



2015 Product Design

Higher

Finalised Marking Instructions

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Part One: General Marking Principles for Product Design Higher

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. *You can do this by posting a question on the Marking Team forum or by e-mailing/phoning the e-marker Helpline.*
- (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 Higher

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

Section A

Question		Expected Answer(s)	Max Mark	Additional Guidance
1	(a)	<p>The coat stand must:</p> <ul style="list-style-type: none"> • Be stable/must be freestanding • Hold a minimum of 12 coats/jackets • Hold a variety of types of coats, jackets, etc • Hold umbrellas (Classic chrome stand only) • Not take up too much floor space • Be manufactured from durable materials that are suitable and appropriate for their function • Available in a variety of colours (Cascando Tree stand only) • Be priced to suit the intended target market • Ensure aesthetics suit the market niche or consumer aspirations • Production costs significantly less than selling price • Be easy to clean/maintain • Comply with relevant safety regulations • Suitable for self-assembly(Flat Pack) • Any other suitable answer <p>Six statements – 1 mark each</p> <p>Comments accept; Lifespan Sustainability Portability Easily Accessible(Ergonomics)</p>	6	

Question		Expected Answer(s)	Max Mark	Additional Guidance
1	(b)	<p>Statements which justify issues such as:</p> <ul style="list-style-type: none"> • Durability of material • Strength to weight issues (if combined 1mark) • Strength with justification • Weight in context • Readily available materials • Safety issues • Suitability for production methods • Function of component parts • Aesthetic properties • Ease of cleaning • Re-cycling • Corrosion resistant • Any other suitable answer <p>Sample answers <i>ABS offers excellent strength to weight ratio and has a high impact resistance. (2 marks)</i></p> <p><i>Chromed steel tube is durable, non-corrosive and aesthetically pleasing. (3 marks)</i></p> <p>NB – mention of mass production can be awarded in (1b) only Six valid statements – 1 mark each (5 + 1) No mark awarded for repetition.</p>	6	

Question		Expected Answer(s)	Max Mark	Additional Guidance
1	(c)	<p>Suitable Processes and finishes:</p> <p>Cascando Tree – Spindle moulding, CNC machining, die casting, turning, paint/lacquer spray (accept drilling)</p> <p>Classic Chrome – Welding, Press forming, Injection moulding, Bending/forming, Extrusion, Chrome plating.</p> <ul style="list-style-type: none"> • How manufacturing/assembly techniques are influenced by volume of production. <p>Statements could include:</p> <ul style="list-style-type: none"> • Standardisation of sizes, component parts all the same size. Shapes/forms suitable for process. • Standardisation of components and materials chosen because they are easily sourced/formed. • Suitable for mass/batch production – CNC machining, injection moulding. • Economy of scale – mass/continuous production/JIT <p>Maximum of 3 marks for identification of processes. (1 each process) Maximum of 3 marks per process (1 mark identification, 2 marks justification)</p>	6	
1	(d)	<p>Any four environmental issues described:</p> <ul style="list-style-type: none"> • Using recycled materials/re-use of materials • Use of finite materials(Sustainability) • Disposal of MDF, chromed steel, etc. • Chemical waste as a by-product from manufacturing processes • Safety conditions – spraying, chrome plating, dust extraction, etc. • Transportation issues (loading/unloading/ fumes/use of fossil fuels) • Workers conditions during production • Any other acceptable answer <p>Four issues described, 4 issues - 1 mark each (3 + 1)</p>	4	

