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Design technology
Higher level
Paper 3

18 May 2026

Zone A morning | **Zone B** morning | **Zone C** morning

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.
- 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]**.



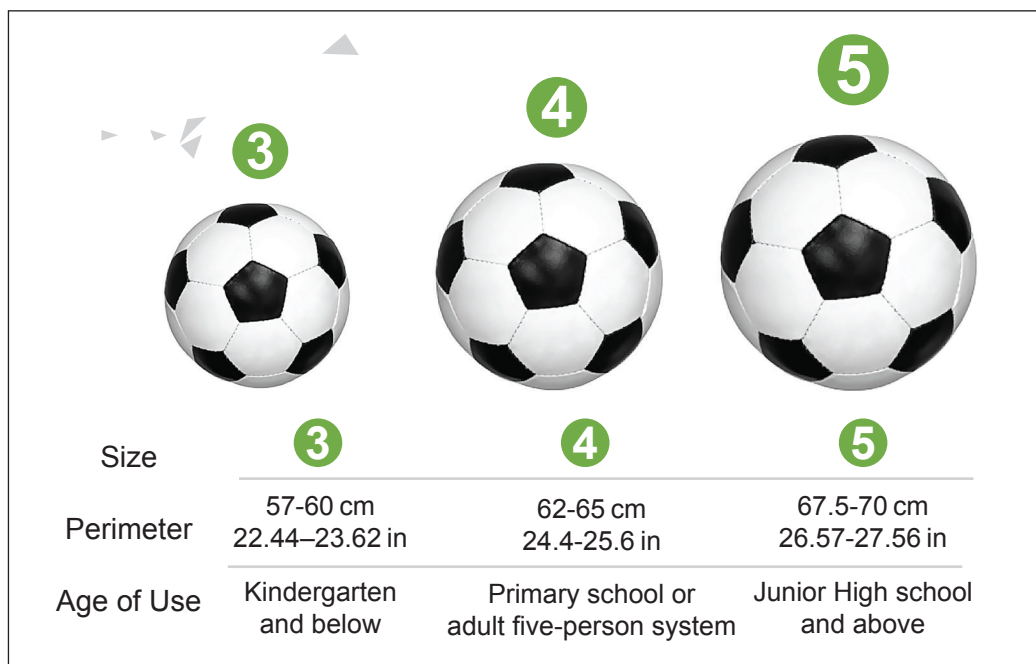
Section A

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

1. Soccer (football) equipment is ergonomically designed to support skill progression using relevant anthropometric data, see **Figure 1**.

Typically, soccer balls are made from synthetic leather, making it hard to recycle, and are often abandoned as youth players grow and develop.

Figure 1: Youth soccer ball sizes



Eco Fitness, whose motto is “bridging the gap between performance and sustainability”, produces sustainable soccer balls that are both vegan and biodegradable, avoiding use of non-renewable resources.

The thermoplastic polyurethane (TPU) and thermoplastic elastomer (TPE) layers of the ball are sustainable, see **Figure 2**. Eco Sports guarantees its durability for extended periods of play in various weather conditions.

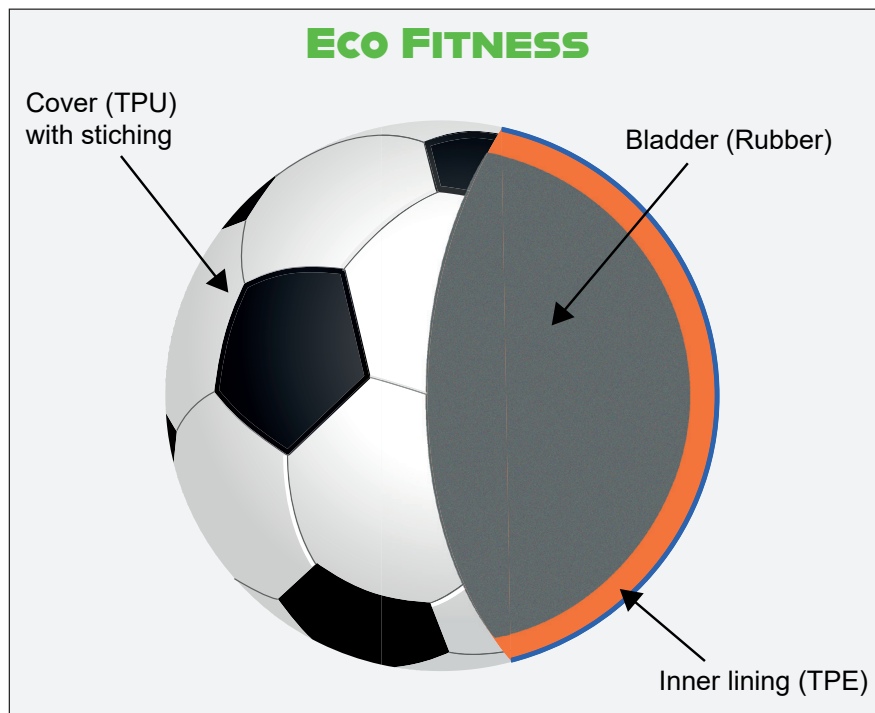
The vegan material properties and construction stitching enable the spinning of the ball during flight, making it just as aerodynamic as traditional soccer balls.

