



**GCSE**

## **Design and Technology Graphics**

Unit **A535**: Sustainability and technical aspects of designing and making

General Certificate of Secondary Education

**Mark Scheme for June 2017**

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All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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**Annotations**

A  tick is to be used to show where a mark has been awarded.

Marks awarded must be equal to the number of ticks show. (This does not apply to banded questions).

**Do not use **

**Do not use **

Banded mark scheme questions to show **L1, L2 or, L3 only** – do not use ticks.

Where a **list or bullet points** have been used to answer the Banded Mark Scheme question a **maximum mark of 2** is to be given.

 <b>L1</b>	L1	Level 1	Use in banded mark scheme responses only
 <b>L2</b>	L2	Level 2	Use in banded mark scheme responses only
 <b>L3</b>	L3	Level 3	Use in banded mark scheme responses only
 <b>SEEN</b>	SEEN	Noted but no credit given	Only to be used to acknowledge additional answer sheets or when an answer has been seen, but warrants no marks
	Tick	Tick	Ticks must be used to show where a mark has been awarded. Marks awarded must be equal to the number of ticks show. (This does not apply to banded questions).
<b>BP</b>	Blank Page	Blank Page	Blank pages seen

## MARK SCHEME FORMAT 1

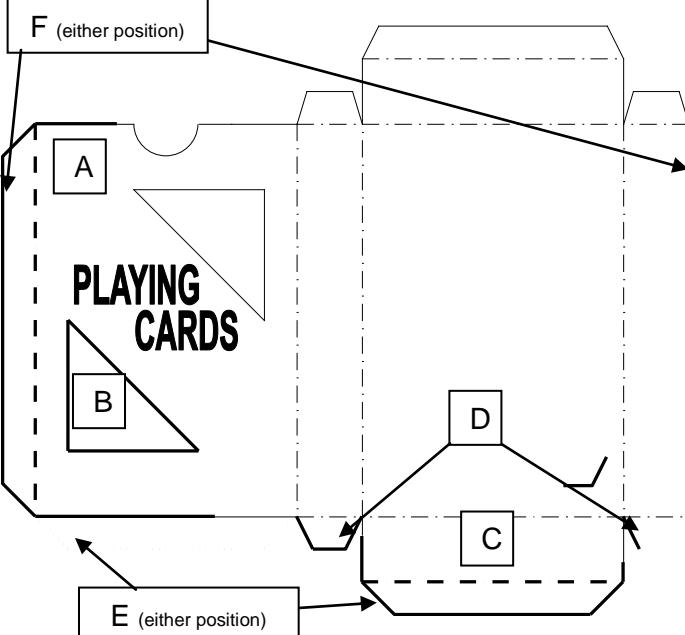
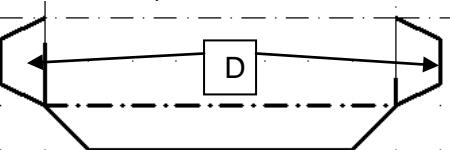
Question		Answer / Indicative Content	Mark	Guidance
1		(b) Waste	1	These are the only acceptable answers. No mark awarded if more than one answer ringed or if a candidate's response is not clear. Accept any other method of indicating response eg. tick
2		(d) Anthropometric	1	
3		(c) Greenhouse gas	1	
4		(d) Changing plastic bottles into fleece fibres	1	
5		(a) Organic materials	1	
6		Offshore wind farm, wind turbine, windmill, turbine	1	DO NOT ACCEPT: Wind Power, Wind
7		PET (Polyethylene Terephthalate), HDPE (High-Density Polyethylene), LDPE (Low-Density Polyethylene), PP (Polypropylene), PS (Polystyrene), HIPS, Polythene	1	DO NOT ACCEPT: PVC, Acrylic, Polymorph
8		Ethical Trading Initiative/ Ethical Trade Initiative	1	These are the only acceptable answers
9		<u>Planned</u> Obsolescence or <u>Built in</u> Obsolescence	1	These are the only acceptable answers Do not accept Obsolescence on its own
10		Disposal, Disposed of, Dispose	1	Do not accept: Landfill, burned, thrown away <u>unless</u> accompanied with <b>disposal</b>
11		True	1	These are the only acceptable answers. Only one answer should be ticked. If candidate ticks/marks both answers award zero.
12		False	1	
13		True	1	
14		True	1	
15		True	1	

