



2014 Product Design

Intermediate 2

Finalised Marking Instructions

© Scottish Qualifications Authority 2014

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 SQA's NQ Assessment team.

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 NQ Assessment team 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.

Part One: General Marking Principles for Product Design Intermediate 2

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this Paper. These principles must be read in conjunction with the specific Marking Instructions for each question.

- (a)** Marks for each candidate response must always be assigned in line with these general marking principles and the specific Marking Instructions for the relevant question. If a specific candidate response does not seem to be covered by either the principles or detailed Marking Instructions, and you are uncertain how to assess it, you must seek guidance from your Team Leader/Principal Assessor.
- (b)** Marking should always be positive ie, marks should be awarded for what is correct and not deducted for errors or omissions.

GENERAL MARKING ADVICE: Product Design Intermediate 2

The marking schemes are written to assist in determining the “minimal acceptable answer” rather than listing every possible correct and incorrect answer. The following notes are offered to support Markers in making judgements on candidates’ evidence, and apply to marking both end of unit assessments and course assessments.

Part Two: Marking Instructions for each Question

Within each question, marks are not awarded for repetition. This excludes question 1, where repetition is not allowed with parts (a), (b) and (c)

SECTION A

Q1		Marks
a	<p>i</p> <p>Suitable material: (Polypropylene)</p> <p>Reasons given could be derived from any of the usual design issues:</p> <ul style="list-style-type: none"> • Functional reasons • Ergonomic reasons • Environmental reasons • Durability reasons • Safety reasons • Cost reasons • Aesthetics reasons • Material reasons • Manufacturing reasons <p>Other possible routes of reasoning within this answer including consumer and manufacturer suitability.</p> <p>Light in weight Strong in every direction (for consumer) Strong/hardwearing/robust/tough/sturdy Easily moulded (for manufacturer) Inexpensive/cheap Inbuilt colour Washable/waterproof/easy to clean Readily available etc.</p> <p>Only the first two responses are marked. However, where the candidate has given two contradicting reasons, these cancel each other out and the first two remaining responses should be marked</p> <p>1 mark per correct reason up to total of 2 marks.</p>	<p>2</p>

Q1		Marks
a	<p>ii</p> <p>Suitable process and reason (brush handle):</p> <p>Process</p> <ul style="list-style-type: none"> <li>• Injection moulding/pressed in components/fabricated <li>• “moulding” alone scores zero <p>Reason</p> <ul style="list-style-type: none"> <li>• Cheap/quick/easy to make <li>• Mass produced component <li>• Intricate detail <li>• Any other suitable justification <p>Only first response should be marked for each part of the question.</p> <p>1 mark for correct process and 1 mark for correct reason up to total of 2 marks.</p>	2
a	<p>iii</p> <p>Suitable material (nylon):</p> <p>Reasons given could be derived from any of the usual design issues:</p> <ul style="list-style-type: none"> <li>• Functional reasons <li>• Ergonomic reasons <li>• Environmental reasons <li>• Durability reasons <li>• Safety reasons <li>• Cost reasons <li>• Aesthetics reasons <li>• Material reasons <li>• Manufacturing reasons <p>It is assumed that any properties of nylon will fall into one or more of the areas above.</p> <ul style="list-style-type: none"> <li>• Hardwearing/durable/strong <li>• Static electricity produced can help lift dust <li>• Tough/impact resistant <li>• Inbuilt colour <li>• Self-lubricating <li>• Can be easily moulded/shaped/extruded <li>• Suitable for mass production <li>• Flexible/soft <li>• etc. <p>Only the first two responses are marked. However, where the candidate has given two contradicting reasons, these cancel each other out and the first two remaining responses should be marked.</p> <p>1 mark per correct response up to total of 2 marks.</p>	2

