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 2013

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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.

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Question			Answer	Marks	Guidance
1	(a)		Accept any from: Stable /not wobble in use, appropriate size for children to fit knees underneath, appropriate height to work at, sloping top/lid for comfort, no sharp edges, no places for children to trap fingers, non-toxic finish, adequate storage, strong construction, hardwearing materials, attractive, durable sustainable material. 3x1	3	Lightweight must be justified Points must be relevant for inclusion in a specification, not necessarily written in specification format
	(b)		Suitable joints include: dovetail, dowel, finger [comb], lap, half-lapped, mitre. Award 1 mark for correct name. Award 0–2 marks dependent on clarity and accuracy of joint.	3	Sketch can be correct and name incorrect or sketch incorrect and name correct. Do not allow KD fittings, biscuit joint.
	(c)	(i)	plywood	1	
		(ii)	15mm	1	
		(iii)	Practical idea – 0–2 Constructions/fittings – 0–2	4	Practical ideas include: Hinged lid inside or outside: traditional hinges or pivoted using metal rods. Lift-off lid located on inside or outside. Hinge 1 mark Position of two hinges 1 mark Constructions/fittings: look for details of how the lid works, recesses for hinges, components used such as screws, hinges, materials used for fittings.

Question			Answer	Marks	Guidance
2	(a)		Car needs to be lightweight 1 Increased battery life 1 Electric motor has to cope with the load 1 Car needs to be heavy for increased traction 1	2	
	(b)		Polystyrene,	1	
	(c)		Causes: mould too deep, plastic too hot, insufficient air holes, Sealing problems air not sucked out	1	
	(d)		Quicker than PVA to dry. Does not require clamping. Accurate/less messy to use. 2x1	2	
	(e)		Injection moulding	1	
	(f)		Mark out circle on manufactured board [variety of tools/equipment could be named] 1 Cut out circular shape using coping saw, tenon saw, Hegner, bandsaw, jigsaw. 1 Finish to achieve circular shape using sanding disc 1	3	Accept laser cutter/ hole saw/ lathe/ cnc router for 1 mark, extra information needed for further marks. Reward information relating to the hole or other features of the wheel
	(g)		Nail, screw, bolt/ nut and bolt, pin, dowel, axle, star washer, threaded bar and lock nut, rivet 2x1	2	

Question			Answer	Marks	Guidance
3	(a)		Thermoplastics can be reheated and reshaped	1	Do not allow 'easier to bend'
	(b)	(i)	Rule, try square, chinagraph pencil, marker pen, felt marker	1	Not scriber or pencil
		(ii)	Accept the following stages: Use of strip heater/line bender/oven to heat until soft 1 Bend to shape – around thin rod, using appropriate former, bending jig 1 Hold until cool 1 Quality/accuracy of technical detail 1	4	Allow mark for 'heated up' **Max 3** if no sketches are provided

Question			Answer	Marks	Guidance	
					Content	**Levels of response**
	(c)*		Discussion of advantages of using CAD rather than traditional drawing methods should concentrate on those aspects relating to speed, accuracy, the ease of editing, modelling and on-screen manipulation. Use of CAD packages to design and draw. Use of a range of drawing tools not available with traditional methods. Transfer of CAD drawings to enable CAM. Storage, sharing, copying and retrieval of drawings.	6		**Level 3 (5–6 marks)** Detailed discussion of advantages of using CAD rather than traditional drawing methods 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. **Level 2 (3–4 marks)** Some discussion of advantages of using CAD rather than traditional drawing methods with some analysis of the issues. There will be some use of specialist terms although these may not always be used appropriately.

Question			Answer	Marks	Guidance	
					Content	**Levels of response**
					If answers are presented as a list of bullet points then award Level 1 maximum and specific mark 1 or 2 dependent on quality of list. Identify the band that the answer fits best then decide on which of the two marks in that band.	The information will be presented for the most part in a structured format. There may be occasional errors in spelling, punctuation and grammar. **Level 1 (1–2 marks)** Limited discussion of advantages of using CAD rather than traditional drawing methods. 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. **0 marks** = no response worthy of credit

Question			Answer	Marks	Guidance
4	(a)		Resistant to heat, easy to bend to shape 2x1	2	
	(b)		To protect from weather, to prevent rust, to look attractive	1	
	(c)		So they can be cleaned To enable charcoal to be inserted	1	
	(d)	(i)	Some sort of handle/grip 0–2 Recognition that it must be heat resistant 1 Details of fittings and/or materials used 0–2	5	Do not allow castors or wheels or hinged legs. Carrying holes cut in sides 1 mark only
		(ii)	Explanation to include:- ergonomics will consider: the comfort of the user 1 the safety of the user 1 how the barbecue will be carried 1	3	Award 1 mark for a definition of ergonomics Award marks for individual points made or award full marks for one or two points explained in detail

Question			Answer	Marks	Guidance
5	(a)		Softwoods are more plentiful than hardwoods. Softwoods generally grow faster and therefore can be restocked quicker. 2x1	2	Must be environmental advantages, not cheaper Do not reward sustainable
	(b)		Modesty bloc, block fitting, plastic block, corner block/fitting/joint/piece 1 Used to join seat rail to end frame/leg 1 Barrel nut, scan fitting, cross dowel 1 Used to join stretcher rail to end frame/leg to end frame 1	4	Only accepted use for barrel nut, scan fitting

Question			Answer	Marks	Guidance	
					Content	Levels of response
	(c)*		Explanation of the problems facing designers when designing products for outdoor use and how these are overcome includes: The effects of weather on different materials involving the use of wood, metal and plastic. The term weather should refer to hot and cold as well as wet and dry conditions. For example, many woods and metals can be treated to withstand outdoor conditions. Information about treatments and finishes should be provided Many manufactured boards are unsuitable outdoors. Many solid woods expand and contract.	6		**Level 3 (5–6 marks)** Detailed explanation of the problems facing designers when designing products for outdoor use and how these are overcome. 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. **Level 2 (3–4 marks)** Some understanding of the problems facing designers when designing products for outdoor use and how these are overcome. Some analysis of the issues involved. There will be some use of specialist terms although these may not always be used appropriately.

Question			Answer	Marks	Guidance	
					Content	**Levels of response**
			Plastics tend to be more durable in outdoor conditions. Answers should also relate to specific items to elaborate: for example wooden or plastic doors and window frames, garden furniture.		If answers are presented as a list of bullet points then award Level 1 maximum and specific mark 1 or 2 dependent on quality of list. Identify the band that the answer fits best then decide on which of the two marks in that band.	The information will be presented for the most part in a structured format. There may be occasional errors in spelling, punctuation and grammar. **Level 1 (1–2 marks)** Limited explanation of the problems facing designers when designing products for outdoor use and how these are overcome. 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. **0 marks** = no response worthy of credit

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