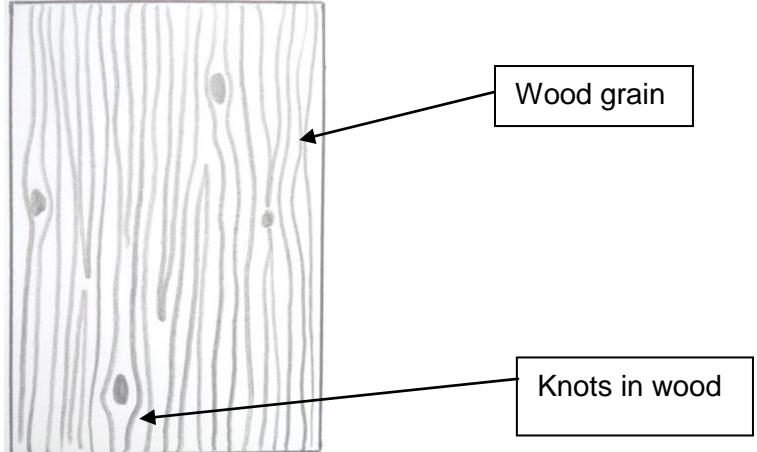
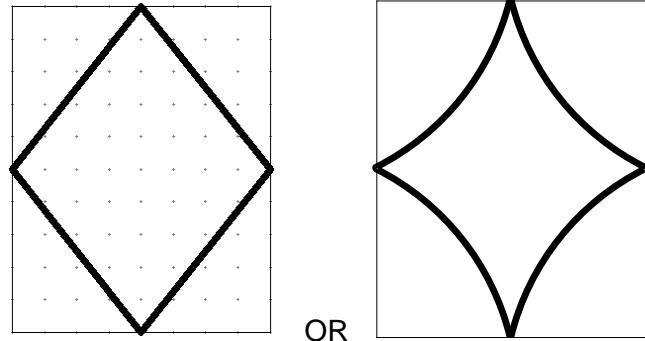
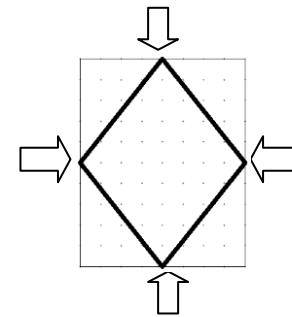
Question			Answer / Indicative Content	Mark	Guidance
16	a	i	<p>Explanation: Function means it is capable of serving the purpose for which it was designed / does the job it was designed for.</p> <p>Example: The POSD is functional because it advertises the product to consumers. It is functional because it displays/holds the product so consumers can take. The POSD is freestanding and can be moved around the store as needed.</p>	2	<p>There are 2 aspects to this answer</p> <ul style="list-style-type: none"> <li>• Understanding the term functional</li> <li>• Explaining how the POSD fulfils it's purpose</li> </ul> <p>An explanation of functional (1 mark) Be careful not to credit the word 'function' (given in the question)</p> <p>An example of a suitable function (1 mark) Note: the example does not need to be related to the POSD</p>
16	a	ii	<p>Explanation: Aesthetic means that the product is attractive to consumers/looks good or appeals to people.</p> <p>Explanation: The POSD needs to be attractive to consumers to encourage them to purchase the product The more attractive the product is the more likely people are going to notice it and buy it. Bright colours and images could be used to make the product look more appealing to the consumer.</p>	2	<p>There are 2 aspects to this answer</p> <ul style="list-style-type: none"> <li>• Understanding the term aesthetic</li> <li>• Explaining how the POSD is aesthetic</li> </ul> <p>An explanation of aesthetic (1 mark) Be careful not to credit the word 'aesthetic' (given in the question)</p> <p>An example of an aesthetic quality (1 mark) Note: the example does not need to be related to the POSD</p>
16	b		<p>Any 2 reasons from. Lightweight, High strength to weight ratio, can be cut to shape, can be recycled, can be printed onto, can be folded into shape, durable, rigid, can be flat-packed, comes from a sustainable source.</p>	2	<p>Do not accept; Strong, Sturdy, Environmentally friendly, Cheap, answers relating to cost on their own <u>unless qualified</u>.</p>

