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**Design technology**  
**Higher level**  
**Paper 3**

Tuesday 21 May 2019 (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 Nintendo Switch was released in March 2017 and aimed to change the way users interact with video game consoles. The Nintendo Switch attempts to appeal to a broad range of users, from those who play occasionally, to those who are dedicated gamers and play as often as possible.

The Nintendo Switch has three different modes: Handheld mode, TV mode and Tabletop mode, see **Figure 1**. This supports both individual and multi-person gameplay in a variety of situations. The flexibility of three different modes mean you can take the console anywhere, and play with anyone.

**Figure 1: Handheld, TV and Tabletop modes**

Images removed for copyright reasons

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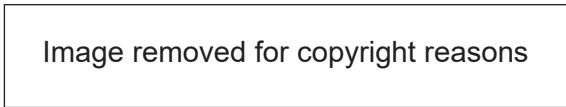
**(Question 1 continued)**

This “anytime, anywhere, with anyone” gameplay aims to provide video gamers an experience that makes it stand out from other popular games consoles, see **Figure 2**. The unique design of the Nintendo Switch blends together familiar TV-based video games consoles like the Microsoft Xbox, Sony PlayStation and handheld (portable) video games consoles like Nintendo’s 3DS. The controllers are modular and can be used together as a single controller for solo gameplay, or separately for multiplayer use. See **Figure 3** and **Figure 4**.

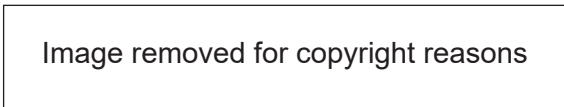
**Figure 2: Nintendo Switch played in a car**



**Figure 3: Controller for single player mode**



**Figure 4: Separated controller in multiplayer mode**



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**(Question 1 continued)**

- (a) List **two** types of market research Nintendo may have conducted during the development of the brief for the Nintendo Switch. [2]

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- (b) Outline **one** way how Nintendo may have used a usability lab during the development of the Nintendo Switch. [2]

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- (c) Outline **one** way that the designers have incorporated design for emotion to influence the success of the Nintendo Switch. [2]

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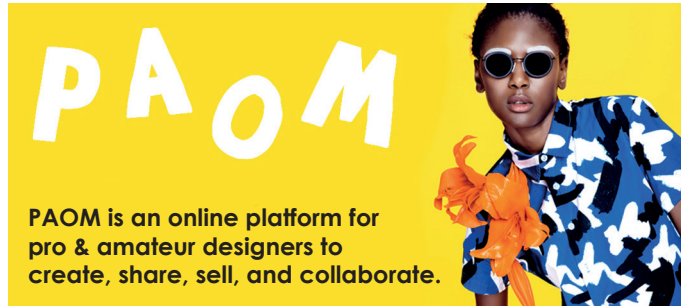
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- 2. Print All Over Me (PAOM) is an online platform that utilizes mass-customization to create custom-printed fashion garments. Its unique aesthetic of bold, all-over printing is created using digitally printed fabrics, see **Figure 5**.

