

# **Design and Technology**

General Certificate of Secondary Education **A542**

Industrial Technology Sustainable Design

## **Mark Scheme for June 2010**

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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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Question		Expected Answer	Mark	Rationale
<b>Section A</b>				
1		<b>This symbol stands for:</b> c	[1]	This is the only acceptable answer
2		<b>The material indicated is :</b> b	[1]	This is the only acceptable answer
3		<b>The property is:</b> c	[1]	This is the only acceptable answer
4		<b>Which of these processes produces the least material waste?</b> d	[1]	This is the only acceptable answer
5		<b>Aesthetic design considers</b> a	[1]	This is the only acceptable answer
6		<b>What is the name given to materials that respond to external stimuli?</b> A smart material	[1]	This is the only acceptable answer
7		<b>What term describes the design of an object to ensure it becomes outdated after a period of time?</b> Planned/built in Obsolescence	[1]	This is the only acceptable answer
8		<b>What do Solar cells convert the sun's energy into?</b> Electricity	[1]	This is the only acceptable answer
9		<b>State the name given to the science of refining the design of products to optimise them for human use.</b> Ergonomics	[1]	This is the only acceptable answer

Question		Expected Answer	Mark	Rationale
10		<b>What is geothermal energy?</b> Heat from underground (Greek gē - earth, thermē - heat)	[1]	This is the only acceptable answer
11		<b>Using recycled materials is good for the environment.</b>  True	[1]	This or wording that indicates correct knowledge
12		<b>Insulating a house will save on energy costs.</b>  True	[1]	This is the only acceptable answer
13		<b>Oil is a renewable energy source.</b> False	[1]	This is the only acceptable answer
14		<b>Single use disposable products are good for the environment.</b> False	[1]	This is the only acceptable answer
15		<b>The Fair Trade Foundation is committed to tackling poverty and injustice through trade.</b> True	[1]	This is the only acceptable answer
<b>Section A Total</b>			<b>[15]</b>	

Question		Expected Answer	Mark	Rationale
<b>Section B</b>				
16	(a)	<p><b>Give one technological advance that has influenced the design of Car B</b></p> <p>Any one of:            The development of efficient electric motors            The developments in computer control of motor vehicle features            The development of dual fuel use (hybrid engines)            Variable valve timing systems            Improvements in fuel injection            Materials development that facilitates lighter vehicles</p>	[1]	Award one mark for any one of these answers
	(b)	<p><b>Give one environmental pressure that has influenced the design of Car B</b></p> <p>The pressure to:            Use less materials in the manufacture of cars            Use less energy in the manufacture of cars            Produce less Co2 emissions in the production of the car            Enable the user to use less energy resources            To enable the user to reduce his/her carbon footprint.            Oil is a non-renewable resource.</p>	[1]	Award one mark for any one of these answers
	(c)	<p><b>Give two advantages to the user of Car A.</b></p> <p>Any two from:            Greater carrying capacity            Greater comfort on longer journeys - from air conditioning, more spacious, luxurious seating.            More efficient when motoring 'off road'            More protection for passengers in the event of an accident            Kudos.            Ability to tow.</p>	[2]  [2]	Any two of these for two marks each

Question		Expected Answer	Mark	Rationale
16	(d)	<p><b>Give two ways in which globalisation benefits a multinational company.</b></p> <p>Any two of –            Reduced labour costs            Reduced transportation costs            Reduced risk of relying on one country's financial stability            Gaining a strong foothold into the international market            Low-cost locations            Cheaper raw materials            Cheaper distribution costs            The advantage of the many tax breaks offered by foreign countries            Access to new technologies and methods            Availability of government grants.</p>	<p>[1]</p> <p>[1]</p>	<p>Accept any two of these            No explanation needed</p>
	(e)	<p><b>Give two benefits of globalisation for a country where products are manufactured.</b></p> <p>Any two of:            Employment            Improvement of quality of life            Development of education system            Development of health care system            Boost to the economy.</p>	<p>[1]</p> <p>[1]</p>	<p>Accept any two of these</p>

