

Design and Technology

General Certificate of Secondary Education

Unit **A532**: Graphics: Sustainable Design

Mark Scheme for June 2013

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

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

Annotation	Meaning
Green tick	Use for all correct answers and to show where marks are awarded, marks awarded must equal the number of ticks
L1, L2, L3	Use to show the level of response in 17c – Do not use ticks
BOD	Benefit of doubt, use only if absolutely necessary
Seen	Use for Level of response question (17c) where the candidate answer is noted but worthy of zero marks
REP	Repetition, use if necessary

Subject-specific Marking Instructions

Question		Answer	Marks	Guidance
1		(c) Use sustainable sources	1	These are the only acceptable answers. No mark awarded if more than one answer circled or if a candidate's response is not clear. Accept any other method of indicating a response eg ticked
2		(a) Using a product again without changing it	1	
3		(b) The manufacturer has contributed towards recycling	1	
4		(a) Take it apart	1	
5		(d) Glass should be disposed of in a bottle bank	1	
6		The product <u>can be</u> recycled, recyclable product	1	Do not accept: Made <u>from</u> recycled materials, recycled
7		To get rid of, throw away, put in the bin	1	Do not accept: Disposed
8		Thermochromic, Thermochromic ink/material/pigment	1	These are the only acceptable answers. Do not accept: Thermo.
9		Specific named plastic such as: High impact polystyrene (HIPS), polystyrene, PVC, LDPE, HDPE, Polyethylene, PETE, PET, acetate, Polyethylene Terephthalate, acrylic	1	Do not accept: Plastic, products made from plastic eg.bottles, bags, corriflute, perspex
10		Geothermal power is electricity/energy converted from the <u>earth's heat</u>	1	Do not accept: 'Power/energy generated from heat' unless linked to the earth
11		False	1	These are the only acceptable answers. No mark awarded if more than one answer ticked or if a candidate's response is not clear. Accept any other method of indicating a response eg ringed
12		False	1	
13		False	1	
14		True	1	
15		True	1	
		Total	15	

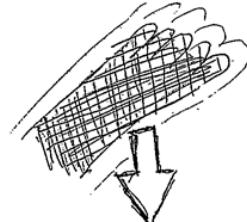
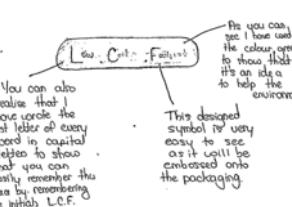
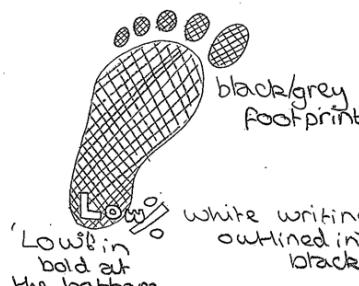
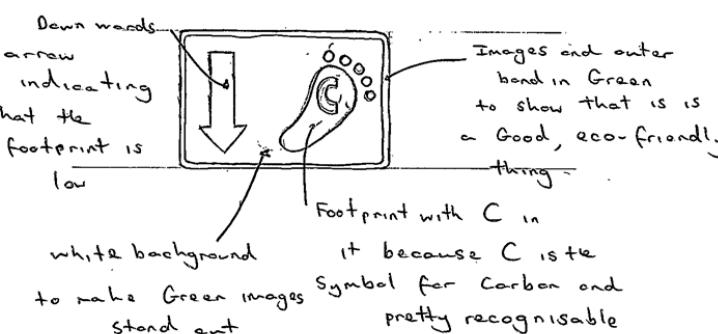
Question		Answer	Marks	Guidance
16	(a)	Outer box, cardboard box, box, bleached card, card	1	These are the only acceptable answers
		<p>The vacuum formed tray could be removed and replaced with a card insert</p> <p>Remove the plastic bubble cover and use a hessian/string tie to hold the bottle</p> <p>The plastic window is unnecessary remove the plastic window from the outer package and make the hole/cut out smaller</p> <p>Replace the plastic window with biodegradable plastic so it can be degraded after use</p> <p>Use recycled card instead of bleached card for the outer box so it does not use new materials/reduce the chance of bleach being <u>leaked</u> into the environment and harming plants and wildlife</p> <p>Use vegetable/soy/water based inks for printing the graphics</p> <p>Remove all packaging to reduce waste/just have the bottle on its own</p> <p>Single material for whole product so recycling is easier</p> <p>Make the box reusable so that is it doesn't get thrown away</p> <p>Add recycling symbols to packaging to encourage consumers to recycle</p> <p>Reduce size of packaging so less material is needed.</p>	6	<p>Three ways the manufacturer can make the package more environmentally friendly.</p> <p>Three points should be <u>identified</u> and <u>explained</u>. Unexplained points should only be credited with 1 mark.</p> <p>Do not accept repeat explanations.</p> <p>Do not accept one word answers.</p> <p>Do not accept answers relating to the glass perfume bottle</p> <p>Only 1 mark for;</p> <ol style="list-style-type: none"> 1. 'Use recycled materials' 2. 'Make products recyclable'
		Security seal, tamperproof seal, protection of the packaging, protection from theft, stop it from opening; prevent the <u>packaging</u> getting wet/damaged/colours fading.	1	Do not accept: Stop glass from smashing or protect the product (unless they say 'the box' or 'the packaging')