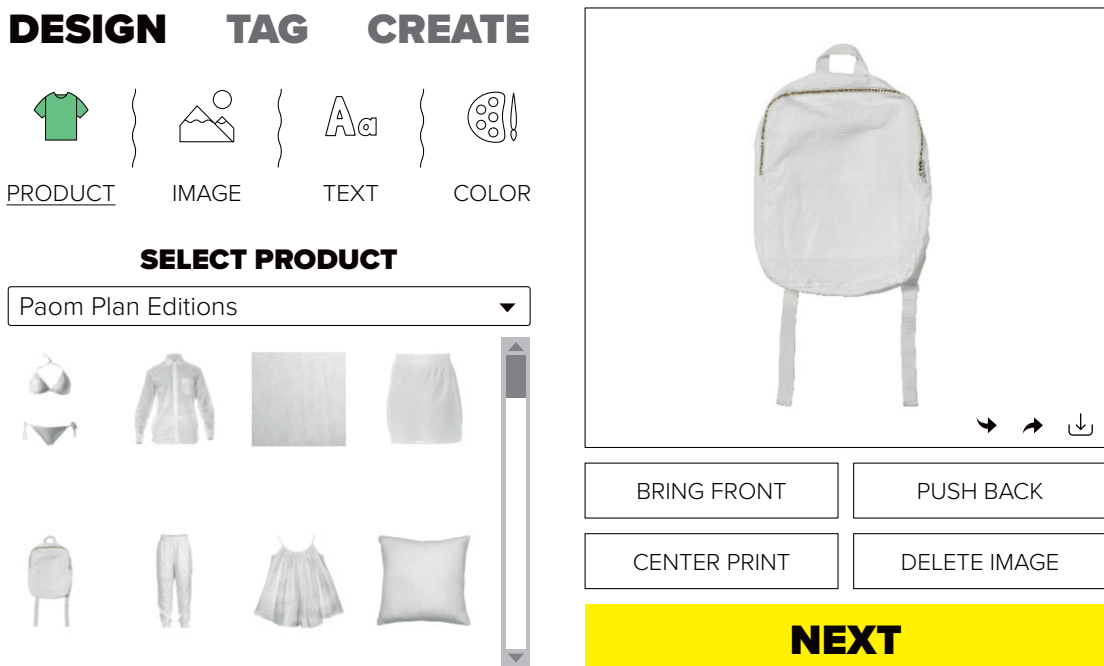
**Figure 5: The PAOM platform**



[Source: adapted from Print All Over Me <https://paom.com>]

The platform allows users to apply their image files to various garment designs which can be previewed and bought, see **Figure 6**.

**Figure 6: PAOM platform design interface**



[Source: adapted from Print All Over Me <https://paom.com>]

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**(Question 2 continued)**

PAOM has their own original garment designs and every three months they release new blank garment templates that can be printed on, see **Figure 7**. There is a wide variety of garment types to choose from.

PAOM uses just in time (JIT) production. Garments take two to three weeks to manufacture as the fabric must be printed, then cut, then sewn. PAOM uses a pioneering strategy and refers to this as “slow fashion”. They define “slow fashion” as a sustainable and ethically made fashion.

**Figure 7: A blank template of a PAOM hoodie and a virtual representation of what it looks like with a user’s design applied**



[Source: adapted from Print All Over Me <https://paom.com>]

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**(Question 2 continued)**

- (a) List **two** characteristics of the PAOM online platform that will lead to an effective user-product interface.

[2]

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- (b) Outline **one** way how computer integrated manufacturing (CIM) creates a more efficient manufacturing system for PAOM.