Question		Answer / Indicative Content	Mark	Guidance
16	c	<p>4 benefits of flat-pack products for manufacturers and retailers:</p> <p><b>Transport</b> - less fuel/less journeys/lower pollution from fumes</p> <p><b>Distribution</b> - smaller package for sending/posting/more transported in same vehicle space</p> <p><b>Packaging</b> - less packaging than for a fully assembled version so less waste.</p> <p><b>Easier disposal</b> - can be flat packed and compacted at end of use</p> <p><b>Assembly</b> - less energy used during manufacture for assembly</p> <p><b>Damage</b> - less likely to be damaged in transit (as compared with a fully assembled POSD)</p> <p><b>Cost</b> – More packages can be transported as once which is more cost effective.</p> <p><b>Time</b> – Manufacturer doesn't need to assemble the POSD so can ship the product in a faster time.</p> <p><b>Storage</b> – retailer or manufacturer can store the flat-packed product until needed.</p> <p><b>Labour</b> – Staff not needed to assemble the POSD</p>	4	<p><b>Be careful not to credit repeat answers</b></p> <p>Answers must relate to manufacturers and/or retailers. <u>No marks for answers relating to customers.</u></p> <p>Do not accept one word answers eg: cheaper/quicker/faster/easier</p>

Question		Answer / Indicative Content	Mark	Guidance
16	d	<p>Design includes a named Smart/Modern material – must be clearly identified (1)</p> <p>Eg.</p> <p>Fluorescent (responds to UV light)</p> <p>Thermochromic ink (responds to changes in temperature)</p> <p>Photochromic Ink (responds to changes in light levels)</p> <p>Hologram (variation due to viewing angle)</p> <p>Chameleon ink (changes colour according to viewing angle)</p> <p>Smart wire (responds to temperature changes/shape changing)</p> <p>Phosphorescent pigment (glows-in-the-dark)</p> <p>Polymorph (mouldable modelling material)</p> <p>Paperfoam (Bio based flexible modelling material)</p> <p>Potatopak (starch based biodegradable material)</p> <p>Explanation of how the smart material enhances the design/how it works (1)</p> <p>Design appeals to target market – images <b>and</b> text (1)</p> <p>Clearly displays how the toothbrush boxes/brushes are held onto the display (hooks, shelf, holes, rails, slots etc) (1)</p>	4	Method of displaying/holding the product(s) shown using labels or described clearly

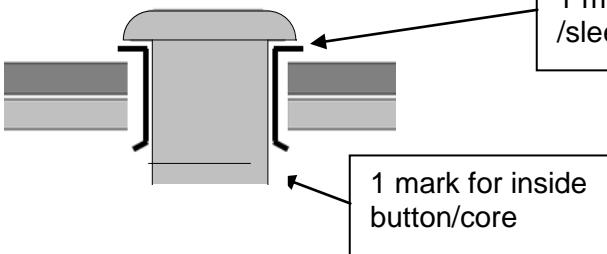
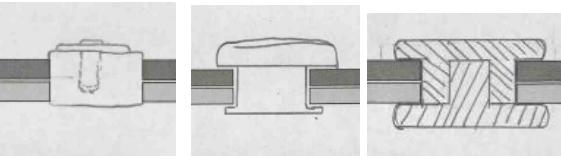
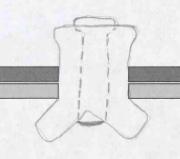
Question		Answer / Indicative Content	Mark	Guidance
16	e *	<p>Read through candidates answer decide on the level of response, then decide whether it just meets that level or clearly meets that level.</p> <p><b>Maximum of 2 marks for a list of separate points</b></p> <p>Points to consider;</p> <ul style="list-style-type: none"> <li>Manufacturers may have to decide between aesthetic finish and impact on the environment.</li> <li>Some surface finishes such as gloss varnish contain solvents that can harm the environment in both the production and disposal.</li> <li>High VOC surface finishes can be harmful to workers during the application of the finish. Workers need to be protected such as wearing gloves, masks and working in a well ventilated area.</li> <li>Laminating makes the product unlikely to be able to be recycled without removing the lamination, manufacturers have a duty to reduce the amount of landfill.</li> <li>Most recycling centres will not accept foiled card and embellishments, the manufacturer will need to decide between making a product more attractive aesthetically or environmentally friendly.</li> <li>Carbon footprint – transporting of finishes (varnishes, oils) from place of manufacture to graphic product.</li> <li>Air pollution - production of finishes, gases may be released, impact on global warming and ozone layer</li> </ul>	<p><b>Level 3 (5 - 6 marks)</b></p> <p><b>Level 2 (3-4 marks)</b></p> <p><b>Level 1 (1 - 2 marks)</b></p> <p>0</p>	<p><b>Thorough discussion</b>, showing clear understanding of the issues <b>manufacturers</b> face. Can provide clear examples of issues <b>with appropriate reference to a range of surface finishes</b>. <b>Specialist terms</b> will be used <b>appropriately and correctly</b>. The information will be presented in a <b>structured</b> format. The candidate will demonstrate the <b>accurate</b> use of spelling, punctuation and grammar.</p> <p><b>Adequate discussion</b>, showing an understanding of the issues. Can provide a <b>reasonable discussion</b> of the issues <b>with some surface finishes</b>. There will be <b>some</b> use of <b>specialist terms</b>, although these may not always be used appropriately. The information presented will be for the most part in a <b>structured</b> format. There may be <b>occasional</b> errors in spelling, grammar and punctuation.</p> <p><b>Basic discussion</b>, showing some understanding of the issues. Can provide a limited discussion of some of the issues surrounding surface finishes. There will be <b>little or no</b> use of <b>specialist terms</b>. Answers may be <b>ambiguous</b> or <b>disorganised</b> or 'list like'. <b>Errors</b> of grammar, punctuation and spelling may be intrusive.</p> <p><b>Response worthy of no credit</b></p>

