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**Design technology**  
**Higher level and standard level**  
**Paper 2**

15 May 2026

**Zone A** afternoon | **Zone B** afternoon | **Zone C** afternoon

Session number

1 hour 30 minutes

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**Instructions to students**

- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Section A: answer all questions.
- Section B: answer one question.
- Answers must be written within the answer boxes provided.
- A calculator is required for this paper.
- The maximum mark for this examination paper is **[50 marks]**.



## Section A

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

**Figure 1: Festival tents and the P+365 Travel Bag designed from tent material**



1. Each year abandoned tents from music festivals across the world generate approximately 25 800 000 kilograms (25 800 tonnes) of waste. Designer, Tuo Lei, wanted to address this issue by designing fashion clothing and accessories from this waste.

Tuo Lei named the fashion range “P+365 products”, they are sold at festivals as souvenirs and include a tag stating the name of the festival the tent was collected from. Once obsolete, the material and components from P+365 products can be reused to make new products.

One of Tuo Lei’s products, the P+365 Travel Bag (**Figure 1**), was designed for a range of users, from teenagers to adults. The P+365 Travel Bag, which uses synthetic tent materials for the exterior making it both waterproof and durable.

**(This question continues on the following page)**



**(Question 1 continued)**

- (a) (i) State the term that best describes a physical model that is used to test ergonomic features.

[1]

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- (ii) List **two** drivers for invention that motivated Tuo Lei to create the P+365 products.

[2]

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- (b) (i) Outline why adaptation is the strategy for innovation used for Tuo Lei's P+365 products.

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- (ii) List **two** properties that would make synthetic fibres more suitable for use in tents than natural fibres.

[2]

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(Question 1 continued)

- (c) (i) Describe the process of pultrusion used in creating the straps of the P+365 Travel Bag.

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- (ii) Computer-aided design (CAD) simulation allows designers to gain valuable data at low cost.

Explain **three** ways CAD modelling may be used in the design of the P+365 Travel Bag.

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- (d) (i) Tuo Lei is passionate about sustainability and reusing materials for new products. He also aims to create ergonomic designs that are easy to manufacture.

State the percentile range Lei would have used to determine the length of the adjustable strap of the P+365 Travel Bag.

[1]

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(This question continues on the following page)



(Question 1 continued)

- (ii) Outline the advantage of using an assembly drawing for the P+365 Travel bag. [2]

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- (e) (i) Outline **one** waste mitigation strategy, other than reuse, that could be used for the discarded festival tents. [2]

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- (ii) Explain how Tuo Lei applied life cycle analysis (LCA) to the design of the P+365 products. [3]

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2. Traditionally a thermal insulation flask, called a hu (壺), was used by people in China to sip warm fluids throughout the day to stay hydrated.

The hu (壺) is constructed by utilizing a handmade ceramic flask, together with woven layers of bamboo strips to hold liquid and retain the temperature of the fluids. This provides both insulation and outer protection (**Figure 2a**).

**Figure 2a: Traditional hu (壺) thermal insulation flask**



[Source: RosenKaranedev / iStock.]

**Figure 2b: Heirloom flask**



**Figure 2c: Heirloom flask with woven bamboo**



(This question continues on the following page)



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(Question 2 continued)

**Figure 2b** and **Figure 2c** shows the Heirloom brand’s version of a thermal insulating flask, a modern version inspired by the function and aesthetics of the traditional hu (壺).

This combination of traditional Chinese craft and the modern technology used in standard thermal insulating flasks combines the properties of woven bamboo as an outer layer of its exterior, and a paper-thin titanium metal flask to contain the fluids.

- (a) Outline why titanium flasks are more durable than ceramic flasks. [2]

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- (b) Outline how the Heirloom flask fits with Rogers’ characteristic of *Compatibility*. [2]

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3. Explain **one** characteristic that makes the Heirloom flasks shape a classic design. [3]

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4. The key stages of the product life cycle are launch, growth, maturity, and decline.  
Explain how product versioning can help extend the life cycle of a product. [3]

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## Section B

Answer **one** question. Answers must be written within the answer boxes provided.

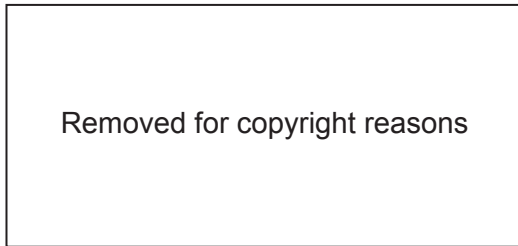
5. Experienced athlete Bryan Robbins created Lumabelt, a belt designed to help athletes running at night to stay safe.

