employ staff to separate the materials, they have to be trained, it takes time for staff to sort • Machinery can be used but it is expensive to purchase • Not everything can be recycled, recycling centre have to dispose carefully of the waste 	6	<p>Level 3 (5-6 marks) Thorough discussion, showing clear understanding of the issues facing recycling centres when separating/sorting products. Can provide clear examples of issues with examples. Specialist terms will be used appropriately and correctly. The information will be presented in a structured format. The candidate will demonstrate the accurate use of spelling, punctuation and grammar.</p> <p>Level 2 (3-4 marks) Adequate discussion, showing an understanding of the issues facing recycling centres when separating/sorting products. Can provide a reasonable discussion of the issues with some examples. There will be some use of specialist terms, although these may not always be used appropriately. The information presented will be for the most part in a structured format. There may be occasional errors in spelling, grammar and punctuation.</p> <p>Level 1 (1-2 marks) Basic discussion, showing some understanding of the issues facing recycling centres when separating/sorting products. Can provide a limited discussion of some of the issues. There will be little or no use of specialist terms. Answers may be ambiguous or disorganised or 'list like'. Errors of grammar, punctuation and spelling may be intrusive.</p> <p>0 marks = no response or no response worthy of credit.</p>
		Total	20	

Section B

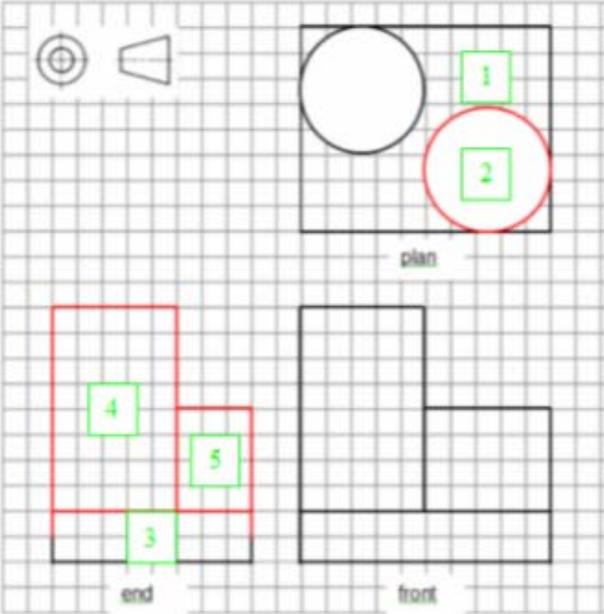
Question		Answer	Marks	Guidance
17	(a)	Award one mark for naming a suitable material: Card, cardboard, board, boxboard, paper or any named thin plastic sheet such as polypropylene.	1	Do not accept: Plastic, corriflute or foam board.
	(b)	Award one mark for a reason linked to viewing the contents: So the colours of the crayons can be seen or the contents can be seen.	1	Do not accept: More environmentally friendly because it uses less materials, more interesting, more attractive or more eye-catching.
	(c)	Die cutting	1	This is the only correct answer.
	(d)	Max three marks for an accurate description: A roll of foil (1) is pressed onto the box by a heated plate (1). The foil only sticks to the box where pressure has been applied (1). Tick (✓) to identify the award of each mark.	3	The three aspects to this answer are: 1. Foil in a roll, film or thin sheet (1) 2. Hot plate presses foil against the box (1) 3. Foil only sticks where pressure has been applied (1) Award one mark for each aspect (in any order). Hot foil printing Hot foil printing process requires a 'hot foil' machine that is capable of heating up a plate and applying pressure. The plate is usually made of magnesium or copper. The foil comes on a roll which when sandwiched between the item being printed and the plate releases the foil from the roll in the areas that the plate touches.
	(e)	Ignore the position or orientation of the triangle on the package.  (1) (0) (1) (1) (0) (1)	2	The two aspects to this answer are: 1. Equilateral triangle (three equal sides and angles)(1) 2. Triangle 'adjusted' to the isometric view (1) Award one mark for each aspect. Accept answers in any orientation → 