Question		Answer	Marks	Guidance
	(d)	Reduced carbon emissions/carbon footprint/less transportation fumes Local materials can be used Local people can be employed Lower costs as less transport that can equal cheaper products Attracts people to the area/helps local economy Origins of the product can be traced/assured	2	Answers must relate to community benefits. Accept: Saves money if qualified Do not accept: Easier to return
	(e)	Separate all the parts Flatten/crush the box Remove the plastic window Reuse the box	1	One way the consumer can make it easier to recycle Do not accept answers that relate to the manufacturer doing something
	(f)	Packaging is collected for recycling or taken to a recycling centre/bank/facility/processing plant/Landfill/Dump/Tip Packaging is sorted/organised/separated/split/disassembled/taken apart into different components by trained staff Water added to cardboard and mixed to a pulp, virgin pulp blended with the recycled pulp Bleach/chemicals/Chlorine added to the pulp mixture to clean and sterilise, pulp is pressed and dried flat Processed cardboard sheets are trimmed/cut to size Processed cardboard is used to make new products	4	Do not accept: Bin Do not accept: Soap, detergent
		Total	15	

Question		Answer	Marks	Guidance
17	(a) (i)	<p>Functional means that the product has a purpose/fulfils a purpose/does it job.</p> <p>The child's lunchbox is functional as it holds the lunch securely and safely, it stops it from becoming squashed and enables the child to carry the lunch around, the plastic material means that it is durable and can be washed.</p> <p>The lunchbox has a handle so that it can be carried.</p> <p>The lunchbox has a hinge so that it can be opened and closed, lightweight as it is plastic</p>	3	<p>There are 2 aspects to this answer Understanding the term functional Explaining how the child's lunchbox fulfils it's function</p> <p>An explanation of functional (1 mark) 2 x functions of the child's lunchbox or 1 well explained function.</p> <p>The child's lunchbox holds the lunch, stops the lunch from getting squashed, allows it to be transported, plastic materials means it's durable and can be washed (up to 2 marks)</p>
	(ii)	<p>Built in obsolescence means the product is designed to have a limited lifetime.</p> <p>The child's lunchbox has a limited lifetime as the hinge is likely to break quickly, students have a new lunchbox at the start of the new school year/term, the design/graphics on the lunchbox is subject to changes in fashion and trends/popularity</p>	3	<p>There are 2 aspects to this answer Understanding the term built in obsolescence Explaining how the child's lunchbox designed to only last a short period of time</p> <p>An explanation of built in obsolescence (1 mark) 2 x features of built in obsolescence to the child's lunchbox or 1 well explained feature: The design of the child's lunchbox is short lived because children usually have a new lunchbox at the start of the school year, the design/graphics on the lunchbox are dependent on popularity (up to 2 marks)</p>
	(b) (i)	<p>The number and letters identify what type of plastic (PET) the product is, it means what type of plastic it is that can be recycled, people can identify what type of recyclable plastic it is, to identify the material.</p> <p>Polyethylene Terephthalate</p>	1	<p>Answer must relate to the numbers &/or letters showing what type of recyclable plastic it is.</p> <p>Do not accept: 'It can be recycled' or 'recyclable' on its own. Any other named plastic than Polyethylene Terephthalate.</p>
	(ii)	<p>The embossed symbol is raised /like Braille so that a partially sighted person could feel the symbol</p>	2	<p>There are two aspects to this answer; Understanding that embossing means that something is raised/indented on the product That a partially sighted person would be able to feel the embossed part Do not accept: Stands out</p>