Q1			Marks
a	iv	<p>Modelling</p> <ul style="list-style-type: none"> • Generate ideas • Quickly producing concepts • Test ergonomics/sizes • Test aesthetics • Check performance/check how it works • Check assembly/inter-relationship of parts • To see the product in 3D • To see possible proportions/sizes • Show client • etc. <p>Only the first two responses are marked. However, where the candidate has given two contradicting reasons, these cancel each other out and the first two remaining responses should be marked.</p> <p>1 mark per correct response up to total of 2 marks.</p>	2

Q1			Marks
b	i	<p>“Anthropometrics”</p> <p>Response should show link between ‘dustpan and brush set’ part and human dimension.</p> <p>eg</p> <ul style="list-style-type: none"> • Brush handle – grip diameter • Dustpan handle – palm width <p>Any suitable answer relating human dimensions and relevant aspect of the dustpan and brush set should be awarded 1 mark.</p> <p>1 mark per correct response (including both elements of information) up to total of 2 marks.</p> <p>Vague answers which display an appropriate level of knowledge attract one mark. eg Palm width for the two handles/Palm width for the length of both handles.</p> <p>Two marks should be awarded where candidates have given an extended answer, which links one part of the dustpan and brush set to three or more bits of anthropometric data.</p> <p>eg The length of the dustpan handle has been designed to fit the 95th percentile adult palm width so that almost all potential users can fit their hand into it. (Percentile/user/body dimension/dustpan part) (Dustpan part/percentile/user/body dimension).</p>	2
b	ii	<p>“Physiology”</p> <p>Response should show link between ‘dustpan and brush set’ part and human capabilities.</p> <p>eg</p> <ul style="list-style-type: none"> • Dustpan – easy to empty • Brush – easy to lift <p>Any suitable answer relating to human limitations, linking to a part of the dustpan and brush set. The use of two physical action verbs linking to the use of the dustpan and brush set are to be looked for here.</p> <p>1 mark per correct response (including both elements of information) up to total of 2 marks.</p> <p>One mark should be awarded for vague answers which display an appropriate level of knowledge. Two marks should be awarded where candidates have given a correct, extended answer.</p> <p>eg The dustpan and brush set is light in weight which makes it easily carried around the house and when being used it requires a small amount of physical strength.</p>	2

Q1			Marks
b	iii	<p>“Psychology”</p> <p>Response should show link between ‘dustpan and brush set’ part to human thoughts/feelings/emotions.</p> <p>eg</p> <ul style="list-style-type: none"> • Thin sheet plastic on dustpan– looks easy to manoeuvre • Serrated part on dustpan – looks useful for bristle cleaning • Brush handle curves – looks comfortable to hold • Handle of brush – makes a clicking noise as it locates into the dustpan handle • Soft inserts on brush handle - looks comfortable to touch • Holes in ends of handles – looks easy to store on a hook • White (coloured) brush handle – emotes feeling of hygiene and cleanliness • Pale blue colour scheme - looks safe to use • etc. <p>• <i>“Nice colour/looks nice/aesthetically pleasing/attractive” scores zero</i></p> <p>Any suitable answer relating to human thoughts/feelings/emotions, linking to part or bit of the dustpan and brush set.</p> <p>1 mark per correct response (including both elements of information) up to total of 2 marks.</p> <p>Vague answers which display an appropriate level of knowledge attract one mark.</p> <p>Two marks should be awarded where candidates have given an extended answer.</p> <p>eg The rounded grip on the brush handle looks like it will feel comfortable to hold and also be safe to the user when they hold it as they will not cut their hand.</p>	2