Question		Expected Answer	Mark	Rationale
	(f)	<p><b>Explain how globalisation affects the carbon footprint of the company?</b></p> <p>May increase the transportation costs of senior workers, raw materials/parts and the finished product More relaxed carbon emission standards in some countries may lead to increased carbon footprint of the company.</p>	[3]	One mark for each point correctly made – maximum of three.
	(g)	<p><b>Describe the main purpose of the Ethical Trading Initiative.</b></p> <p>To improve working conditions including: health and safety, hours of work, wages.</p>	[2]	
<b>Question Total</b>			<b>[15]</b>	

Question			Expected Answer	Mark	Rationale
17	(a)	(i)	<p><b>Explain why packaging is important to the manufacturer, the retailer and the consumer.</b></p> <p><b>Manufacturer:</b>            Protection from damage            Ease of handling            Ease of transportation            Storage identification            Tracking of products</p>	[3]	One mark should be awarded for each of these – max 3
		(ii)	<p><b>Retailer:</b>            Protection from damage            Stock storage            Ease of handling            Marketing            Display            Advertising            Security (to deter shoplifting)            Cash desk identification (bar codes)            Communication of information            Point of sale/stock data</p>	[3]	One mark should be awarded for each of these – max 3
		(iii)	<p><b>Consumer:</b>            Protection from damage            Storage container            Ease of handling            Product information            Ease of product identification            Re-useable applications            (e.g. transparent pvc case)</p>	[3]	One mark should be awarded for each of these – max 3



Question		Expected Answer	Mark	Rationale
	*(b)	<p><b>Discuss how designers could reduce the environmental impact of packaging.</b></p> <p>Points that should be made:</p> <ul style="list-style-type: none"> <li>Reference and discussion linked to 6Rs</li> <li>Materials choice could ensure that packaging could be recycled</li> <li>Materials labelled according to type (recycling)</li> <li>Materials choice could ensure that packaging is bio-degradable</li> <li>Recycled materials could be used</li> <li>Materials could be designed to be used in new products</li> <li>Packaging could be designed to be used again</li> <li>Reduction of packaging material</li> <li>Limiting types of packaging material</li> </ul>	[6]	<p>Level 1 (1 - 2) Basic discussion, mainly about disposal</p> <p>Level 2 (3 -4) Adequate discussion referring to choice of materials and disposal</p> <p>Level 3 (5 – 6) Full discussion, referring to most of the 6Rs</p>
<b>Question Total</b>			<b>[15]</b>	

Question		Expected Answer	Mark	Rationale
18	(a)	(i)		
	(a)	(ii)		

Question			Expected Answer	Mark	Rationale
	(a)	(iii)	<p><b>HDPE bottle</b></p> <p><b>Positive:</b>            Light material, compared with glass, requires less energy to transport (reduce)            Can be recycled            Can be reused as a handy liquid container</p> <p><b>Negative:</b>            Majority are not recycled            Compared with glass, more containers need to be produced (reduce)            Cannot be repaired (repair)            Non-sustainable materials used (refuse).</p>	<p>[1]</p> <p>[1]</p>	<p>Statements only required            Accept any of these</p>
	(b)		<p><b>Explain how fashion has influenced the design of mobile 'phones.</b></p> <p>The answer should refer to influences such as:            prevailing style of dress or behaviour,            the style characteristic of a social elite or the image of a particular social group,            the desire of the customer to be seen to belong to a social group,            the influences of colours, materials and/or styles that are in vogue at the time of design.</p>	[3]	<p>One mark should be awarded for each of these – max 3</p>
	(c)		<p><b>Explain how technological advances have influenced the design of bicycles.</b></p> <p>The answer should refer to advances in:            materials development,            developments in manufacturing techniques,            aerodynamic analysis,            suspension systems, gear systems, tyres and wheels and braking systems,            development in frame materials,</p>	[3]	<p>One mark should be awarded for each of these – max 3</p>

Question		Expected Answer	Mark	Rationale
	(d)	<p><b>Explain how environmental pressures have influenced the design of houses</b></p> <p>The answer should refer to influences such as:  reduction of carbon emissions,  improvement in thermal efficiency,  sustainability of design,  safeguarding the environment,  need to recycle.</p>	[3]	One mark should be awarded for each of these – max 3
<b>Question Total</b>			<b>[15]</b>	

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