

Markscheme

May 2021

Design technology

Higher level

Paper 3

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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;	<i>Accept force for acceleration.</i>	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	<p>The light phone is a complex system / is meant to curb phone fidgeting / is the size of a credit card; which requires specialist skills / expertise from different fields/disciplines;</p> <p>More creative problem solving; as team members brainstorm/exchange/build on each other's ideas;</p>	<p><i>Award [1] for identifying why multidisciplinary teams would have been important in developing this product and [1] for a brief explanation.</i></p>	2
1.	b	<p>Improved product acceptance / increased sales /more competitive in the market; Improved user experience / likeability; Improved productivity; Decreased user error; Decreased training and support / lower memory burden / enhanced learnability; Improved product user interface / intuitive;</p>	<p><i>Award [1] for listing each way that the Light Phone has led to enhanced usability.</i></p>	2
1.	c	<p>A usability lab is a controlled environment /does not replicate a natural setting / test users are monitored; subjects may be uncomfortable / may behave differently / may not interact with their phone;</p> <p>Usability laboratories are expensive to operate; which limits the data collected;</p>	<p><i>Award [1] for identifying one disadvantage of using a usability laboratory to determine whether the Light Phone has led to a decrease in “phone fidgeting” and [1] for a brief explanation.</i></p>	2

Question		Answers	Notes	Total
1.	d	<p>Persona is a profile (a fictional character) of the (primary) target audience for a product; focusing on users' characteristics (demographics/age/gender/habits/behaviors/lifestyle); to help in the understanding of users / tasks / needs / environments; and build real-life scenarios / use case; to identify situations where phone fidgeting needs to be addressed / would be detrimental;</p>	<p><i>Award [1] for each of four distinct points in an explanation of why designers might use personae and characteristics in their user research to define the problem.</i></p>	4

Question		Answers	Notes	Total
2.	a	<p>The use of robotics and 3D printing manufacturing technology; allows Reebok Liquid Speed production to react to customer demands and trends (mass customization);</p> <p>Reduced storage/inventory/overproduction (waste); as they only produce what has been ordered;</p>	<p><i>Award [1] for identifying why the production method for the Liquid Speed Shoe is an example of JIT production and [1] for a brief explanation.</i></p>	2
2.	b	<p>CIM lowers (the unit) cost; as it monitors/controls Reebok's (entire) automated manufacturing processes /reduces errors (defects, waste) / reduces lead time / allows for faster (batch) production / allows for mass customization / reduces the size of the workforce; reduces the need for moulds / production quality is consistent;</p>	<p><i>Award [1] for identifying how Reebok has used CIM to make a smaller scale of production economically viable and [1] for a brief explanation.</i></p>	2
2.	c	<p>Imitators take advantage of the innovators' R&D / Imitators are less likely to invest in R&D as much as the innovators; this lowers their total cost; allowing them to sell at more competitive prices / to breakeven faster;</p> <p>Imitator products are less risky than innovations; they wait until an innovation is successful; and have established markets / have more time to develop a customer base;</p> <p>Imitators learn from the innovators; they understand consumer preferences (behaviors) /gain consumer feedback; and enter the market with improved designs;</p>	<p><i>Award [1] for each of three distinct points in an explanation of why innovations fail to succeed whilst imitator products dominate.</i></p> <p><i>Do not award marks across different clusters.</i></p> <p><i>Mark as [3] + [3].</i></p>	6

Section B

Question		Answers	Notes	Total
3.	a	Gain feedback (how it tastes, how easy it is to use, how it reacts with different food, ergonomics, its strength); leading to improved design;	<i>Award [1] for identifying why the development of the edible cutlery required the use of a usability testing session and [1] for a brief explanation.</i>	2
3.	b	Ideo-pleasure is derived from being consistent with personal values / morals / tastes / aspirations; Futuretensils' edible cutlery appeals to consumers who value ethical consumerism/ environmentally friendly choices / sustainable choices / who aim to reduce their single use plastic consumption / Futuretensils' edible cutlery satisfies certain dietary lifestyles (as it contains no preservatives, chemicals, additives or dairy products);	<i>Award [1] for identifying how edible cutlery meets the need for ideo-pleasure and [1] for a brief explanation.</i>	2
3.	c	Raising public awareness / providing consumers with information / suggesting greener alternatives; Educating consumers; attracting support using the media (including social media); providing companies with negative or positive publicity; supporting or undermining the development of (specific) technologies; lobbying governments (to change laws/issue legislations); Pressuring organizations (to opt for more sustainable practices);	<i>Award [1] for listing each way pressure groups such as Greenpeace influence consumer preferences.</i>	2

Question		Answers	Notes	Total
3.	d	<p>Market research strategies would have helped Futuretensils collect information/ data; related to the need to solve the problems associated with single-use plastic cutlery; and evaluate existing solutions (trends) in the market / identify user preferences/needs; to determine what attributes the cutlery should have (such as being edible, its flavors, its size, design, cost, price); For example, through literature search / expert appraisal / user trial / user research (interviews, surveys, questionnaires, focus groups) / perceptual mapping / environmental scanning / field research / observation;</p>	<p><i>Award [1] for each of five distinct points in an explanation of how the use of market research strategies would have led to the development of edible cutlery.</i></p>	5
3.	e	<p>Cyclic; edible / will easily biodegrade in a few days if uneaten; closed loop system / compost / creates zero waste / less carbon emissions;</p> <p>Safe; The edible cutlery is non-toxic (not harmful / in use and disposal); as it contains no preservatives, chemicals or additives;</p> <p>Social; founded in response to the 120 billion pieces of disposable plastic cutlery used in India each year / trying to disrupt the single-use plastic market; its manufacture and use supports the (human) right to a clean environment / supports human well-being;</p> <p>Efficient; Edible / biodegradable; therefore a reduction in the energy required for disposal;</p> <p>Solar: the cutlery is manufactured from various flours; that use the sun's energy to grow / are renewable;</p>	<p><i>Award [1] for each of three distinct points in an explanation of the ways in which Futuretensils is meeting Datschefski's principles of sustainable design.</i></p> <p><i>Mark as [3] + [3] + [3].</i></p>	9