Q1		Marks
c	<p>i</p> <p>‘contrast’</p> <p>Any suitable answer relating to contrast, linking to part of the dustpan and brush set.</p> <p>eg contrast in:</p> <ul style="list-style-type: none"> • Shape • Form • Colour • Material • Texture • Grip • Finish <p>Vague answers which display an appropriate level of knowledge attract 1 mark.</p> <p>You must say WHY to get full marks.</p> <p>1 mark per correct response up to total of 2 marks.</p>	2
c	<p>ii</p> <p>“economics”</p> <p>Any suitable justification relating to economics (cost / value for money), linking to part of the dustpan and brush set.</p> <p>Candidates may choose to refer to a variety of economic aspects of the product when responding to this question.</p> <p>eg</p> <ul style="list-style-type: none"> • Materials – choice of suitable materials for manufacturer • Manufacturing techniques – scale of production • Doesn’t use electricity, like a small, hand held vacuum cleaner • Purchase price – value for money for customer • Product lifespan – long for customer / planned obsolescence for manufacturer • Using recycled/recycling materials - helps keep costs down <p>Vague answers which display an appropriate level of knowledge attract 1 mark.</p> <p>You must say WHY to get full marks.</p> <p>1 mark per correct response (including both elements of information) up to total of 2 marks.</p>	2

Q1			Marks
c	iii	<p>“function”</p> <p>Any suitable justification relating to function, linking to part of the dustpan and brush set.</p> <p>eg</p> <ul style="list-style-type: none"> • The brush sweeps well - the bristles are flexible • The dustpan collects dust well – thin (silicon/rubber/flexible) edge • The dustpan can collect a large amount of dust – it has a large storage area <p>N.B. Candidates should be awarded marks where responses refer to durability, ergonomics and materials. It is difficult to directly refer to function without the inter-relationship to these listed design issues.</p> <p>Vague answers which display an appropriate level of knowledge attract 1 mark.</p> <p>eg Function is extremely important because, if it functions really well, lots of people will buy it (or converse).</p> <p>You must say WHY to get full marks.</p> <p>1 mark per correct response (including both elements of information) up to total of 2 marks. (2)</p> <p>Note: The marking scheme for question 1 (b) and (c) is as follows One part + one justification = one mark One part + two justifications = one mark One part + three justifications = two marks Two separate parts + two separate justifications = two marks Vague, incomplete/extended responses may attract one mark</p>	2
			(20)

Section B

Q2		Marks
<p>i</p>	<p>Vacuum cleaner</p> <p>Vacuum cleaner specific issues:</p> <ul style="list-style-type: none"> • Size of existing vacuum cleaners on market • Accessories that consumers would like • Typical power cord length • Use of controls: on/off etc. <p>Generic design issues</p> <p>Function / ergonomics / environmental concerns / durability / safety / cost / aesthetics / materials / manufacturing processes / existing products / etc.</p> <p>Any four relevant design issues; which may be a mixture of both specific and generic; as long as they are relevant for a vacuum cleaner.</p> <p>eg handle, cable, size, weight (although all seemingly vague) scores 1.</p> <p>1, 2 or 3 correct responses scores 0 marks.</p> <p><u>1 mark</u> for 4 correct responses up to total of 1 mark</p>	<p>1</p>
<p>ii</p>	<p>Each issue <i>should</i> be explained with reference to vacuum cleaner design. The candidate <i>should</i> show the link between the issue and vacuum cleaner design.</p> <p>However, vague/generic answers which display an appropriate level of knowledge about the relevant design issue will attract 1 mark.</p> <p>eg <i>Aesthetics, so it looks attractive to the buyer.</i></p> <p>eg <i>Ergonomics should be researched so that the designer can ensure it is easy to operate.</i></p> <p>1 mark for each correct response up to total of 4 marks</p>	<p>4</p>
		<p>(5)</p>

Q3		Marks
<p>a</p>	<p>Suitable manufactured board</p> <ul style="list-style-type: none"> • NOT hardboard/NOT Chipboard (in the question) • Plywood • MDF • Batten board • Blockboard • Laminboard • etc. <p>Each of these boards would be veneered, however candidates do not need to state the term 'veneered' to attract marks.</p> <p>Only the first two responses are marked.</p> <p>1 mark per correct response up to total of 2 marks.</p>	<p>2</p>
<p>b</p>	<p>'advantages of manufactured board over solid timber'</p> <ul style="list-style-type: none"> • Available in wide flat boards • Stable/don't warp/easy to machine • Stronger • No need for a finish • More durable/last longer • Low cost/cheap/cheaper • Environmental reasons • etc. <p>Only the first two responses are marked.</p> <p>1 mark per correct response up to total of 2 marks.</p>	<p>2</p>
<p>c</p>	<p>'Knock down fittings' (consumer)</p> <ul style="list-style-type: none"> • Makes product cheaper • Package easy to transport • Non-permanent fixings • You can do it yourself/no tradesman required • Easy to assemble • Easy to dismantle • Easy to upgrade/modernise • No specialist tools required • etc. <p>Only the first two responses are marked.</p> <p>1 mark per correct response up to total of 2 marks.</p>	<p>2</p>

