

Markscheme

November 2018

Design technology

Higher level

Paper 3

8 pages

This markscheme is the property of the International Baccalaureate and must **not** be reproduced or distributed to any other person without the authorization of the IB Global Centre, Cardiff.

Section A

Question			Answers	Notes	Total
1.	a		Tesla's Powerwall 2 system involves small-scale energy production / is designed for individual, household or small community use ✓ it stores energy from renewable (sustainable, solar resources) / provides opportunities for individuals to go off grid and secure their energy needs from sustainable resources ✓	<i>Award [1] for identifying how the Powerwall 2 system is an example of micro-energy sustainability and [1] for a brief explanation</i>	2
1.	b		regulation/legislation ✓ education ✓ subsidies ✓ taxes/fines ✓	<i>Award [1] for listing each method of government intervention.</i> <i>[2 max]</i>	[2 max]
1.	c		Powerwall 2 system provides an opportunity for consumers to consciously purchase a product that minimises environmental damage (for example: global warming, climate change, pollutants, etc.) ✓ by promoting the use of renewable energy / by reducing reliance on fossil fuels / by storing energy from solar panels / sustainable energy consumption ✓	<i>Award [1] for identifying how the Powerwall 2 system can support the concept of ethical consumerism and [1] for a brief explanation</i>	[2 max]
1.	d		Eco-champion: Attitude: adopt/support environmental issues ✓ Behaviour: will promote the Powerwall 2 system within an organization ✓ Eco-phobes: Attitude: resent talk and discussion of environmental issues / doubt claims relating to the sustainable performance of Tesla Powerwall 2 ✓ Behaviour: will not adopt this system / may fight against it ✓	<i>Award [1] for each of two distinct points in that compare the consumer attitudes of an eco-champion and an eco-phobe</i> <i>[2 max]</i> <i>Award [1] for each of two distinct points that compare the consumer behaviours of an eco-champion and an eco-phobe</i> <i>[2 max]</i>	4

Question			Answers	Notes	Total
2.	a		<p>a product family is a group of products that have common processing / manufacturing techniques / parts / assemblies ✓</p> <p>reducing training / reducing down time / reducing dealing with various suppliers / reducing lead time / reducing space requirements / reducing waste / reducing manufacturing cost / improving efficiency ✓</p>	<p><i>Award [1] for identifying one benefit of Garmin developing a product family as a feature of lean production and [1] for a brief explanation</i></p>	2
2.	b		<p>automated systems / reduction in errors / higher production rate / higher quality management / global workflow / global distribution / reduction in costs ✓</p> <p>through computer monitoring and controlling of the entire process / production ✓</p> <p>reduction in the size of workforce ✓</p> <p>because of automated manufacturing processes ✓</p> <p>real-time data exchange ✓</p> <p>between all the elements of CIM (design, planning, purchasing, cost accounting, distribution) ✓</p>	<p><i>Award [1] for identifying one advantage of Garmin using computer aided manufacturing (CIM) and [1] for a brief explanation</i></p>	[2 max]
2.	c		<p>higher sales / stand out in a competitive market ✓</p> <p>as consumers are committed to purchasing Garmin products / regardless of their price ✓</p> <p>less risk for Garmin ✓</p> <p>when adopting product development / diversification / pioneering strategies ✓</p>	<p><i>Award [1] for identifying the importance of consumer brand loyalty <u>to Garmin</u> and [1] for a brief explanation</i></p>	[2 max]