17 a		<p>1 Front face (A) completed correctly</p> <p>1 Triangular cut out (B) in front face completed correctly <b>and in correct position</b></p> <p>1 Base of pack (C) completed correctly. See note below</p> <p>1 2 flaps (D) added as shown opposite or on sides of C as shown below</p>  <p>1 Large flap (E) completed correctly in either position shown.</p> <p>1 End flap (F) added to either end of net</p> <p><b>If base (C) is drawn below side A, DO NOT award mark for C, but marks for D &amp; E can be awarded if added correctly to it.</b></p> <p><b>If extra flaps are added that clash with D, E or F do not award these marks.</b></p> <p><b>Flaps must have angled sides.</b></p>
17 b	A5	1 This is the only correct answer
17 c	<p><u>Drawing out the net onto card:</u> Pencil, Ruler, Set square</p> <p><u>Cutting out the net:</u> Scalpel, Stanley knife, craft knife, safety rule, cutting/safety/self-healing mat</p>	<p>1 Do not accept: pen, marker.</p> <p>1 Do not accept: Scissors, 'ruler' on its own</p>

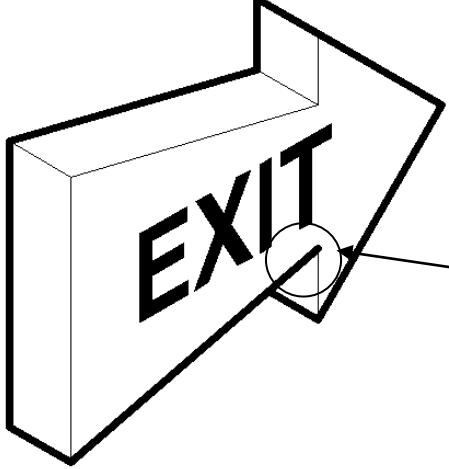
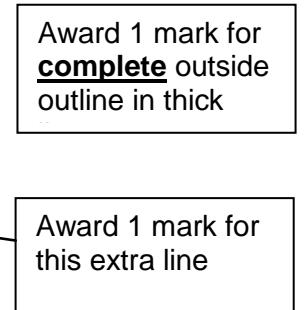
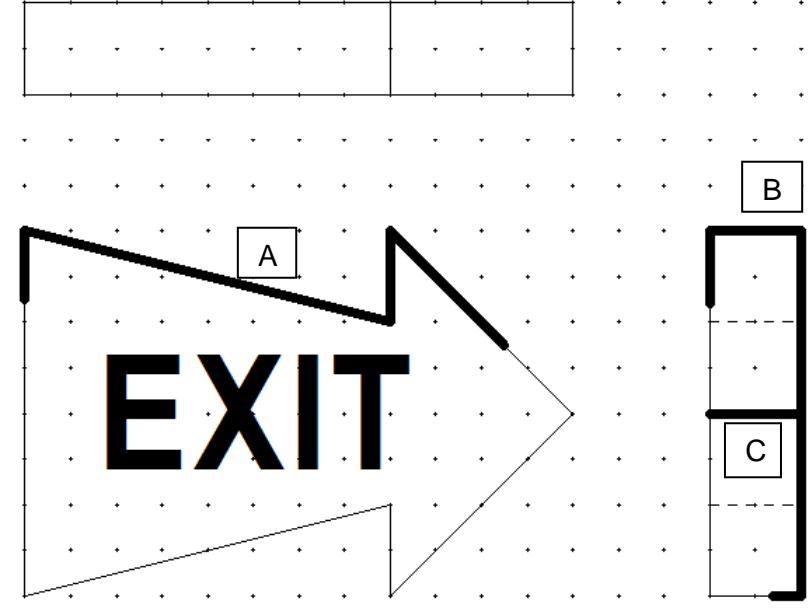
		<p><u>Scoring the fold lines:</u> Paper creaser, creasing tool, blunt blade, scissor blade, back of scissors/craft knife/scalpel, ruler/straight edge, run-out pen, rotary scoring blade/tool</p> <p><u>Assembling the net:</u> PVA glue, PVA, glue spreader, Double sided tape</p>	1	<p>Do not accept: repeat answers from first two stages</p> <p>Accept suitable scoring device except 'Scorer' 'Scissors' must be justified</p> <p>.</p> <p>Do not accept: glue gun, glue stick, hot glue, pritt stick, superglue or other trade/brand names</p>
17	d	Acetate	1	This is the only correct answer
17	e		1	<p>Award mark for lines drawn that look like something like wood grain.</p> <p>Do not accept lines drawn with ruler i.e. perfectly straight</p> <p>Candidates may also draw knots in the wood as shown but do not have to.</p>
17	f	 <p>OR</p>	1	<p>The 4 corners of the diamond must touch the centre points on the sides of the square.</p> <p>Sides can be concave</p> 

17	g					FSC® Logotype. Item removed due to third party copyright restrictions			1	This is the only correct answer	
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Question			Answer / Indicative Content			Mark	Guidance		
18	a	i	Vinyl, PVC,			1	These are the only correct answers		