Question	Answer	Marks	Guidance
(f)	<p>1. Cut out window completed correctly (1) 2. Back and side completed correctly (1) 3. Bottom completed correctly (in appropriate position) (1) 4. At least three flaps/tabs added in correct positions (1) 5. Dotted or dashed lines used for fold lines (1)</p> <p>Award one mark for each aspect.</p> 	5	<p>Award marks for freehand or accurate drawings that are within plus/minus 1mm of the grid lines.</p> <p>Almost correct answers Window, bottom, back and side added but incorrect sizes – award marks 1 and 2 (not mark 3). Bottom, back and side added but incorrect sizes – award mark 2 (not mark 3).</p>
(g)	<p>Max two marks for an accurate explanation: Colours change (1) in response to changes in light levels (1) As the light changes (1) the colour changes (1)</p> <p>Award one mark for each aspect.</p>	2	<p>The two aspects to this answer are:</p> <ol style="list-style-type: none"> 1. What happens 2. Why it happens
	Total	15	

Question		Answer	Marks	Guidance
18	(a)	Award one mark for each appropriate decision (1 x 2): Font type or font size or font style or alignment	2	The decisions must relate to: 1. Font type (arial, times new roman...) 2. Size (point size...) 3. Style (italic, underlined...) 4. Alignment (left, right...) The mark is for the decision, not the answer. In the given example 'blue' as a colour for the font would not score the mark.
	(b)	Award one mark for each appropriate contact detail (1 x 2): Email address or website address or fax number or Skype.	2	There may be others that need to be considered when the marking scheme is finalised.
	(c)	Max two marks for an accurate explanation: Copyright protects images (1) and it is illegal to use a protected image (1) Legal action can follow (1) if you use a copyright protected image without permission (1)	2	The two aspects to this answer are: 1. Understanding of the term copyright 2. Consequences of not gaining permission Award one mark for each aspect.
	(d) (i)	Ultra Violet Both words are required for the mark.	1	This is the only acceptable answer.
	(ii)	Award one mark for naming each appropriate reason, max two: Improves appearance or locks in colours or non smudge surface for colours or makes it shiny or makes it waterproof or more environmentally friendly.	2	The two reasons must be clearly different and not the same reason given twice.

Question	Answer	Marks	Guidance
(e*)	<p>Look for an understanding of the Life Cycle of the business card:</p> <p>Life Cycle - designed, printed, given away, used, recycled or disposed of</p> <p>Valid points to support this understanding include:</p> <ul style="list-style-type: none"> • Business card has a limited life because details change • Material selection reflects the limited Life Cycle • Card the most appropriate material - easily recycled or relatively cheap. • Recycled card could be used but must look 'classy' • Thin plastic sheet could be used (and will last longer) but more difficult to recycle • Laminating and glossy finishes make recycling more difficult • More environmentally friendly if printed with vegetable inks • Recycling symbol could be included on the business card • Production run of 100-500 appropriate as the card can easily be reprinted • Unlikely to be recycled, because small and disposable • Must create a good impression - made of quality materials with a quality finish • The cost will have to be balanced against future increased business • Use of recycled materials may create a good impression 	6	<p>Level 3 (5-6 marks) Thorough explanation, showing clear understanding of the Life Cycle of a Business Card. Can provide clear examples of appropriate material selection and manufacturing methods. Specialist terms will be used appropriately and correctly. The information will be presented in a structured format. The candidate will demonstrate the accurate use of spelling, punctuation and grammar</p> <p>Level 2 (3-4 marks) Adequate explanation, showing an understanding of the Life Cycle of a Business Card. Can provide a description of some of examples of appropriate material selection and manufacturing methods. There will be some use of specialist terms, although these may not always be used appropriately. The information will be presented for the most part in a structured format. There may be occasional errors in spelling, grammar and punctuation</p> <p>Level 1 (1-2 marks) Basic explanation, showing some understanding of the Life Cycle of a Business Card. There will be little or no use of specialist terms. Answers may be ambiguous or disorganised or 'list like'. Errors of grammar, punctuation and spelling may be intrusive</p> <p>0 marks = no response or no response worthy of credit.</p>
	Total	15	

