OCR
RECOGNISING ACHIEVEMENT

GCSE

Design and Technology: Resistant Materials

General Certificate of Secondary Education

Unit **A564:** Technical aspects of designing and making

Mark Scheme for January 2011

Oxford Cambridge and RSA Examinations

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of pupils 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.

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

Section A

<table>
<tr><th colspan="4">Expected Answer</th><th>Mark</th><th>Additional guidance</th></tr>
<tr><td>1</td><td>(a)</td><td></td><td>
<table>
<tr><td>Stage</td><td>Processes</td><td>Tools/items of equipment</td></tr>
<tr><td>1</td><td>Mark out shape, draw shape</td><td>Template</td></tr>
<tr><td>2</td><td>Drill hole /cut hole</td><td>Saw tooth bit</td></tr>
<tr><td>3</td><td>Cut out shape</td><td>Coping saw</td></tr>
<tr><td>4</td><td>Smooth cut edges</td><td>Half-round file</td></tr>
</table>
</td><td>[4]</td><td>Not cut heart shape

Accept any reference to smoothing /filing edges</td></tr>
<tr><td></td><td>(b)</td><td></td><td>Clear varnish would not hide the unattractive MDF surface.
Add colour, cover the MDF, make more attractive, aesthetically pleasing.</td><td>[1]</td><td></td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td>Hardener and resin in separate tubes. [1]
Mix (equal) amounts. [1]</td><td>[2]</td><td>Reference to two parts = 1 mark
Mix together= 1 mark</td></tr>
<tr><td></td><td>(c)</td><td>(ii)</td><td>The joint requires pressure: use of weights, vice, cramps. [1]
Use of scrap wood /method of accurate positioning. [1]</td><td>[2]</td><td>Look for detail in whole answer for maximum 2 marks.</td></tr>
<tr><td></td><td>(d)</td><td></td><td>Fitting: solid wood block/sheet metal bracket or plate. [0-2]

Method of attachment the fitting to the back [1]
(do not accept screws or pins for attachment)</td><td>[3]</td><td>Use of string with pins, screws, hooks or eyes, keyhole slot = 1 max (upside down = 0)
Use of drilled hole = max 1
Do not accept hinges</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>[12]</td><td></td></tr>
</table>

Expected Answer				Mark	Additional guidance
2	(a)		Joint at **A** strengthened by means of: brace, or corner plate, insert or triangular piece clearly communicated. [0-2] Additional details relating to joint; eg. method of fitting to upright and /or side. [0-1]	**[3]**	Brace, corner plates, 'L' shaped plates screwed to upright and side. (Dowel joint could be wedged.) Up to 2 marks for an appropriate method giving effective strengthening. (award max 1 for method which gives limited strengthening) Do not accept a change of the joint (eg mortice and tenon, KD fitting)
	(b)		Safety feature added to rear of base or to uprights. Will it work? [0-2] Method of fixing.[0-1]	**[3]**	Look for position and effectiveness of safety feature: Size, section, proportion of feature clearly shown Accept hinge as method of fixing
	(c*)		Explanation of **WHY** it is important to consider the physical and aesthetic properties of materials when designing children's toys includes: Aesthetic properties: colour, grain, texture, finish. Fashion. Shape and form as a result of manufacturing processes Physical properties: durability, toughness manufacturing processes possible with the chosen materials. Health and safety issues. Detailed references to how specific toys may be used by children is essential. **Level 1 (0-2 marks)** Gives a limited explanation of why it is important to consider the physical and aesthetic properties of materials when designing children's toys. There will be little or no use of specialist terms. Answers may be ambiguous or disorganized. Errors of grammar, punctuation and spelling may be intrusive. **Level 2 (3-4 marks)** Gives some explanation of why it is important to consider		There are 2 questions: 1: 'physical' and 2: 'aesthetic' properties. Award maximum marks even if a predominance of one answer only over the other. Award maximum 3 marks if only one question is addressed.

Expected Answer				Mark	Additional guidance
			the physical and aesthetic properties of materials when designing children's toys with some analysis of the issues. 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, punctuation and grammar. **Level 3 (5-6 marks)** Gives a detailed explanation of why it is important to consider the physical and aesthetic properties of materials when designing children's toys and analyses most of the issues. Specialist terms will be used appropriately and correctly. The information will be presented in a structured format. The candidate can demonstrate the accurate use of spelling, punctuation and grammar.	**[6]**	
			Total	**[12]**	