Question		Answer	Marks	Guidance
	(c)*	<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>Maximum of 2 marks for a list of separate points</p> <p>Points to consider;</p> <ul style="list-style-type: none"> • Before designing a product, designers need to think about each stage of the products life from manufacture to disposal • Designers need to understand how the materials used are sourced, do they come from renewable or sustainable sources such as paper sourced from renewable or managed forests or can it be made from recycled materials/products such as newspapers/magazines • If the product is made from recycled materials, does the processing of these materials have little impact on the environment – does recycled paper need to be bleached before it can be used, reduces overall impact on the environment • Can the product be made using renewable energy such as wind/solar/geothermal power • If the product needs printing can vegetable/soy or water based inks be used instead of solvent based inks • If the product is made from plastic can the plastic be recycled/reformed/reused. • How will the product be disposed of, can it be recycled or reused, can the parts be separated and used again in new products – is the product suitable for primary, secondary or tertiary recycling. The product should not be disposed into landfill. 	<p>Level 3 (5 - 6 marks)</p> <p>Level 2 (3-4 marks)</p> <p>Level 1 (1 - 2 marks)</p> <p>0</p>	<p>Thorough discussion, showing a clear understanding of Life Cycle Analysis in relation to the design, manufacture, production and disposal of 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>Adequate discussion, showing an understanding of the consideration of Life Cycle Analysis in the designing of 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>Basic discussion, showing some understanding of Life Cycle Analysis in relation to 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>Response worthy of no credit</p>
			Total	15

Question		Answer	Marks	Guidance
18	(a)	<p><u>A feature of using the computer:</u></p> <p>Lots of nets could be saved onto a computer creating a database/store of lots of nets.</p> <p>A more sustainable way of printing mass produced products.</p> <p>Nets can be e-mailed to customers or other manufacturers</p> <p>Nets can be tessellated</p> <p>Modifications can be done on screen/Greater accuracy/Easier editing reduces the chance of a failed product.</p> <p>You can model it on screen/Check the net fits together</p> <p><u>An environmental benefit:</u></p> <p>Reduces the need for storage space in the factory</p> <p>It lowers the carbon footprint of the product overall</p> <p>Reduces the need for postage/transportation</p> <p>Reduces the amount of waste produced</p> <p>Less paper/material is needed</p> <p>Maximise materials usage</p> <p>Reduces pollution from paper production</p>	6	<p><u>Look for two aspects in each answer:</u></p> <ol style="list-style-type: none"> 1. <u>A feature of using the computer</u> 2. <u>An environmental benefit</u> <p><u>Be careful not to credit repeat answers – such as wasted materials</u></p> <p>Two correct one word answers 1 mark only Eg Better/easier or cheaper/faster</p>
	(b)	Computers can be difficult to dispose of after their useful life has ended and can end up in landfill Computers can use a lot of energy when running/being used this can damage the environment/ozone layer	2	<p><u>This is an explain answer.</u></p> <p>Candidate response must state a qualifying point and then explain why to gain 2 marks</p>
	(c)	Reduce or Rethink	1	These are the only acceptable answers
	(d) (i)	<p>Manufacture and distribute locally</p> <p>Use renewable energy in manufacture</p> <p>Reduce packaging/materials</p> <p>Use renewable materials</p> <p>Reduce carbon/fuel emissions/CO₂ by reducing transportation/flat packing products</p> <p>Use energy efficient transport/bio-fuel</p> <p>Use recycled materials/make products recyclable</p> <p>Turning computers/machinery off when not in use</p> <p>Vegetable/Soy/Water based inks used</p>	2	<p>Do not accept answers relating to cost or carbon offsetting</p> <p>Only 1 mark for;</p> <ol style="list-style-type: none"> 1. 'Use recycled materials' 2. 'Make products recyclable'

Question		Answer	Marks	Guidance
	(ii)	<p>Sketch(s) or words which shows a clear link to a carbon footprint (must show Carbon & Footprint) (1)</p> <p>Sketch(s) or notes which shows a link to low or lowered (carbon footprint) (1)</p> <p>Good quality simplistic stylised image/symbol (do not award if just letters/words) (1)</p> <p>Symbols/images are combined/integrated. Must be contained in a shape (1)</p> <p>1 mark Arrow pointing down acceptable for 'Low' or 'Lowered' Sketch shows some kind of footprint but there is no clear link to carbon so no marks awarded Not a stylised image No integration</p> <p>2 marks Sketch shows a link to carbon footprint (CO₂ is written inside footprint) Good quality stylised image No marks for a link to low or integration</p> <p>3 marks Sketch shows Carbon Footprint (words) Sketch shows that it is low Sketch is integrated (inside outer shape) No mark for stylised symbol/image as there is no symbol included</p>	4	     <p>3 marks Sketch AND notes shows a link to carbon footprint (notes explaining black/grey footprint) Sketch shows that it is low Good quality stylised image No mark for integration</p> <p>4 marks Sketch & notes show clear link to Carbon Footprint Sketch & notes shows a lowered footprint (arrow pointing down) Good quality stylised image Symbols are integrated in an outer box</p>
		Total	15	
		Paper Total	60	

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