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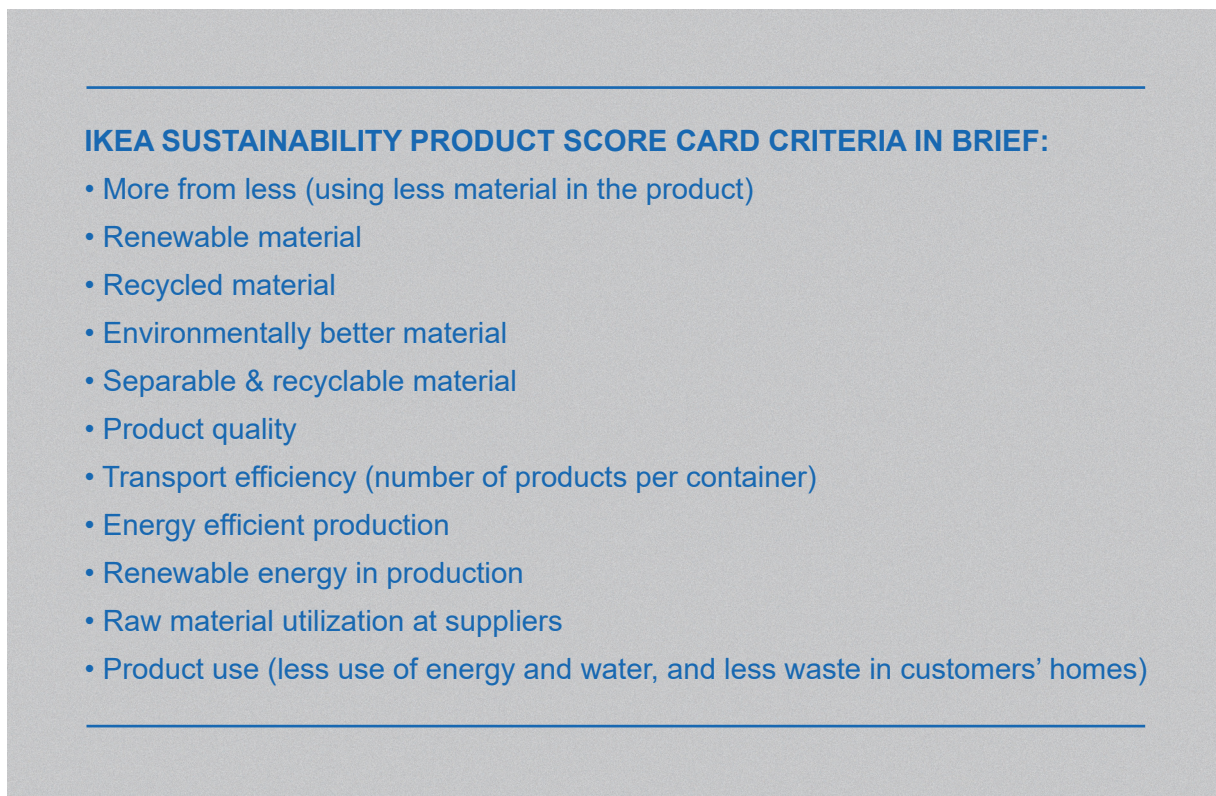
## Section B

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

3. IKEA is currently the world's largest home furnishings retailer operating in over 40 countries and has been celebrated for its commitment to sustainable growth.

The IKEA Group People & Planet Positive sustainability strategy lays out IKEA's vision for a more sustainable future. As part of this strategy, IKEA developed a "sustainability scorecard" to measure how sustainable their products are at each stage of their lifecycle, see **Figure 8**.

**Figure 8: The IKEA Sustainability Product Score Card criteria**



[Source: with permission from IKEA]

Part of IKEA's sustainability strategy is to reduce transport-based carbon emissions by 30% by the year 2020. To reach their goals, IKEA is constantly reviewing their manufacturing and distribution systems to ensure production and distribution is sustainable.

In the mid-2000s, IKEA saw a rapid increase in the North American market. A manufacturing centre at Swedwood, Virginia (USA) was opened in 2008 and specializes in panel-based wood products, such as bookcases. This highly-automated factory uses a lean manufacturing system developed by IKEA and based on several well-known techniques including the 5Ss and Kaizen.

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**(Question 3 continued)**

One of IKEA's ranges, BESTÅ, is manufactured at Swedwood. The BESTÅ range is a modular storage and display system that is customizable in a range of sizes, designs, and finishes. Individual components such as frames and doors are separate and this allows customers better control over the function and aesthetic of their interior design layout. The components are flat packed. See **Figure 9** and **Figure 10**.

**Figure 9: Manufacturing centre in Swedwood, Virginia**



[Source: with permission from IKEA]

**Figure 10: BESTÅ office**



[Source: with permission from IKEA]

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**(Question 3 continued)**

- (a) List **two** ways how IKEA considers corporate social responsibility. [2]

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- (b) Outline **one** way how pressure groups may have led to the creation of the IKEA Product Sustainability Scorecard criteria. [2]

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- (c) List **two** ways that IKEA might address the environmental impact of transportation and distribution. [2]

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