Q3		Marks
d	<p>'Standard components' (manufacturer)</p> <ul style="list-style-type: none"> • Cheap to purchase • No machinery required for manufacture • No workforce required for manufacture • No material required for manufacture • Consistent quality of bought in/mass produced components • JIT production/no storage required • etc. <p>1 mark per correct response up to total of 2 marks.</p>	2
		(8)

Q4		Marks
	<p>Two idea generation techniques</p> <p>Description of idea generation activity marked on a 2-1-0 scale.</p> <p>Responses where sketching has been used will attract marks as appropriate.</p> <p>An informative annotated sketch on its own could attract 2 marks.</p> <p>Maximum of 2 marks per technique up to a maximum of 4 marks for the question. (2+2)</p>	<p>(4)</p>

Q5		Marks
	<p>Product A: Compression Moulding Product B: Vacuum forming Product C: Sand Casting Product D: Extrusion Product E: Drop forging</p> <p>1 mark per correct response up to total of 5 marks.</p>	<p>(5)</p>

Q6		Marks
	<p>A description of each evaluative method will attract marks when appropriately linked to an aspect.</p> <p><i>Generic descriptions of methods of evaluation may attract 2 marks.</i></p> <p>Candidates are asked to describe an evaluation activity.</p>	
a	<p>Description of <u>user trial</u> (for evaluation of ergonomics) activity marked on a 2-1-0 scale.</p> <p>eg Give the kettle to a range of users and ask them to fill it with water and then report back with a score out of 5, 5 being the easiest. (Scores 2)</p> <p>eg Pick it up to see how heavy it is. (Scores 1). Boiling water. (Scores 0).</p>	2
b	<p>Description of <u>testing</u> evaluation activity marked on a 2-1-0 scale.</p> <p>eg Fill the kettle with a measured amount of cold water and time how long it takes to boil. (Scores 2)</p> <p>eg See how quickly it boils water. (Scores 1)</p>	2
c	<p>Two key questions included in a survey</p> <p>Appropriate survey questions stated.</p> <p>Candidates' responses to this question should be ones which would not result in being too time consuming for the person being surveyed.</p> <p>Any survey questions using appropriate "visual" vocabulary are likely to be OK. ie: contrast/colour/shape/proportion/style/sheen/materials/etc.</p> <p>Questions should not be repetitive. eg: two questions about shape</p> <p>eg Do you like the shiny metallic finish of the kettle? Yes/No. (Scores 1)</p> <p>eg Do you like the colour/shape/style etc? (Scores 1)</p> <p>eg I like the curved shape of the kettle ...strongly agree / agree / disagree / strongly disagree. (Scores 1)</p> <p>1 mark per correct response up to a total of 2 marks</p>	2

Q6		Marks
d	<p>Symbol</p> <ul style="list-style-type: none"> • Complete symbol: It is made of plastic / it is made of HDPE • Lower Initials: Type of plastic / name of plastic / high density polyethylene / polythene / polyethylene/high density poly..something • Central Number: Group of plastic / group 2 plastic / <i>NOT type 2 plastic</i> • 3 Arrows: Can be recycled / recyclable / has been recycled / where it can be recycled • <i>Using the word “category” of plastic scores zero.</i> <p>1 mark per correct response up to total of 2 marks.</p>	2
		(8)

[END OF MARKING INSTRUCTIONS]