

Markscheme

May 2018

Design technology

Higher level

Paper 3

10 pages

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Section A

Question		Answers	Notes	Total
1.	a	<p>there is a large population in some Chinese cities / China has a large population / China is overpopulated ✓</p> <p>Chinese roads and highways are congested / Increasing number of car owners has led to increased congestion / main roads have large numbers of people travelling in the same direction at the same time ✓</p> <p>many people commute and need a more efficient public transportation system / willingness (culture) of using public transportation already exists ✓</p>	<p><i>Award [1] for each way that the Chinese population influenced the TEB design concept listed.</i></p> <p><i>[2 max]</i></p>	2 max
	b	<p>the TEB is a complex / innovative system ✓</p> <p>that requires a variety of skills, knowledge and perspectives / specialists from many fields / eg engineers, town planners, designers, IT system specialists etc ✓</p> <p>multidisciplinary design teams allow for more creative problem solving as everyone has different skills and experiences ✓</p> <p>and ideas can leapfrog from one person's thoughts to awaken a different idea in another person's thinking / sharing and building on each other's ideas ✓</p> <p>a multidisciplinary design team provides a deeper understanding of complex problems ✓</p> <p>associated with user needs based on multiple perspectives / to ensure all possible aspects associated with the designing of the product from engineering to aesthetics are considered ✓</p>	<p><i>Award [1] for identifying the importance of using a multi-disciplinary design team for the TEB and [1] for a brief explanation</i></p>	2 Max

c		<p>ethnographers study societies / study cultures / immerse themselves within the Chinese culture ✓ to develop a deep understanding/empathy of the needs/behaviour of the people ✓</p> <p>an ethnographer would gather data from the point of view of the Chinese population/the subject of the study ✓ to forecast if the TEB would be an accepted solution by the people in China ✓</p>	<p><i>Award [1] for identifying the role an ethnographer may play in the design team for the TEB and [1] for a brief explanation</i></p>	<p>2 Max</p>
d		<p>Benefit: enhanced usability increases product acceptance / creates a positive user experience ✓ by reducing commute time / by increasing passenger comfort / by providing easy accessibility for a wide range of users / ease of movement within the TEB once on board ✓</p> <p>How: more people will use / purchase it ✓ making the system economical to run / use ✓</p> <p>Benefit: enhanced usability of the user interface for the driver/operator ✓ will reduce driver error ✓</p> <p>How: this will increase safety ✓ build user confidence / increases the use of the TEB system ✓</p> <p>Benefit: enhanced usability of the user interface for the driver/operator ✓ will reduce training costs/accidents ✓</p> <p>How: this will lower the cost of operating the TEB ✓ reflecting positively on ticket prices ✓</p>	<p><i>Award [1] for each of two distinct points in an explanation of the benefits of enhanced usability of the TEB [2 max]</i></p> <p><i>Award [1] for each of two distinct points in an explanation of how enhanced usability would contribute to its success. [2 max]</i></p> <p><i>Note to markers: Do not award marks from different clusters.</i></p>	<p>4 Max</p>

Question		Answers	Notes	Total
2.	a	<p>use of bamboo reduces the amount of plastic being used and disposed of / limits the build-up of waste (environmental) ✓</p> <p>made from 100% biodegradable material (bamboo, nylon) / cyclic / circular economy / safe (environmental) ✓</p> <p>promotes human well-being during production, use and disposal (social) ✓</p> <p>encourages public health (social) ✓</p> <p>the Humble Brush provides employment (economic) ✓</p> <p>sales contribute towards local economy(economic) ✓</p>	<p><i>Award [1] for each way listed of how the Humble Brush is an example of sustainable design.</i></p> <p><i>Note to markers: this is a list question.</i></p>	2 Max
	b	<p>the Humble Toothbrush provides an alternative to traditional plastic toothbrushes / the Humble Brush only uses biodegradable materials ✓</p> <p>this allows consumers to make a conscious decision to buy a product that does not harm the environment / positive buying ✓</p> <p>an increasing number of consumers are demanding ethical products ✓</p> <p>this has provided the impetus for designing and developing the Humble Toothbrush ✓</p>	<p><i>Award [1] for identifying how the Humble Brush can be seen as an example of ethical consumerism and [1] for a brief explanation</i></p>	2 Max

