

# Markscheme

November 2021

Design technology

Higher level

Paper 3

7 pages

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## General Marking Instructions

### Subject Details: Design Technology HL Paper 3 Markscheme

#### Mark Allocation

Candidates are required to answer **ALL** questions in Section A (total **[20 marks]**) ONE question in Section B **[20 marks]**. Maximum total = **[40 marks]**.

#### Markscheme format example:

Question			Answers	Notes	Total
4.	b	ii	the displacement and acceleration; are in opposite directions;	Accept <b>force</b> for <b>acceleration</b> .	2

- Each row in the “Question” column relates to the smallest subpart of the question.
- The maximum mark for each question subpart is indicated in the “Total” column.
- Each marking point in the “Answers” column is shown by means of a semi-colon (;) at the end of the marking point.
- A question subpart may have more marking points than the total allows. This will be indicated by “**max**” written after the mark in the “Total” column. The related rubric, if necessary, will be outlined in the “Notes” column.
- An alternative wording is indicated in the “Answers” column by a slash (/). Either wording can be accepted.
- An alternative answer is indicated in the “Answers” column by “**OR**” on the line between the alternatives. Either answer can be accepted.
- Words in angled brackets < > in the “Answers” column are not necessary to gain the mark.
- Words that are underlined are essential for the mark.
- The order of marking points does not have to be as in the “Answers” column, unless stated otherwise in the “Notes” column.
- If the candidate’s answer has the same “meaning” or can be clearly interpreted as being of equivalent significance, detail and validity as that in the “Answers” column then award the mark. Where this point is considered to be particularly relevant in a question it is emphasized by **OWTTE** (or words to that effect).
- Remember that many candidates are writing in a second language. Effective communication is more important than grammatical accuracy.
- Occasionally, a part of a question may require an answer that is required for subsequent marking points. If an error is made in the first marking point then it should be penalized. However, if the incorrect answer is used correctly in subsequent marking points then **follow through** marks should be awarded. When marking, indicate this by adding **ECF** (error carried forward) on the script. “ECF acceptable” will be displayed in the “Notes” column.
- Do **not** penalize candidates for errors in units or significant figures, **unless** it is specifically referred to in the “Notes” column.

**Section A**

Question		Answers	Notes	Total
1.	a	Develops processes and systems to prevent defects; assures products meet the required/consistent quality / ensures the quality of all activities (quality of raw materials, machinery, parts, training, assemblies and products) from design to inspection;	<i>Award [1] for listing each way how Quality Assurance (QA) contributes to quality management up to [2 max].</i>	2
1.	b	Smart's Shoes is experiencing economic growth / sold 35 million pairs in 2015 / sold over 250 million pairs to date; while decreasing its environmental impact / reusing materials / recycling / reducing energy consumption;	<i>Award [1] for identifying how decoupling contributes to Smart's Shoes sustainable policies and practices, and [1] for a brief explanation up to [2 max].</i>	2
1.	c	Lean production enables Smart's Shoes to minimize waste / errors / energy; which lowers their impact on the environment;	<i>Award [1] for identifying reason why Smart's Shoes would use lean production to help meet their sustainability goals and [1] for a brief explanation up to [2 max].</i>	2
1.	d	A sustainability report focuses on a company's sustainable (economic, environmental, social and governance) performance; through reporting targets / impacts / strengths / weaknesses / progress; demonstrating a commitment to sustainability / increasing transparency; which boosts their reputation / competitive advantage in the market / sales / innovation / brand loyalty / stakeholders' trust / ability to attract investors / government subsidies;	<i>Award [1] for identifying the benefits of sustainability reporting for manufacturers such as Smart's Shoes and [1] for each subsequent explanation up to [4 max].</i>	4