Question		Expected Answer(s)	Max Mark	Additional Guidance
1	(e)	<p>Any description from:</p> <ul style="list-style-type: none"> • Cost (only if compared) • Aesthetics • Durability • Brand name/Image/prestige • Recycling • Easy to use/store • Lightweight • Number of jackets that can be held • Holding umbrellas (Classic chrome only) • Removable drip tray (Classic chrome only) • Flatpack issues (1mark max) • Any other acceptable answer <p>4 issues described – 1 mark each (3 + 1)</p>	4	
1	(f)	<p>The manufacturer:</p> <ul style="list-style-type: none"> • Raw materials checked for quality • Prompt delivery times (JIT) • Component accuracy • Identification of quality in finished bought parts • Project planning of assembly • Manufacturer reputation • Staff training • Machinery maintenance • Any other acceptable issue <p>The consumer:</p> <ul style="list-style-type: none"> • Product meets legislation standards • Assurance of appropriate function • Product is finished to a high standard • BSI regulations (relationship between customer safety and manufacturer liability) • Durability of product • Warranty • Customer support • Brand image • Any other acceptable issue <p><u>Two issues identified for the Manufacturer</u> <u>Two issues identified for the Consumer</u> 4 issues – 1 mark each (2 + 2)</p> <ul style="list-style-type: none"> • No marks awarded for repetition from 1 (e) 	4	
			(30)	

Section B

Question		Expected Answer(s)	Max Mark	Additional Guidance
2	(a)	<p>Material selection:</p> <ul style="list-style-type: none"> • Melamine Formaldehyde • Bakelite • Urea Formaldehyde • GRP • Phenol Formaldehyde <p>1 mark for identification of material</p> <p>Any two explanations from:</p> <ul style="list-style-type: none"> • Easily formed • Electrical insulation • Heat resistance • Scratch resistance • Stiffness of material • Durability/Strength issues • Any other suitable answer <p>1 mark for correct explanation</p>	2	
2	(b)	<p>Compression Moulding (accept Thermoset Injection Moulding)</p> <p>1 mark for identification of process</p> <p>Justifications could include:</p> <ul style="list-style-type: none"> • Economies of scale • Components are a suitable form for the process • Process is suitable for Thermosetting plastics • Little or no wasted material • Very accurate with little shrinkage • It is a high volume, high pressure method suitable for moulding complex shapes • One piece production • Relatively low cost production method • Quality surface finish/detail • Repeatability • Any other acceptable answer <p>1 mark for each correct justification (2 x 1 mark)</p>	3	
			(5)	

Question		Expected Answer(s)	Max Mark	Additional Guidance
3	(i)	<p>Explanations could include:</p> <ul style="list-style-type: none"> • Easily recognised products • Assumption of quality (Consumers know what they are getting) • Company loyalty (Consumers are familiar with products) • Lifestyle choices (Fashion/Style) • Adds value to products • Any other acceptable answer <p>1 mark for each explanation (2 x 1 mark)</p>	2	
3	(ii)	<p>Explanations could include:</p> <ul style="list-style-type: none"> • Creation of Corporate Identity • Promote image of large reliable company • Allows easier production expansion. (increased range) • Can be trademarked for protection • Any other acceptable answer not given in part (a) <p>1 mark for each explanation (2 x 1 mark)</p>	2	
			(4)	

Question		Expected Answer(s)	Max Mark	Additional Guidance
4	(a)	<p>Any suitable explanation relating to the process:</p> <ul style="list-style-type: none"> • Suitability of material • Form of product • Moulds/patterns are cheaper to produce than die cast moulds • Low set up costs • Bespoke designs • Batch/Bespoke production process/cost of production • Produces a substantial product • Any other suitable answer <p>(2 x 1 mark)</p>	2	
4	(b) (i)	<p>Any description from:</p> <ul style="list-style-type: none"> • Produces quality item • Aesthetic appeal • Resistance to wear and tear • Easily cleaned • Resistance to corrosion • Any other suitable answer 	1	
4	(b) (ii)	<p>Any description from:</p> <ul style="list-style-type: none"> • Material properties suit product function • Produces quality item (no repetition from (b (i))) • Suitability for production method • Recyclable materials • Aesthetics of brass(no repetition from b(i)) • Any other suitable answer 	1	
4	(c)	<p>Any two benefits described from:</p> <ul style="list-style-type: none"> • Faster process • Greater accuracy • Greater repeatability • Greater strength in product • Less waste due to measured billet • Improved finish • Any other suitable answer <p>(2 x 1 mark)</p>	2	
			(6)	

