

Design and Technology

General Certificate of Secondary Education

Unit **A542**: Industrial Technology Sustainable Design

Mark Scheme for January 2012

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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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Section A

Question		Answer	Marks	Guidance
1		b	1	Only acceptable answer.
2		c	1	Only acceptable answer.
3		b	1	Only acceptable answer.
4		c	1	Only acceptable answer.
5		d	1	Only acceptable answer.
6		Coal, oil, natural gas, fossil fuels.	1	Acceptable answers.
7		Reforestation.	1	Only acceptable answer, not replanting
8		Chart of human body measurements / size.	1	Only acceptable answer.
9		Any recyclable plastic – PP, PETE, HDPE etc.	1	Any recyclable plastic material – abbreviation or full name.
10		Energy derived from heat within the earth.	1	Only acceptable answer.
11		Recyclable products help the environment. True	1	
12		Eco design is to do with designing products that minimise damage to the environment. True	1	
13		Fair trade means manufacturers make sure customers get a good deal on their products. False	1	
14		Polypropylene is a sustainable plastic. False	1	
15		Moral issues are always considered in the design of products. False	1	
Section A Total			15	

Section B

Question		Answer	Marks	Guidance
16	(a)	Symbol 1 Wear eye protection. Hazard – flying swarf from drilling, milling etc causing damage to eyes or blindness	1	1 mark for identifying symbol.
		Symbol 2 Wear ear protection. Hazard – noise from machinery or manufacturing process causing impaired hearing.	2	1 mark for identifying each symbol, hazard or risk. (Max 4)
		Symbol 3 Wear dust mask. Hazard – prevent inhalation of dust causing damage to respiratory system.	2	Do not accept inhalation of fumes or toxic / poisonous gas
	(b)	Symbols quick to interpret and remember. Language issues overcome. Some people illiterate. Easy to see.	2	1 mark for each correct point identified.(Maximum of 2 marks)
	(c)	(i) European eco-label.	1	1 mark for identifying correctly.
		(ii) Label guarantees that this product has a lower environmental impact than a similar product without the label. Sign of environmental quality.	2	2 marks for a full correct explanation
	(d)	(i) Kitemark	1	Only answer acceptable
		(ii) British Standards Institute.	1	Only answer acceptable.
		(iii) Kitemark indicates that the product is safe to use and of a good quality. Product is manufactured to a set standard. This enables the consumer to buy products, which they can have faith in & will cause them reduced anxiety.	3	A full explanation of these points
		Total	15	

Question		Answer	Marks	Guidance
17	(a)	1 - 2 Development of computers. Reduction in size of chips & components. Injection moulding advances etc.	1 1	1 mark for a point identified and justified. 2 marks max.
	(b)	(i)	1	1 mark for correct answer.
		(ii)	2	1 mark each for noting the critical points. 2 marks maximum.
	(c)	<p>Advantages - do not need a computer or printer. Have instant access to a hard copy. Will not break down. Can not be lost like USB. Secure storage.</p> <p>Disadvantages – Cabinet is heavy, not portable, physically large. Can't send the information quickly. Requires a person to file things correctly. Paper may be lost in a fire. Limited to storage space in cabinet. Only accessible in one place.</p>	4	1 mark for each advantage/disadvantage stated.

Question		Answer	Marks	Guidance	
				Content	Levels of response
	(d*)	<p>Discussion revolving around the production of greenhouse gases during the entire life cycle of the cabinet. Including. Discussion should include:</p> <p>Reference to impact of greenhouse gas emissions on global warming.</p> <p>Reference to measurement of the carbon footprint through an analysis of transportation of materials and goods. Energy use in manufacture & the use of natural resources and any renewable resources.</p> <p>The impact of mining the raw materials.</p> <p>Transportation of materials for processing.</p> <p>The impact of processing the raw materials & rolling into sheet material.</p> <p>Transport of the refined metal to the manufacturer.</p> <p>Further impact of the actual manufacture of the cabinet.</p> <p>Impact of transporting the completed product to the retailer/customer.</p> <p>Impact on disposal of disposal, recycling, landfill.</p>	6	<p>6 x 1 marks</p> <p>Basic discussion, showing some understanding of the cabinet's carbon footprint . 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. List of one or two points maximum one mark. List of three or more maximum two marks.</p> <p>Adequate discussion, showing some understanding of the cabinet's carbon footprint . 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>Thorough explanation, showing some understanding of the cabinet's carbon footprint . There will be three or more clearly identified and explained points. 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 1 (0-2 marks)</p> <p>Level 2 (3-4 marks)</p> <p>Level 3 (5-6 marks)</p>
		Total	15		

Question		Answer	Marks	Guidance
18	(a)	Built in obsolescence is where a product has been designed to last a set period of time. This may include using components with limited life or planning updates to products to make older products obsolete.	2	1 mark for a partially correct or brief explanation. 2 marks for a full explanation
	(b)	<p>Many batteries have integrated circuits on them that help regulate power, but they are also set to disable the battery after a predetermined number of cycles, requiring purchase of often expensive replacements.</p> <p>Keyboards are often designed to break after a set period of usage.</p> <p>Software is upgraded on new models & old software becomes quickly obsolete or not supported Spare parts for older mobiles of 12 months or more can be axed & not available from the manufacturer – including batteries.</p>	3	1 mark for each justified point (max 3).
	(c)	<p>Consumer – it will become necessary to spend money on spare parts in order to keep the phone operational or safe to use. If planned obsolescence of parts was not built in this cost would be unnecessary. Breakdown could loose data or prevent business.</p> <p>Environment - phones have a shorter life and so the carbon footprint of manufacturers of phones and their parts will be increased due to the reduced phone life. Environmental impact of disposal is also increased as well as sourcing raw materials.</p>	4	<p>1 mark for each justified point – Maximum 2.</p> <p>1 mark for each justified point – Maximum 2.</p>

Question		Answer	Marks	Guidance
	(d)	<p>Product life cycle is the analysis of how a product impacts on the environment & society as it progresses through a variety of stages, from original idea to its eventual disposal.</p> <ol style="list-style-type: none"> 1. Raw materials – how made or harvested. 2. Production process. 3. Transport & distribution. 4. How the product will be used by the customers. 5. Recycling – how the product can be recycled 6. Is care & maintenance environmentally friendly. 7. Disposal – is the waste from manufacture or product disposal recyclable or biodegradable. 	6 (3 x 2)	3 x 2 marks for naming and explaining a stage clearly.
		Total	15	
		Section B Total	45	
		Question Paper Total	60	

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