

Design technology
Higher level
Paper 3

Monday 7 May 2018 (morning)

Candidate session number

1 hour 30 minutes

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Instructions to candidates

- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Answer all of the questions.
- Answers must be written within the answer boxes provided.
- A calculator is required for this paper.
- The maximum mark for this examination paper is **[40 marks]**.



Section A

Answer **all** questions. Answers must be written within the answer boxes provided.

- 1. The authorities in Qinhuangdao, China are prototyping the Transit Elevated Bus (TEB). The TEB runs on rails and has 2.1 m of clearance over the road below. This allows the cars to share the road as shown in **Figure 1**.

Figure 1: The TEB in Qinhuangdao, China



[Source: [https://en.wikipedia.org/wiki/Transit_Elevated_Bus#/media/File:InnoTrans_2016_%E2%80%93_Chinese_Bus%E2%80%A6-ish_Thing_\(29861803605\).jpg](https://en.wikipedia.org/wiki/Transit_Elevated_Bus#/media/File:InnoTrans_2016_%E2%80%93_Chinese_Bus%E2%80%A6-ish_Thing_(29861803605).jpg) by FelixM]

The TEB can use the existing roads and transport 1400 passengers at up to 60km/h.

- (a) List **two** ways in which the Chinese user population influenced the TEB design concept.

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- (b) Outline the importance of a multidisciplinary design team for the TEB.

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12EP02

(Question 1 continued)

- (c) Outline the role an ethnographer may play in the design team for the TEB. [2]

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- (d) Explain **one** benefit of enhanced usability of the TEB and how it would contribute to its success. [4]

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12EP03

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2. The Humble Brush, see **Figure 2**, is a toothbrush based on sustainable design. The handle is made from 100 % biodegradable bamboo and the bristles are made of Nylon 6 which the manufacturers claim is the most biodegradable nylon in the world.

Figure 2: The Humble Brush



[Source: www.humblebrush.com]

- (a) List **two** ways in which the Humble Brush is an example of sustainable design. [2]

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- (b) Outline how the Humble Brush can be seen as an example of ethical consumerism. [2]

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- (c) Outline **one** pricing consideration and how it would stimulate sales of the Humble Brush. [2]

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12EP04

(Question 2 continued)

(d) Explain how the Humble Brush balances material, health **and** usability considerations. [4]

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12EP05

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Section B

Read the case study. Answer the following questions. Answers must be written within the answer boxes provided.

3. The Vozz Helmet, see **Figure 3**, is a revolutionary motorcycle helmet with a hinged shell and no chin strap. It is marketed as a high-quality, comfortable and practical helmet.

Figure 3: The Vozz Helmet



[Source: © VOZZ Helmets]

The Vozz Helmet has a hinge at the top which allows the user to put it on while wearing glasses or with your gloves on. There are clips on each side of the chin piece and these can be clicked together. This removes the need for a chin strap.

The main reason why the Vozz Helmet has been designed in this way is to make it easier and safer to remove the helmet from the wearer in the event of an accident. **Figure 4** shows the special release system. The helmet also has a Vozz logo that the paramedic can scan enabling them to get instructions over their phone on removal procedures.

[Source: © VOZZ Helmets]

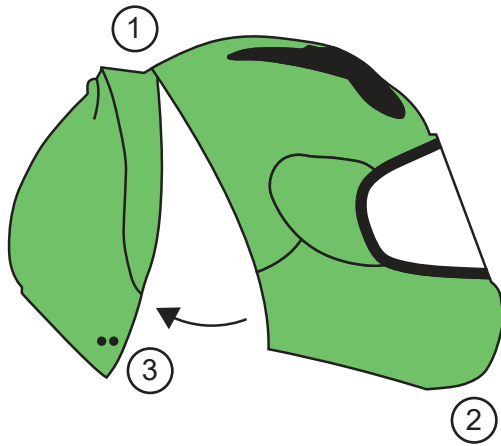
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12EP06

(Question 3 continued)

Figure 4: The Vozz Helmet special release system

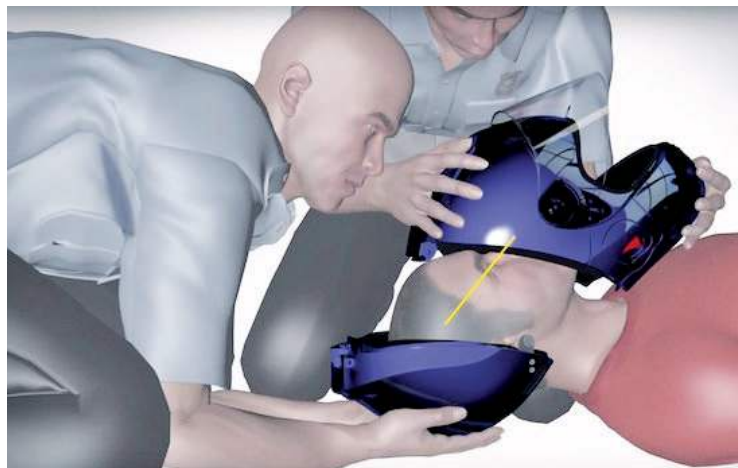


- ① The helmet splits vertically in two parts that pivot around a hinge at the top and toward the back of the shell. This allows the wearer to put it over their head and lock the helmet back in place.
- ② The helmet's underside has been redesigned as it needs no chinstrap, resulting in an extended and rounded chin cup that surrounds the head from below.
- ③ In the event of an accident, paramedics can use a special safety release system. By removing two screws that hold the upper hinge in place, emergency personnel can detach the front part of the helmet in a matter of minutes without applying any pressure to the rider's head.

[Source: Mail Online / Solo Syndication.]

Once the paramedics have been able to operate the special release system they can remove the helmet by detaching the front part as shown in **Figure 5**.

Figure 5: A paramedic removing the Vozz Helmet



[Source: © VOZZ Helmets]

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12EP07

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(Question 3 continued)

- (a) Outline why frequent contact with potential users is essential by the design team for the development of the Vozz Helmet. [2]

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- (b) List **two** promotion strategies that could be used to market the Vozz Helmet to motor cycle riders. [2]

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- (c) List **two** reasons why interviews would have been utilized as a user research strategy in the development of the Vozz Helmet. [2]

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(Question 3 continued)

- (d) The Vozz Helmet has gained acceptance for use in motorcycling and Vozz intends to extend its product range.

Explain how the Vozz Helmet could be developed as a product family.

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