

Design and Technology

General Certificate of Secondary Education

Unit **A512** Electronics and Control Systems: Sustainable Design

Mark Scheme for June 2012

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

© OCR 2012

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

Question	Answer	Mark	Guidance
	Section A		
1	b	1	
2	d	1	
3	c	1	
4	b	1	There was a typographical on (b).
5	a	1	
6	The Control of Substances Hazardous to Health.	1	Must be complete and accurate (i.e. not Harmful), but allow odd spelling so long as meaning is clear.
7	Something that does not biologically (naturally) degrade in the environment.	1	Or similar, watch for something vague like 'not degradable'. Allow rot.
8	Lead, tin, cadmium, 'solder', CFCs, breakdown components Acids, alkalis, etchants, solvents.	1	Not batteries/cells
9	Aesthetics or Aesthetically pleasing.	1	Allow odd spellings as long as intention is clear. Not looks nice or attractive.
10	REPAIR	1	Only
11	False	1	
12	False	1	
13	True	1	
14	True	1	
15	False	1	
	Section A Total	15	

Question		Answer	Mark	Guidance
Section B				
16	(a)	(i)	2	2x1, single unjustified or unexplained but appropriate point, 1 mark only. Point should relate to a change required for it to be applicable to a different culture as should the explanation/reason why. Change AND Qualification. Allow additional power options (solar, wind up).
		(ii)	2	2x1, 1 mark for each valid comment/words. Allow list-like answers if points covered.
	(b)	(i)	1	Allow, Repair, reuse, dismantle, upgrade memory. "easily fixed".
		(ii)	4	Relevant point with linked explanation , 2x 2 if offered NOT a list of 4 benefits alone (max 2 marks). An i-phone is a good example of the leap in functionality offered over perhaps a keyboard based product. Not 'appearance or looks' related. About the functionality. Second mark must be well justified rather than throw-away generic statements.
	(c)		4	Relevant point with linked explanation, 2x 2 if offered NOT a list of 4 benefits alone (max 2 marks). Watch for repeat of stem 'Web based support'.
	(d)		2	1 mark for valid remark relating to CO2 caused by a product, 2 marks only for answer detailing two specific points in a

Question			Answer	Mark	Guidance
			distribution, use and subsequent disposal.		products lifetime. Comments involving 'LCA' can score 2
			Question 16 Total	15	

Question		Answer	Mark	Guidance
17	(a)	(i)	1	Answer should relate to the facts that these bulbs use less energy than the incandescent ones they often replace and that they last up to ten times longer, meaning less labour costs involved in maintenance. Watch for "more compact" from stem.
		(ii)	1	Not landfill or incineration.
		(iii)	1	Allow misspelling.
		(iv)	2	Vague answers, 1 mark only, well-reasoned or justified answer 2 marks. Relevant point with linked explanation. Links to sustainability
	(b)	Information relating to: Provides work in poor countries where (population has grown) there may not be much other employment opportunity. Wages are often lower than in developed countries so the exporter can be 'green' without incurring high labour costs in the country of origin. Western consumers see it as "out of sight, out of mind". Disposal of potentially harmful products becomes someone else's problem – there may not be adequate legislation / laws to prevent this – reduces costs to the collector/exporter.	6	3x2 , If response is 'list-like' then 3 marks maximum. Each point should have some attached explanation or expansion for 2 marks. Not looking for any of the 6Rs. Moral and socioeconomic issues
	(c)	Planting a tree(s), re-forestation, investing in renewable energy generation (Solar electric, hydro-electric, wind wave tidal, geothermal, landfill gas capture, animal waste gas capture), carbon capture. Investment in Green energy.	4	Relevant point with linked explanation, 2x 2 if offered NOT a list of 4 methods alone (max 2 marks) Looking for a 'method/way' and a 'how it helps/achieves carbon saving' answer. Not 'reducing CO2' or same in concept.

Question	Answer	Mark	Guidance
	Question 17 Total	15	

Question			Answer	Mark	Guidance
18	(a)	(i)	Trapped air is environmentally friendly, sustainable, low cost, non-toxic, lightweight (reduction in transport costs), can be released after use no problems, plastic can be re-used / re-cycled into different product or could be made biodegradable. Less to dispose, uses less material.	2	So long as it IS an environmental benefit.
		(ii)	Crude Oil, Natural gas.	1	Allow just 'oil' or 'gas'.
	(b)	(i)	Any material that is renewable - wood / timber / card produced from a sustainable / managed source / straw / wool waste, any useable as packaging but sustainable natural product including 'papier mache' from old paper and plant products), potato-pak, blown starch, pop-corn.	1	Some candidates may suggest other natural products derived from milk protein for example. Relevant point with linked explanation.
		(ii)	Explanation needs to detail how the product is sustainable, either planting more to replace what is harvested, is already an unwanted by-product from another industry (straw, wool, cotton waste) or is diverting/using as an alternative as it can be grown, a food source such as potato-pak, blown starch, pop-corn.	2	
	(c)		Any three of: Recycle carton / contents, made from sustainably sourced wood pulp or recycled material, printed in non-toxic ink, type of plastic code, recycle logo(s), return address for recycling, information about energy saved by re-using the actual cartridge. Wheelie bin	3	3x1 as a series of sketches, a list, or both. Should be clear and unambiguous. Credit candidates own symbols and logos which would inform relating to environmental impact. Not Kitemark, CE and Fairtrade

Question	Answer	Mark	Guidance
(d)	<p>Marks to be awarded for points relating to: A discussion relating specifically to moral issues surrounding this type of practice, i.e. that of actively preventing users from refilling and reusing ink and toner containers, tied to brand, monopoly, price fixing, using more materials, oil, fossil fuels, energy, more waste going to landfill.</p>	6	<p>TO BE ADDED TO IN THE LIGHT OF CANDIDATE RESPONSES 6X1-</p> <p>Level 1 (1-2 marks) Basic discussion, showing some understanding of the moral aspects. 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 some understanding of the moral aspects. 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 some understanding of the moral aspects. 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>
	Question 18 Total	15	
	Paper Total	60	

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity

OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553

© OCR 2012