Question			Expected Answer(s)	Max Mark	Additional Guidance
5	(a)		<p>Any description from:</p> <ul style="list-style-type: none"> • Specific utensils for different cooking tasks dictating form • Separate colours indicating different utensils • “Nesting” function limiting form options • Stability of product limits form • Any other suitable answer <p>(2 x 1 mark)</p>	2	
5	(b)	(i)	<p>Product testing methods described:</p> <ul style="list-style-type: none"> • User trials • Test rigs • Expert appraisal • Focus groups (Questionnaires, etc.) • Any other suitable answer <p>No marks awarded for identifying the testing method (2 x 1 mark)</p>	2	
5	(b)	(ii)	<p>Information gathered:</p> <ul style="list-style-type: none"> • Durability of materials • Durability of form of product • Performance issues • Ease of cleaning/hygiene issues • Functional issues • Ergonomic issues – ease of use, dexterity, etc • Any other suitable answer <p>(2 x 1 mark)</p>	2	
				(6)	

Question		Expected Answer(s)	Max Mark	Additional Guidance
6	(a)	<p>Explanations could include:</p> <ul style="list-style-type: none"> • To see if parts fit together • To test the functional issues of materials • To assess reliability • To assess aesthetic issues • To assess ergonomic issues • To assess performance • To show the model to the client or customer for feedback • Any other acceptable answer <p>1 mark for each explanation (3 x 1 mark)</p>	3	
6	(b)	<p>Descriptions could include:</p> <ul style="list-style-type: none"> • The designer would be able to get a full size working model • Accuracy of component parts • Modifications to the design can be made more easily and effectively • Turnaround speed for prototypes is relatively quick when compared to traditional model making methods • Complexity of shape • Prototypes can be produced using exact materials • Any other suitable answer <p>1 mark for each description (3 x 1 mark)</p>	3	
			(6)	

Question		Expected Answer(s)	Max Mark	Additional Guidance
7	(a)	<p>Any description from:</p> <ul style="list-style-type: none"> • Structured planning of production of (JIT) • Specific deadlines for all stages • Increased quality assurance and control of design and production • Improved productivity • Labour issues • Reduced lead times • Timing of sub-contractors/component deliveries • Any other suitable answer 	3	
7	(b)	<p>Any description from:</p> <ul style="list-style-type: none"> • Improved time management • Improved communication between departments • Period of feedback in initial part of programme • Necessary changes can be highlighted quicker • Greater access to different areas of expertise • Any other suitable answer <p>Do not accept repetition from part (a)</p> <p>(2 x 1 mark) A more descriptive answer can be awarded two marks.</p>	2	
7	(c)	<p>Any explanation from:</p> <ul style="list-style-type: none"> • Identifying market wants and needs • Checking existing products • Assuring a suitable market exists • Price comparison • Promoting future products • Any other suitable answer <p>(2 x 1 mark) A more detailed answer can be awarded two marks.</p>	2	

Question	Expected Answer(s)	Max Mark	Additional Guidance
8	<p>Descriptions could include:</p> <p>Materials</p> <ul style="list-style-type: none"> • One piece construction of frame provides stability • Complexity of form can influence riding position • Durability issues • Excellent strength to weight ratio • Easily maintained/weatherproof • Any other suitable statement <p>Ergonomics</p> <ul style="list-style-type: none"> • Form/Size of grip enhances riding position • Overall weight of bicycle • Adjustable Riding Position (Aerodynamics) • Psychology (looks and feels fast) • Physiology (position and form of pedals etc) • Any other suitable statement <p>Function</p> <p>Efficient function of;</p> <ul style="list-style-type: none"> • Gears • Steering • Bearings • Pedal type <p>1 mark for each factor identified 1 mark each for four single simplistic answers or two indepth answers that cross over several times may be awarded two marks.</p>	6	
		(40)	

[END OF MARKING INSTRUCTIONS]