18	a	ii	Waterproof, durable, stronger than paper/card, easy to cut/bend, difficult to rip, flexible, smooth, comfortable, lightweight, can be printed onto, comes in a range of colours			1	Do not accept answers such as 'strong', 'cheap' or related to recycling		
18	b		Dimension A: 230 Dimension B: 180 Dimension C: 130			1	Accept any value between 230 and 250		
18	c	i	Dimension B: 180 Dimension C: 130			1	This is the only correct answer		
18	c	i	Accept any value between 110 and 130			1	So that there is as little waste as possible, to save materials, to get as many as possible out of one sheet, to maximise space, Cost effectiveness		
18	c	ii	Do not accept 'tessellation' or 'lay planning'.			1	Tessellation		
18	c	ii	This is the only correct answer			1			

Question		Answer / Indicative Content	Mark	Guidance
18	d	 <p>1 mark for collar /sleeve</p> <p>1 mark for inside button/core</p>	1 1	<p>Award first mark for the outer sleeve of the clic rivet. A 'lip' must be shown at the top <u>and</u> bottom</p> <p>Award second mark for the centre / core of the clic rivet.</p> <p>Must be a SECTIONAL VIEW</p> <p>See examples below</p>  <p>1 mark for core</p>  <p>2 marks</p>

Question		Answer / Indicative Content	Mark	Guidance
18	e	<p>Award 1 Mark for showing the structure of the sign is made from a waterproof graphic material (eg. Corriflute, HIPS, Laminated card/paper, <u>1mm Acrylic</u>.)</p> <p>Award 1 mark for showing the sign will be free standing</p> <p>Award 1 mark for showing how the sign can collapse into flat pieces for storage, must be non-permanent fixing (hinges, slots, removable pieces or similar)</p> <p>Award 1 mark for showing <b>all three</b> relevant pieces of information (band, performance time, stage)</p> <p>Award 1 mark for showing a <u>clear</u> method of how the information will be updated.</p> <p>Award 1 mark for the quality of the drawing and communication</p>	1	A waterproof graphic material is shown or stated / a graphic material with a waterproof finish is shown or stated (thickness of Acrylic must be 1mm or less)
			1	The design shows how the sign will be self supported by means of some kind of structure made from the material (details of how it is slotted together, folded, joined)
			1	The way the sign is assembled/taken apart/folded up is clearly shown.
			1	The sign shows a space/slot for band, time <b>and</b> stage.
			1	The method of updating the sign is clearly shown
			1	A clear, easy to understand design solution