Question		Answers	Notes	Total
2.	a	<p>Automated systems /reduction in errors / higher production rate / higher quality management / reduction in costs / efficient global workflow / efficient global distribution / enhanced communication; through computer monitoring and controlling of the entire process (design, planning, purchasing, cost accounting, inventory control, distribution);</p> <p>Reduction in the size of the workforce; because of automated manufacturing processes;</p>	<p><i>Award [1] for identifying reason why Dyson Ltd would use Computer Integrated Manufacturing (CIM) and [1] for a brief explanation up to [2 max].</i></p>	2
2.	b	<p>Brand loyalty / value for money; Dyson products are perceived to perform better than competitors / seen as premium products / build a strong user experience;</p>	<p><i>Award [1] for identifying a reason why some consumers purchase Dyson products even though they are on average 30% more expensive than their competitors and [1] for a brief explanation up to [2 max].</i></p>	2
2.	c	<p>Reduce costs / prices / time; as imitators develop products that benefit from Dyson's R&amp;D / technologies;</p> <p>Reduce risk / improve product acceptance / remain competitive; as existing Dyson products are successful / profitable / innovative;</p>	<p><i>Award [1] for a reason why Dyson's competitors have adopted an imitative strategy in the development of their products and [1] for a brief explanation up to [2 max].</i></p>	2
2.	d	<p>Staying ahead of competitors / enhancing their image as innovators / being first to market; to gain financial rewards / capture a large market share; as their brand image / brand loyalty; offsets the risks associated with a pioneering strategy / attracts customers to purchase their new products;</p> <p>Large companies such as Dyson are financially secure / have sufficient capital; to fund research and development; handle the risks of using a pioneering strategy; and absorb losses that may occur if the strategy fails;</p>	<p><i>Award [1] for an explanation why large companies such as Dyson Ltd are likely to adopt a pioneering strategy up to [4 max].</i></p>	4

**Section B**

Question		Answers	Notes	Total
3.	a	Testing happens in a controlled environment; that is easier to monitor/observe/record;	<i>Award [1] for identifying an advantage of testing the exoskeleton in a usability lab and [1] for a brief explanation up to [2 max].</i>	2
3.	b	Learnability refers to how easy it is to learn how to use a product / how intuitive a product is; this reduces support and training / reduces error rates / enhances user experience /enhances product acceptance / lowers memory burden;	<i>Award [1] for identifying why learnability is an important usability objective and [1] for a brief explanation up to [2 max].</i>	2
3.	c	A registered design protects a product's (new/distinctive) appearance (shape/form/colors/patterns/ornamentation); to distinguish it from competitors in the market / stop competitors from copying it;	<i>Award [1] for identifying why registered design is used to protect intellectual property and [1] for a brief explanation up to [2 max].</i>	2

*Question 3 continued*

Question		Answers	Notes	Total
3.	d	<p>A product family may be developed by using a product development corporate strategy (new/modified products in an existing market); through user research/market research/user feedback/identified needs; then developing a range of exoskeletons that share common features/parts/assemblies/technologies/codes; for example in various sizes/weights/prices/cost; adapted for a wider range of disabilities/amputees/paraplegic; and able-bodied people to support them in lifting heavy weights / repetitive load carrying;</p>	<p><i>Award [1] for each distinct point of how the exo-skeleton may be developed into a product family up to [5 max].</i></p>	5
3.	e	<p><b>Multi-disciplinary teams:</b> The mind-controlled exoskeleton is a complex product; which requires specialist skills / expertise from different disciplines; for more creative problem solving / as team members brainstorm/exchange/build on each other's ideas;</p> <p><b>Observation:</b> Thibault trained for months in a usability lab; which provided primary data/feedback; to evaluate whether the exoskeleton meets users' wants and needs/is usable / to improve the design;</p> <p><b>Personae:</b> Personae are fictional characters that represent the characteristics and lifestyle of the target audience; they focus the team's understanding of the required needs/challenges/tasks; to show empathy during design development;</p>	<p><i>Award [1] for why Clinattec have used multi-disciplinary teams, as part of the development of the exo-skeleton up to [3 max].</i></p> <p><i>Award [1] for why Clinattec have used observation as part of the development of the exo-skeleton up to [3 max].</i></p> <p><i>Award [1] for why Clinattec have used personae as part of the development of the exo-skeleton up to [3 max].</i></p> <p><i>Mark as [3] + [3] + [3].</i></p>	9