Expected Answer				Mark	Additional guidance
3	(a)		Will not rust or rot when covered with damp towel. Waterproof, will not absorb water. Possible colour co-ordination, will not get hot, attractive.	[1]	Do not accept reference to 'lightweight' or 'cost' or 'easy to clean'
	(b)		Size of towel, number of towels, weight of towel, size of radiator. Potential market, possible construction methods, Materials	[1]	
	(c)		2 benefits include: speed of process **once set up**, reusable moulds [dies], quality of finish means less machining, less waste, repetitive accuracy. [2x1]	[2]	Do not accept reference to 'cost'
	(d)		Hole to locate plastic tube drawn clearly. [1] Secured by means of small screw. [1] Position of screw hidden from view. [1]	[3]	Glue max 1 Appropriate glue named 2 marks
	(e)		Adjustment in and out clearly shown. [0-2] Method of locking at adjusted size. [0-1] Details of fittings used : materials /sizes/construction [0-2]	[5]	Accept a screw thread as a method of locking
			Total	[12]	

Section B

Expected Answer				Mark	Additional guidance
4	**(a)**		Processes include: mark out slots for remote, drill hole in corner of marked out slots, saw out shape, file edges, heat up using oven or strip heater, bend (around former).	**[3]**	Look for genuine stages involved. Sequence can be incorrect if processes are correct. Do not allow leave to 'cool'
	(b)		Strips or pegs added to prevent remotes from sliding. Practical idea clearly shown. [0-2] Added notes re materials, sizes, construction. [0-1]	**[3]**	Award 0-2 marks for idea then look for any additional information to support the design. Use of rubber sheet on surface 1 max for idea The information does **not** have to be full and comprehensive.
	(c)	**(i)**	Miller, router, machining centre, laser cutter, high pressure water cutter.	**[1]**	Accept trade names, eg Roland CAMM2.
	(c)	**(ii)**	Place and/or secure material in machine Set up correct tooling Set machine parameters / set laser auto focus / fume extraction Transfer data from computer to CNC machine	**[3]**	From the information given, does the candidate understand/demonstrate practical understanding of the process or the answers are calculated guesses? Candidates can achieve max marks by describing one stage in detail Do not reward 'turn on machine'
	(d)		Benefits include: • Decreases development time; • can replicate material properties of final materials; • can evaluate designs before starting full-scale production; • faults can be eliminated saving money before full-scale production.	**[2]**	Many candidates will state 'faster', 'quicker'. Only award if comparative statement is complete: ie. 'faster than traditional modelling'. Does the candidate demonstrate a genuine understanding of RP?
			Total	**[12]**	

Expected Answer				Mark	Additional guidance
5	(a)		Anthropometric data used because it concerns the measurements of human body, eg average height of people [1] Specific references to dimensions relating to hip, leg, foot. [1]	[2]	Award 1 mark max for basic understanding of anthropometrics. Award 1-2 mark for specific references.
	(b)		Method of **JOINING** clearly shown: use of metal pegs, metal insert, fit into recess into plastic end. [0-2] Method of **FIXING** clearly shown: use of screws, nuts and bolts must be unobtrusive. Accuracy of technical detail. [0-2]	[4]	Accept references to pivoting seats that candidates may have used at bus stops.
	(c*)		Discussion to include: • demonstration of what is meant by each of the 6Rs. • how they can be applied to the design of the seat. • analysis of the extent to which the designer has considered the 6Rs. **Level 1 (0-2 marks)** Shows limited understanding of the extent to which the designer has considered the 6Rs in the design of the seat. There will be little or no use of specialist terms. Answers may be ambiguous or disorganized. Errors of grammar, punctuation and spelling may be intrusive. **Level 2 (3-4 marks)** Shows some understanding of the extent to which the designer has considered the 6Rs in the design of the seat, with some analysis of the issues involved. There will be some use of specialist terms although these may not always be used appropriately.		There are 3 parts to be considered when marking candidate responses: • understanding of 6Rs (reuse, rethink, refuse, repair, recycle, reduce) • Award up to level 3 (5-6 marks) for detailed discussion of three or more of the 6R's • applied to the seat in question; • discussion of extent. Try to identify the band that the answer fits best then decide on which of the two marks in that band.

Expected Answer				Mark	Additional guidance
			The information will be presented for the most part in a structured format. There may be occasional errors in spelling, punctuation and grammar. **Level 3 (5-6 marks)** Shows detailed understanding of the extent to which the designer has considered the 6Rs in the design of the seat and analyses most of the issues involved. Specialist terms will be used appropriately and correctly. The information will be presented in a structured format. The candidate can demonstrate the accurate use of spelling, punctuation and grammar.	**[6]**	
			Total	**[12]**	

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

OCR Customer Contact Centre

14 – 19 Qualifications (General)
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