Question			Answer	Marks	Guidance
19	(a)	(i)	Award one mark for any of the following: Easy to cut or shape, easy to join, easy to paint or lightweight.	1	Do not accept: Light, cheap or can be recycled.
		(ii)	Award one mark for any of the following: PVA, contact adhesive or an alternative trade name such as Copydex.	1	Do not accept: Solvent based adhesives that will melt the Styrofoam or double sided tape.
		(iii)	Max two marks for an accurate description: Check the sizes (1) by measuring (1) Check surface finish (1) by touching (1) Alignment of pieces (1) by visually inspecting (1) Check if glue has oozed out (1) by visually inspecting (1) Check if glue has dried (1) by attempting to move (1)	2	The two aspects to this answer are: 1. What is being checked (1) 2. How it is checked (1) Do not accept: Anything that refers to checking that the material is soft or not sharp.

Question	Answer	Marks	Guidance
<p>19 (b)</p>	<p>The five aspects to this answer are:</p> <ol style="list-style-type: none"> 1. Circle added to plan (1) 2. Circle of the correct size and position (1) 3. Base correctly completed on the end view (1) 4. Cylinder (left) correctly added to end view (1) 5. Cylinder (right) correctly added to end view (1) <p>Award one mark for each aspect.</p>	<p>5</p>	<p>Award marks for freehand or accurate drawings that are within plus/minus 1mm of the grid lines.</p> <p>Hidden detail was not asked for (ignore if it has been shown).</p> <p>For marks 3, 4 and 5 'correctly completed' means height, width and position as indicated in red on the drawing on the right.</p> <p>Do not double penalise. For example, an incorrect size circle could score mark 5 if correctly projected to the end view. In this case the score could be 1, 0, 0, 0, 1.</p> 

Question		Answer	Marks	Guidance
19	(c)	<p>Sketches and notes show a design for a weather display that:</p> <p>The days of the week can be changed (1) by a clear method (1) that is appropriate for the material (1) .</p> <p>Days – at least five must be shown Method – must be a mechanical system Material – substantially from an A3 size sheet of card</p> <p>Weather symbols can be displayed (1) by a clear method (1) that is appropriate for the users (1) .</p> <p>Symbols – at least three must be shown Method – must be a mechanical system Users – appropriate for use in a primary school</p> <p>Tick (✓) to identify the award of each mark as indicated on the left.</p>	6	
		Total	15	
		Paper Total	80	

Assessment Objective Grid					
GCSE Design & Technology: Graphics					
		Recall, select and communicate	Apply knowledge, understanding and skills	Analyse and evaluate	Total
1		1			1
2		1			1
3		1			1
4		1			1
5		1			1
6		1			1
7		1			1
8		1			1
9			1		1
10		1			1
11		1			1
12		1			1
13		1			1
14		1			1
15		1			1
16 a			1		1
16 b			1		1
16 c		2			2
16 d			2		2
16 e			1		1
16 f			2		2
16 g (i)			2		2
16 g (ii)			3		3
16 h*				6	6
17 a		1			1
17 b			1		1
17 c		1			1
17 d		3			3
17 e		2			2
17 f		5			5
17 g		2			2
18 a		2			2
18 b		2			2
18 c		2			2
18 d(i)		1			1
18 d(ii)				2	2
18 e*				6	6
19 a(i)		1			1
19 a(ii)		1			1
19 a(iii)		2			2
19 b		5			5
19 c		6			6
Total		52	14	14	80