



2009 Product Design

Intermediate 2

Finalised Marking Instructions

© Scottish Qualifications Authority 2009

The information in this publication may be reproduced to support SQA qualifications only on a non-commercial basis. If it is to be used for any other purposes written permission must be obtained from the Question Paper Operations Team, Dalkeith.

Where the publication includes materials from sources other than SQA (secondary copyright), this material should only be reproduced for the purposes of examination or assessment. If it needs to be reproduced for any other purpose it is the centre's responsibility to obtain the necessary copyright clearance. SQA's Question Paper Operations Team at Dalkeith may be able to direct you to the secondary sources.

These Marking Instructions have been prepared by Examination Teams for use by SQA Appointed Markers when marking External Course Assessments. This publication must not be reproduced for commercial or trade purposes.

SECTION A

Q1		Marks
(a) (i)	<p>Material</p> <ul style="list-style-type: none"> • PVC. • Elastomers. • Rubber. • Synthetic rubber. • Polypropylene. <p>Reason</p> <ul style="list-style-type: none"> • Good grip. • Some suspension. • Light weight. • Relatively cheap. • Does not suffer from permanent deformation. • Resistant to impact. • Flexible. • Durable. • Wear resistant. • Absorbs shock. • Strong. • Reference to manufacturing process ‘because PVC can be injection moulded’. • NO AESTHETIC REASONS. • Any other property which you would want the tyre to have. <p><i>Where the candidate has given more than one justification only the first should be marked.</i></p> <p>1 mark per correct response for material and one mark for correct reason up to total of 2 marks.</p>	2
(ii)	<p>Reasons why beech plywood is suitable:</p> <ul style="list-style-type: none"> • hard wearing, withstand bumps and scratches, durable • strong in both directions/cross grained/strong • lightweight • does not rust (as most bicycle frames do) • large sheets • consistent quality • can be made waterproof • easy to machine • environmentally friendly/home grown • uniform thickness • even textured • stable. <p><i>Where the candidate has given more than two answers only the first two should be marked. If first two are repeats you may award a mark for the third.</i></p> <p>1 mark per correct response up to total of 2 marks.</p>	2

		Marks
(iii)	<p>Suitable manufacturing process for the plywood parts:</p> <p>Process</p> <ul style="list-style-type: none"> • CNC machining, CIM, CADAM, CAD/CAM, Laser Cutting, HP Water jet cutting. • Batch production*. • Jigs/patterns/templates and electric router, NOT “SAWS”. <p><i>ie one marking out method + cutting out method = 1 mark</i></p> <p>Reason</p> <ul style="list-style-type: none"> • Repetition of shape. • Quality/accuracy/tolerances/finish. • Saves time marking out individually. • Faster speed of production. • Cheaper/reduced labour costs/semi-skilled labour. • If the candidate goes down the production process route eg ‘batch production and correct reason’ can be awarded marks*. <p>1 mark per correct process and one mark per correct reason.</p>	2
(iv)	<p>Suitable clear finish and reason for suitability:</p> <p>Finish</p> <ul style="list-style-type: none"> • Wax. • Varnish. • Lacquer. • Shellac/French polish. • Teak/Danish oil. • Sanding sealer. • PVA + water. • NOT “POLISH”. <p>Reason</p> <ul style="list-style-type: none"> • See the grain. • Protect the wood from deterioration. • Identify any deterioration. • Keeps it clean/easy to clean. • Makes it shiny/matt/satin. • Enjoy the natural wood look. • Aesthetics/change of appearance. • Looks good. • Not coloured and thus “unisex”. • NOT “EASY TO APPLY”. <p>1 mark per correct finish and 1 mark per correct reason up to total of 2 marks.</p>	2