	c	<p>psychological pricing / by ending the price with .99 ✓ will make the customer believe it is cheaper than it really is ✓</p> <p>competitor based pricing / pricing the Humble Toothbrush similar (cheaper) than existing competitor plastic toothbrushes ✓ otherwise people won't buy it, and it would be withdrawn from the market ✓</p> <p>promotional pricing / the manufacturer may provide a limited period of a discounted price when the product is launched ✓ to encourage early adoption / to encourage consumers to trial the Humble Toothbrush ✓</p> <p>premium pricing / a higher retail price than other toothbrushes in the market / the sustainable nature of the Humble Brush ✓ may suggest a high quality / niche product / some consumers may be prepared to pay a higher price / premium price for it ✓</p>	<p><i>Award [1] for identifying a pricing consideration and [1] for a brief explanation of how it would stimulate sales of the Humble Brush</i></p>	<p>2 Max</p>
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Question	Answers	Notes	Total
<p>d</p>	<p>Material: made from biodegradable bamboo and Nylon 6 / made from sustainable materials / material allows for ergonomic shape / material allows for strength of handle / design similar to existing toothbrushes ✓</p> <p>Health: non-toxic / hygienic / provides same health benefits as existing toothbrushes / safe during disposal ✓</p> <p>Usability: same usability (functionality) as existing toothbrushes / ergonomic design / comfortable / (useful/effective/likeable/learnable) ✓</p> <p>Overall: balancing all three aspects results in a functional design and leads to product acceptance / diffusion in the market / evokes emotions (ideo-pleasure) ✓</p> <p>each of the three considerations are dependent on the other if one usability consideration failed, the humble brush would fail as all three need to be at a minimum standard for acceptance ✓</p> <p>[1 max]</p>	<p><i>Award [1] for each of four distinct points in an explanation of how the Humble Brush balances material, health and usability considerations.</i></p> <p><i>Note to markers – each of the considerations needs to be addressed with an overarching statement required for the fourth mark.</i></p>	<p>4 Max</p>

Section B

Question		Answers	Notes	Total
3.	a	<p>involving users early and throughout the UCD process / allows designers to receive feedback ✓ leading to improved design / to understanding how users interact with the Voxx Helmet / satisfying users' needs / gaining consumer confidence / gaining consumer acceptance / enabling diffusion into the marketplace ✓</p> <p>the Voxx Helmet is a radical / new / revolutionary design ✓ there are no existing products to gather potential user feedback that could be used. Therefore, frequent contact / an iterative process involving potential users in its development is required ✓</p>	<p><i>Award [1] for identifying a reason why frequent contact with potential users is essential by the design team for the development of the Voxx Helmet and [1] for a brief explanation</i></p>	<p>2 max</p>
	b	<p>social media / online advertising ✓</p> <p>motorcycling conventions / conferences ✓</p> <p>(motorcycle) magazines / Newspapers ✓</p> <p>TV / radio / billboard / poster advertisements (do not accept the word advertising alone) ✓</p> <p>mail shot /digital marketing e.g. email alerts, mail order marketing ✓</p> <p>point of Sale displays (in Motorcycle showrooms) ✓</p> <p>celebrity / customer endorsement ✓</p> <p>free samples / free gift with purchase / promotional gifts ✓</p>	<p><i>Award [1] for each promotion strategy used to market the Voxx Helmet to motorcycle riders listed.</i></p>	<p>2 max</p>

		<p>limited time offer / discounted pricing / joint offers with partners; contests ✓</p> <p>branding / causes and charity branded ✓</p> <p>leaflets / brochures ✓</p>		
	c	<p>provides large amounts of qualitative data that is difficult to achieve from other forms of data collection instruments ✓</p> <p>data could be gathered by developing ideas that come from the interviewee / identify users' requirements more precisely ✓</p> <p>designers can build a range of scenario / personae / use cases ✓</p> <p>interviews are a cost-effective way of gathering data ✓</p>	<p><i>Award [1] for reason why interviews would have been utilised as a user research strategy in the development of the Vozz Helmet listed.</i></p>	2 max
	d	<p>a product family may be developed by using a product development corporate strategy (new products in an existing market are identified) ✓</p> <p>through user research/market research/user feedback/identified needs ✓</p> <p>then developing a range of unique products that share common features/parts/assemblies ✓</p> <p>for example various sizes, types, colors, qualities, weights, prices, etc ✓</p> <p>the Vozz Helmet could adapt some of its properties / designs to be transferable to other sports/activities ✓</p> <p>for example, children's versions/ BMX/skiing helmets/basic versions/ones that incorporate Bluetooth ✓</p>	<p><i>Award [1] for each of five distinct points in an explanation of how the Vozz Helmet could be developed as a product family.</i></p> <p><i>Note to markers: Do not award marks for answers explaining a product line eg motorcycling gloves, motorcycling suits, etc.</i></p>	5 max

Question	Answers	Notes	Total
e	<p>Quality Control (QC): QC detects defects / checks products for defects ✓ based on the set standards (that have been set as part of the QA process) ✓ prevents defective products being placed on the market that potentially endanger the consumer / endanger the brand name ✓ through correcting the manufacturing techniques ✓ lowering the risk of legal action ✓ [3max]</p> <p>Quality Assurance (QA): QA prevents defects prior to and throughout production ✓ provides consumer confidence (guarantees) that the product is safe to use ✓ ensures (international) safety standards are met / ensures materials meet required standards / ensures staff are sufficiently trained / ensures machines are calibrated etc ✓</p> <p>Statistical process control (SPC): SPC ensures helmets are produced within the acceptable tolerances ✓ statistics are obtained (in real-time) during manufacture ✓ to detect when the process mean has moved away from the target (center line) / detect when item to item variability has increased ✓ leading to the correction of the manufacturing techniques ✓ can be automated and reduces chances of human error ✓ [3max]</p>	<p><i>Award [1] for each of three distinct points in an explanation of the importance through quality control (QC), statistical process control (SPC) and quality control (QC) to ensure the Vozz Helmet is produced to predetermined quality standards.</i></p> <p><i>Note to markers: do not award marks across different clusters.</i></p>	<p>9 Max</p>