He included lights within his design for an appropriate night light for runners that offers the user a sleek utility belt with an integrated effective light (**Figure 3**).

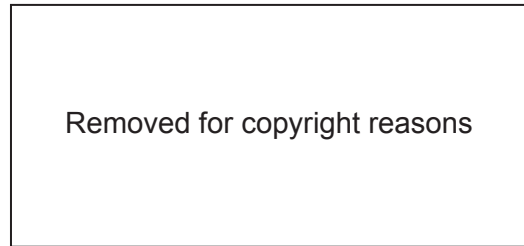
The belt is lightweight and ergonomically shaped to fit the user. The belt comes with a one-size-fits-all design based on average human dimensions. To fully understand the dimensions of the light on the Lumabelt, it was built using fused deposition modelling (FDM).

The material casing holds a light which can be controlled by a smartphone application. It is made from recycled plastic that can resist different weather conditions.

**Figure 3a: User running in the dark wearing the Lumabelt**



**Figure 3b: Close up image of the luma light**



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**(Question 5 continued)**

- (a) Describe fused deposition modelling (FDM).

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- (b) Explain how market research can be used to improve the predictability of a product's success **and** its potential lifespan in the market.

[3]

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**(Question 5 continued)**

- (c) Explain the design of the Lumabelt in relation to the psychological function **and** the practical function.

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(d) Explain how Robbins may utilize one-off, batch, **and** mass customization strategies in the development and production of the Lumabelt.



**Turn over**

6. Many amazing and wonderful people of all ages live with Neurodiversity on a daily basis and develop coping mechanisms to support living, studying and working within their daily lives.

Designer, Quentin Bachelot, wanted to create a product to help people cope with conditions that can affect focus, ability to organise and emotional stress management symptoms by designing Tot·M, a tactile memory recall product, or fidget tool (**Figure 4a**).

Quentin Bachelot stated that “The user can build a Tot·M representing their tasks for the day, using a range of materials, textures, forms and colours, which allows users full control in how they associate tasks with them.” To gain recognition of the product, the designer began a crowd-funded Kickstarter campaign and created social media links communicating the use and benefits of the Tot·M product. The product went viral and gained global recognition.

**Figure 4a: The Tot·M customizable memory recall fidget tool**



**Figure 4b: Tot·M being used, stacking tasks**



**Figure 4c: Tot·M attached to a backpack**



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**(Question 6 continued)**

- (a) Outline **one** physical property that makes hardwood suitable for the use as the main material for the Tot·M. [2]

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- (b) Explain how qualitative **and** quantitative data was used to evaluate the material choices for the Tot·M. [3]

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**(Question 6 continued)**

- (c) Suggest how the designer might have collected both primary **and** secondary anthropometric data to inform the design and development of the Tot-M.

[6]

[illegible]

**(This question continues on the following page)**



(d) Explain why the designer of Tot:M are considered as inventors, product champions **and** entrepreneurs.



**Turn over**

7. While travelling in Vietnam, designer Polly Jennings noticed the lively street culture created by small stools used flexibly as seats, tables, and market stands. Polly noticed that this informal short-stop seating encouraged people to gather, sit closely and interact, so she designed The Every Stool as a version for the Western world.

The Every Stool is a wire-framed stool (**Figure 5**) designed for indoor and outdoor use to encourage informal seating where communities can meet and chat. The Every Stool is low cost, stackable, made from a lightweight welded steel mesh with interconnecting steel rod joints, and a chrome-plated finish for durability and weather resistance.

**Figure 5: The Every Stool**



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**(Question 7 continued)**

- (a) Outline the process of ductility and where it was used within The Every Stool. [2]

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- (b) Explain why design for disassembly of metal parts is an important aspect of The Every Stool design process. [3]

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**(Question 7 continued)**

- (c) Explain why perspective drawings **and** orthographic drawings could be used in the design of The Every Stool.

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**(Question 7 continued)**

- (d) Explain how solid modelling, digital humans **and** finite element analysis (FEA) could help with the design and development of The Every Stool.

[9]



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#### **References:**

- Figure 1:** [Left image] WayneRay. <https://commons.wikimedia.org/wiki/File:ScoutTents.jpg>. Public domain. Source adapted.  
[Right image] With permission from Tuo Lei.
- Figure 2a:** RosenKaranedev / iStock.
- Figure 2b:** With permission from Yiyuandewu design group, Yiyuan Tech. Co. Ltd.
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