Question			Answers	Notes	Total
2.	d		<p>Advantages of adopting a pioneering corporate strategy: pioneering strategies normally lead to a first-to-market / no or less competition ✓ which may lead to significant financial rewards ✓ may lead to brand loyalty ✓ consumers perceive Garmin as an innovative company ✓ [2 max]</p> <p>Disadvantages of adopting a pioneering corporate strategy: requires a large amount of funding for research and development / innovative technologies and manufacturing techniques may be required, that require large capital investment ✓ product champions are required to support and invest in new ideas ✓ pioneering techniques are full of risk / no guarantee that product will be successful; others can imitate their innovative products and surpass them ✓ [2 max]</p>	<p><i>Award [1] for each of two distinct points that explain the advantages of companies such as Garmin adopting a pioneering corporate strategy</i> [2 max]</p> <p><i>Award [1] for each of two distinct points that explain the disadvantages of companies such as Garmin adopting a pioneering corporate strategy</i> [2 max]</p>	[4 max]

Section B

Question			Answers	Notes	Total
3.	a		literature search ✓ expert appraisal ✓ user trial ✓ user research/questionnaires ✓ perceptual mapping ✓ environmental scanning ✓	<i>Award [1] for listing each market research strategy that could have been used in the development of the IKO prosthetic arm.</i> [2 max]	[2 max]
3.	b		involve users throughout design / throughout development ✓ include users in testing designs / in prototype testing sessions / in usability testing sessions ✓ modifications are based on users' feedback (iterative) ✓	<i>Award [1] for identifying each characteristic of participatory design.</i> [2 max]	[2 max]
3.	c		<p>Good understanding of <u>User</u>: empathize / understand users' needs, wants and limitations ✓ by involving users throughout the design and development of the IKO prosthetic arm / through participatory design ✓</p> <p>Good understanding of <u>Task</u>: understand which functions users require the IKO prosthetic arm to perform / which tasks users cannot currently perform ✓ through prototype testing ✓</p> <p>Good understanding of <u>Environment</u>: understand where users will use the IKO prosthetic arm ✓ through performance testing / field research / testing it in all appropriate environments (swimming, playing, etc.) ✓</p>	<i>Award [1] for identifying how UCD applies to the design and development of the IKO prosthetic arm and [1] for a brief explanation</i>	[2 max]

Question			Answers	Notes	Total
3.	d		<p>Learnability: how easy (intuitive) it is for a child to learn how to use the IKO prosthetic arm; affects how much help (training / support / instructions) a child needs / how willing a child is to use it ✓ lowers memory burden ✓</p> <p>Attitude: positive users' perceptions, feelings and opinions (likeability) of the prosthetic arm ✓ make it more interesting (fun) for a child to use / increase product acceptance ✓</p> <p>Overall learnability and attitude are important to the success of the IKO prosthetic arm / they allow for a good user experience / encourage user to buy it / encourage users to recommend it to others ✓</p>	<p><i>Award [1] for each of two distinct points that explain why attitude is important usability objectives for the IKO prosthetic arm</i></p> <p><i>Award [1] for each of two distinct points that explain why learnability is important usability objectives for the IKO prosthetic arm</i></p> <p><i>Award [1] for an appropriate conclusion.</i></p>	5

Question			Answers	Notes	Total
3.	e		<p>Socio-pleasure ✓ users feel more abled / more peer accepted ✓ belong to group of people who use prosthetic arms ✓ not excluded from activities ✓ status conveyed to others from owning a (fun) prosthetic arm ✓ initiates social conversation ✓ [3 max]</p> <p>Physio-pleasure ✓ wearing / controlling / operating / touching the arm ✓ pleasure from enabling hand dexterity and direct manipulation of artefacts ✓ pleasure from comfortably using the arm ✓</p> <p>Ideo-pleasure ✓ arm is made using Lego parts / funded by Lego future lab ✓ customizable/ can be given different attachments that relate to superheroes ✓ aesthetic / technological value ✓ Lego brand loyalty ✓ pleasure from feeling normal / less restricted / freedom ✓</p>	<p><i>Award [1] for each of three distinct points in an explanation how the IKO prosthetic arm uses socio-please, physio-pleasure and ideo-pleasure to satisfy the user.</i></p> <p>[3 max] for each.</p> <p><i>Note to markers: do not award marks across different clusters.</i></p>	[9 max]