19 a	 	<p>2 If <b>one</b> extra line other than those shown are drawn thick award 1 mark only.</p> <p>If <b>two or more</b> extra lines other than those shown are drawn thick award NO MARKS</p>
19 b		<p>1 1 mark for top edges of arrow (A) completed correctly.</p> <p>1 1 mark for outline of end view (B) completed correctly.</p> <p>1 1 mark for point of arrow line (C) completed correctly on end view, must be drawn as a solid line not dotted/dashed.</p>

19	c		<table border="1"> <tr> <td>Position A</td><td>Position B</td><td>Position C</td></tr> <tr> <td></td><td></td><td>✓</td></tr> </table>	Position A	Position B	Position C			✓	1	This is the only correct answer
Position A	Position B	Position C									
		✓									
Do not accept 'saw' on its own, tenon saw or any other type of saw.											
19	d		Hot wire cutter, bandsaw, jigsaw, panel/hand/pad saw, Hegna/Scroll saw, Coping saw	1	Do not accept Laser cutter, craft knife, ruler, scalpel etc.  Accept hacksaw blade but not 'hacksaw' on its own						
19	e		<p>Award 1 mark for naming a specific Software program eg. 2D Design, Photoshop, Corel Draw, Illustrator, Serif Plus, Xara, Fireworks etc that could be used to create the letters.</p> <p>Award 1 mark for description of how the letters could then be produced using CAM – cut out using a laser cutter, vinyl cutter, Stikka, Camm 1, Roland Camm, Camm cutter, Cricut, Silhouette, Scan 'n' cut</p>	1							
				1	Award a mark for 'Printed then cut out by hand'						

Question	Answer / Indicative Content	Mark	Guidance
19 f*	<p>Read through candidates answer decide on the level of response, then decide whether it just meets that level or clearly meets that level.</p> <p><b>Maximum of 2 marks for a list of separate points</b></p> <p>Points to consider;</p> <ul style="list-style-type: none"> <li>• Stage 1: Extraction and processing of raw materials (wood pulp) into card. Reprocessing of card into recycled materials.</li> <li>• Stage 2: Manufacture of specific graphic product using card i.e. Cutting, scoring, printing.</li> <li>• Stage 3: Distribution of product to the retailer/manufacturer (flat packed)</li> <li>• Stage 4: Item is assembled by the manufacturer/retailer, fitted to the product and sold to the customer</li> <li>• Stage 5: Customer opens packaging and disposes of the packaging or puts in recycling bin (separating if required).</li> <li>• Stage 6: Packaging is collected by waste disposal and taken for recycling or if incorrectly disposed of taken to a landfill site.</li> <li>• Stage 7: Packaging is broken down and re-processed into recycled card.</li> </ul>	<p><b>Level 3 (5 - 6 marks)</b></p> <p><b>Level 2 (3-4 marks)</b></p> <p><b>Level 1 (1 - 2 marks)</b></p> <p><b>0</b></p>	<p><b>Thorough description</b>, showing clear understanding of all stages in an item of packaging's lifecycle. Can provide clear description using suitable specific <b>example(s)</b>. <b>Specialist terms</b> will be used <b>appropriately and correctly</b>. The information will be presented in a <b>structured format</b>. The candidate will demonstrate the <b>accurate use of spelling, punctuation and grammar</b>.</p> <p><b>Adequate description</b>, showing an understanding of the main stages in an item of packaging's lifecycle. Can provide a <b>reasonable description with some examples</b>. There will be <b>some use of specialist terms</b>, although these may not always be used appropriately. The information presented will be for the most part in a <b>structured format</b>. There may be <b>occasional errors</b> in spelling, grammar and punctuation.</p> <p><b>Basic description</b>, showing some understanding of the stages in an item of packaging's lifecycle. Can provide a limited description of some of the stages. There will be <b>little or no use of specialist terms</b>. Answers may be <b>ambiguous or disorganised or 'list like'</b>. <b>Errors</b> of grammar, punctuation and spelling may be intrusive.</p> <p><b>Response worthy of no credit</b></p>

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