(This question continues on the following page)



(Question 1 continued)

Figure 2: Diagram of the layers of the Eco Fitness soccer ball



(This question continues on the following page)



(Question 1 continued)

- (a) List **two** market segments used to determine the target audience for the Eco Fitness soccer balls, see **Figure 1**.

[2]

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- (b) Outline **one** way field testing of an Eco Fitness soccer ball in a natural environment would be more beneficial than in a usability laboratory.

[2]

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- (c) Outline **one** benefit to Eco Fitness of creating a product family.

[2]

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(This question continues on the following page)



(Question 1 continued)

- (d) Explain why quality assurance is important in the production of the Eco Fitness soccer ball.

[4]

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16EP05

Turn over

2. City bicycle riding provides direct-transportation without releasing harmful carbon emissions.

Portland Design Works have designed and created narrow fenders (mudguards) known as Sodapop Fenders due to 97 % of their fenders being made from recycled soda beverage bottles.

The Sodapop front fenders (mudguards) mount on the front fork crown, a standard feature on most city and mountain bicycles. The shape of the fender (mudguard) redirects water spray and mud away from the bicycle rider.

Portland Design Works is a member of *1 % for the Planet*. “Each year we donate 1 % of our top of line revenue to nonprofit organizations working to protect our planet. Many of these organizations donate bicycle accessories to those who cannot afford them”.

Figure 3: Sodapop Fender (mudguard) being used in wet weather



(This question continues on the following page)



(Question 2 continued)

Figure 4: Sodapop front fender configuration



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16EP07

Turn over

(Question 2 continued)

- (a) List **two** of Datschefski’s five principles of sustainable design that would be relevant to the design of the Sodapop Fender.

[2]

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- (b) Outline **one** possible price setting strategy that could have been used by Portland Design Works to determine the sale price of the fenders.

[2]

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(This question continues on the following page)



(Question 2 continued)

- (c) Discuss how the Sodapop Fender depicted in **Figure 3** and **Figure 4** appeal to the user's ideo-pleasure **and** physio pleasure.

[6]

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16EP09

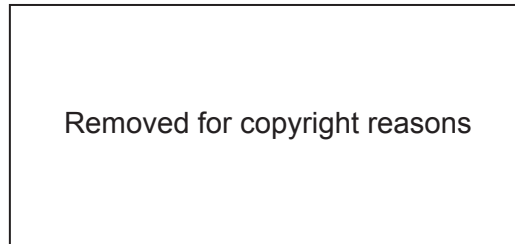
Turn over

Section B

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

3. Fenty Beauty is a cosmetics company founded by popular Grammy award-winning singer Rihanna.

Figure 5: Fenty Beauty products



The simple geometric shapes of the cosmetic containers (**Figure 5**) minimize the use of non-renewable materials (non-recyclable magnets) and limit the amount of packaging needed for transportation of the products. Fenty Beauty also supports sustainability by offering products refills.

(This question continues on the following page)



(Question 3 continued)

Figure 6: Fenty Beauty Virtual Try On and Consultation services

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Fenty Beauty also offer virtual try-on, skin tone-matching and consultation services (**Figure 6**) where you can see a simulation of the product before you buy. New makeup tutorials are released and posted every week.

Additionally, there is a 15 % student discount, and 35 % of the sales of the CLF 3 make-up bag (**Figure 8**) go to the Clara Lionel Foundation.

(This question continues on the following page)



(Question 3 continued)

Figure 7: Clara Lionel Foundation impact



The Clara Lionel Foundation explains, “*We support and fund climate resilience and climate justice projects while advocating for systems change in the U.S. and Caribbean.*” Much of the funding goes to immediate housing needed for individuals and families displaced due to weather events, as well as scholarships for students, see **Figure 7**.

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(Question 3 continued)

Figure 8: CLF 3-Piece Makeup Bag

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- (a) List **two** ways which Fenty Beauty policies could encourage brand loyalty. [2]

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- (b) Outline **one** way in which purchasing Fenty Beauty products can be seen as an example of ethical consumerism. [2]

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(Question 3 continued)

- (c) Outline **one** market research strategy that could be used to determine if there was a market for Fenty Beauty’s Virtual Try-On and Consultation services shown in **Figure 6**. [2]

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- (d) Explain the advantages of using computer integrated manufacturing (CIM) in implementing a just in time (JIT) approach for production of CLF 3-Piece Makeup Bags so that Fenty Beauty can maximize the amount of money that goes to the Clara Lionel Foundation, whose work is shown in **Figure 7** and **Figure 8**. [5]

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(Question 3 continued)

- (e) Discuss how Fenty Beauty meets each of the three corporate social responsibility objectives economic, social, **and** environmental through selling their products.

[9]



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References:

- Figure 1:** Barcin, 2012. *Soccer ball -stock photo*. [image online] Available at: <https://www.gettyimages.co.uk/detail/photo/soccer-ball-royalty-free-image/482855855?show-asset-scope=true> [Accessed 06 October 2025]. Source adapted.
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