		Marks
(b) (i)	<p>Anthropometrics</p> <ul style="list-style-type: none"> The handle grip on the handlebars has been designed to suit human hand dimensions eg palm width (expanded answer showing link between part and dimension). Any suitable answer relating human dimensions to part or bit of the bicycle should be awarded 1 mark. <p><i>1 mark per correct response (including both elements of information) up to total of 2 marks</i></p> <p><i>Two marks should be awarded where candidates have given an expanded answer, which links one part of the bicycle to three or more bits of anthropometric data.</i></p> <p><i>eg the position of the handlebars has been designed to fit the 50th percentile of 2-4 year old's arm reach so that almost all potential users can comfortably use them.</i></p> <p><i>(Percentile/body dimension/bicycle part).</i></p> <p>One bike part + one piece of anthropometric data = one mark One bike part + three pieces of anthropometric data = two marks Two separate bike parts + two separate pieces of anthropometric data = two marks.</p>	2
(ii)	<p>Physiology</p> <ul style="list-style-type: none"> The handlebars have been designed to be pushed/turned easily with little effort from the user. Any suitable answer relating to human limitations, linking to part or bit of the bicycle. The use of physical action verbs linking to the use of the bicycle are to be looked for here. <p><i>1 mark per correct response (including both elements of information) up to total of 2 marks.</i></p> <p><i>Two marks should be awarded where candidates have given an expanded answer, which links at least one part of the bicycle to three, or more justified physiological activities.</i></p> <p><i>eg The padded saddle will have been designed so that its height can be easily adjusted with minimum effort and physical strength. This makes the bicycle suitable for the range of users.</i></p> <p>One part + one justification = one mark One part + three justifications = two marks Two separate parts + two separate justifications = two marks.</p>	2

		Marks
(iii)	<p>Psychology</p> <ul style="list-style-type: none"> • The choice of the blue material on the saddle will ensure that the user is aware of where to sit. • Any suitable answer relating to human thoughts or feelings, linking to part or bit of the bicycle. <p><i>1 mark per correct response (including both elements of information) up to total of 2 marks.</i></p> <p><i>Two marks should be awarded where candidates have given an expanded answer, which links at least one part of the bicycle to three, or more justified psychological feelings.</i></p> <p><i>eg The use of blue as the colour for the saddle has been chosen to ensure the user can see one of the key parts of the bicycle. This is very useful to users because they will know where to sit.</i></p> <p>One part + one justification = one mark One part + three justifications = two marks Two separate parts + two separate justifications = two marks.</p>	2

		Marks
(c)	<p>(i) Function</p> <ul style="list-style-type: none"> • No pedals – small child. • Whole product – look real (more like a motorbike). • Bike – to be a training bike. • Handlebars – permits steering. • Saddle – seat is adjustable. • Etc. <p>One part + one justification = one mark One part + three justifications = two marks Two separate parts + two separate justifications = two marks.</p>	2
	<p>(ii) Safety</p> <ul style="list-style-type: none"> • Handlebars – restricted movement. • Saddle – adjustable height for different users. • Saddle – padded for comfort. • Hand grips – padded/non-slip. • Hand grips – ball shape at ends when it falls over. • Wooden frame – light weight and less likely to injure child. • Whole product – non-toxic materials. • Whole product – no small parts/choke hazards. • Whole product – no sharp edges. • Whole product – conforms to British standards. • Etc. <p>One part + one justification = one mark One part + three justifications = two marks Two separate parts + two separate justifications = two marks.</p>	2
	<p>(iii) Contrast</p> <p>Could be contrast of ... colour/shape/texture/form/material/finish eg colour v colour, shape v shape, NOT “repeats”.</p> <p>Two separate descriptions of contrast influencing the design of the bike with justification at one mark each.</p>	2

