

Design and Technology

General Certificate of Secondary Education

Unit **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	Additional guidance
Section A					
1			b) Renewable	[1]	
2			c) Anthropometrics	[1]	
3			a) Planning the supply and demand of materials	[1]	
4			b) Hybrid vehicles	[1]	
5			c) Materials, energy and environment	[1]	
6			Repair	[1]	Accept - Reuse, Primary Recycling
7			Oil, natural casein, horn	[1]	
8			Recyclable	[1]	
9			Toxic materials and chemicals dangerous to the environment	[1]	Reference to hazardous materials
10			Carbon Dioxide, CO ₂ , Green house gas	[1]	
11			ETI is a worker's Union that fights for better pay and conditions. FALSE	[1]	
12			FSC wood is not sustainable. FALSE	[1]	
13			Energy used in manufacturing is part of a product's carbon footprint. TRUE	[1]	
14			Products at the end of their life span should be put in landfill sites FALSE	[1]	
15			Rechargeable NiCad batteries are toxic TRUE	[1]	
			Section Total	[15]	

Question		Expected answer	Mark	Additional guidance
Section B				
16	(a)	Smaller/lighter, lighter/better fitting ear pieces stores more music rechargeable battery longer battery life more robust other acceptable advances in design and technology	1 each [3]	Must relate to the advances
	(b)	Parts reused Plastic recycled PCB stripped for precious materials	1 each [2]	
	(c)	Product does not have to be replaced, increase product life span. Less environmental impact. More economic to repair than buy new. Defective components easy to access and replace.	1 each [2]	
	(d)	Small solar panel, Hand-wound generator.	[1]	Accept a description of suitable device
	(e)	(i)	Hydroelectric solar photovoltaic or heat exchanger tidal, geothermal, wave, wind	[2]
		(ii)	No or low carbon emissions government grants selling excess to national grid saving on energy costs reduces reliance on fossil fuels	[3]
		(iii)	Expensive to install low power output need to be close to energy source visual impact on the environment can be weather dependent	[2]
			Total	[15]

Question			Expected answer	Mark	Additional guidance
17	(a)	(i)	Rethink – Use sustainable timber/improving design Reduce - Remove material, e.g.: rails, thinner legs Reuse - use as fuel/or reuse for new product 1 each	[3]	
		(ii)	Recycle - card or plastic reprocessed Repair - Difficult to repair if broken Refuse – Refuse: unnecessary packaging, stool made from unsustainable resource 1 each	[3]	
	(b)*		<p>Discussion may include: Reduce use of energy, materials, water, hazardous materials. Use sustainable materials and renewable energy sources. Reduce emission to air, discharge of used water, waste disposal, dispersal of toxic waste.</p> <p>Level 1 (0-2 marks) Basic discussion, showing some understanding of how manufacturing industry could become more eco efficient. Can provide a description of some of the areas of possible influence. 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>Level 2 (3-4 marks) Adequate discussion, showing an understanding of how manufacturing industry could become more eco efficient. 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 3 (5-6 marks) Thorough discussion, showing clear understanding of how manufacturing industry could become more eco efficient. There will be 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>	[6]	

Question			Expected answer	Mark	Additional guidance
	(c)	(i)	Coolants in refrigeration and air conditioners solvents in cleaners (for electronic circuit boards) blowing agents in the production of foam (fire extinguishers) propellants in aerosols.	[1]	accept reference to suitable item such as fridge / aerosol.
		(ii)	Damage to the ozone layer, hole in the ozone, Increase in solar (ultra violet) radiation, damage to life on earth Contributes to global warming	[2]	Only one mark for reference to ozone damage gas with out justification.
			Total	[15]	

Question		Expected answer	Mark	Additional guidance	
18	(a)	<p>Glass – door / glass window panel Wood from managed forest, Forest Stewardship Council, – cabinet, door frame, shelf. Magnet symbol </p> <p style="text-align: right;">1 each</p>	[5]	Accept wood	
	(b)	(i)	Made from 100% recycled material	[1]	
		(ii)	Kerb side collection Paper banks/ recycling centre	[2]	
		(iii)	Reprocessing and /or reformulating of materials Forming new material to make new products	[2]	
	(c)		Operating in many different countries around the world	[1]	World-wide operation must be justified
	(d)	(i)	Advantages: economic manufacturing / packaging costs, manufacturing base in one country, lower cost of labour, could be sold in a number of countries.	[2]	
		(ii)	Disadvantages: high transport cost, increased carbon foot print due to product miles, possible labour exploitation. different H&S and quality standards of product	[2]	
			Total	[15]	
			PAPER TOTAL	[60]	

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