SECTION B

Q2		Marks
(a)	<ul style="list-style-type: none"> • Primary functions versus secondary functions. • Pocket tool – scissors & various functions. Original tools had one function – multi-tool has several. • One main function plus additional uses or features. <p>Described, clear answer 2 marks. <i>Vague responses max 1 mark.</i></p>	2
(b)	<ul style="list-style-type: none"> • User trial, user trip, observation, user questionnaire. <p><i>No marks for naming the technique, only for the description.</i></p> <p>Described, clear answer 2 marks. <i>Vague responses max 1 mark.</i></p>	2
(c)	<ul style="list-style-type: none"> • Shape of handles, curved lines, contrast in colours, logo stylish, plastic versus stainless steel, wow factor. <p><i>(If candidate simply names aesthetic terms then; 1 mark for 2 or 3 terms 2 marks for 4 or more terms)</i></p> <p>Described, clear answer 2 marks. <i>Vague responses max 1 mark.</i></p>	2
(d)	<p>Justified reasons for stainless steel in context of this product.</p> <p>Reasons may fall into four categories:</p> <ul style="list-style-type: none"> • visual/aesthetic • manufacturing aspects • strength/hardness/durability • comparative. <p><i>eg ‘doesn’t rust if it gets wet’, ‘stays shiny to maintain its appearance’, etc</i></p> <p>Two justified reasons 1 mark each (1 + 1). <i>Vague responses max 1 mark.</i></p>	2
(e)	<ul style="list-style-type: none"> • Dip coat, powder coat, baked paint, electro plating, passivating, spray painting, (NOT dipping, anodising, brushing or painting). <p>Two methods 1 mark each (1 + 1).</p>	2

Q3		Marks
(a) (i)	<ul style="list-style-type: none"> • Split lines, injection points/injection nipple/sprue marks, ejector marks, mould information details, webs, ribs, shrinkage, fine surface detail, spark erosion, flow marks, complex form, slight taper. <p>1 mark per feature 3 @ 1 mark each.</p>	3
	<p>(ii)</p> <ul style="list-style-type: none"> • Mass production, moulds used over and over, low labour costs, 24/7 production, quality control, relatively cheap materials, quick cycle time, accurate, cheap process, reduces fabrication, recycled materials, recyclable materials – good image, low waste. <p>1 mark per advantage to manufacturer. 2 @ 1 mark each.</p>	2
(b)	<ul style="list-style-type: none"> • Look at other similar products, modelling, measuring hands, and user trials. <p>Any 1 of the above @ 1 mark.</p>	1
(c) (i)	<ul style="list-style-type: none"> • Opportunity to update design. • Plan ahead for new products. • Users have to replace obsolete products with new ones. • Component parts need replaced. • Workforce stay in employment. • Return income. • Any other appropriate advantage to the manufacturer. <p>Any 1 of the above @ 1 mark.</p>	1
	<p>(ii)</p> <ul style="list-style-type: none"> • Eg throwaway society encourages landfill, requires new resources, requires more energy to manufacture new product, does not encourage re-using, produces waste, more packaging etc. <p>Well reasoned statement 2 marks, 2 stated reasons 2 marks, vague response 1 mark.</p>	2

Q4		Marks
(a) (i)	<ul style="list-style-type: none"> • Clear explanation – Rights given to creators and owners of work resulting from human intellectual creativity. • <i>This response can carry forward to Q4 (a) (ii)</i> <p>Explanation 1 mark.</p>	1
(ii)	<ul style="list-style-type: none"> • Clear description of: Patent, Copyright, Trade-mark, design right, don't tell anyone, register the design, send a letter to self/lawyer. <p>Name at least two ways, 1 mark. Two clear descriptions @ 1 mark each.</p> <p><i>Vague responses max 1 mark.</i></p>	2
(b)	<ul style="list-style-type: none"> • Market research, potential customers/target users, trial period with a small sample of people, survey, website survey, advance ordering, people register their interest. <p>Described, clear answer 2 marks. <i>Vague responses max 1 mark.</i></p>	2

Q5		Marks
(a) (i)	<ul style="list-style-type: none"> • Prevent corrosion, prolongs life, increase durability, low maintenance. <p>Any 1 stated answer @ 1 mark.</p>	1
(ii)	<ul style="list-style-type: none"> • Any rivet, any threaded fixing plus nut or “bolting”. • (no thermal methods or adhesives) <p>Any 2 stated answers @ 1 mark each.</p>	2
(b)	<ul style="list-style-type: none"> • Variety of colours, relatively cheap, lighter, easier to clean, chemical resistant, does not tarnish, variety of styles and accessories, cheaper than metal ones, cheap to buy, colour coding in use, throw away/recycle, readily available, built in colour, waterproof, weatherproof, durable, impact resistant, stackable, easily stored, etc. <p>Three advantages to the consumer @ 1 mark each.</p>	3

[END OF MARKING INSTRUCTIONS]