Design Technology Sample Standard Level Paper 1 Set C

1 hour

Instructions to candidates

- Do not open this examination paper until instructed to do so.
- Answer all questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.
- The maximum mark for the examination paper is [30 marks].

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1. A design team developing a handheld barcode scanner will produce several models during development.



Figure 1: A man using a handheld scanner

A designer wants to check how the new handheld barcode scanner feels in the hand before any detail of the design is settled.

Which model would be most appropriate?

A. The carved foam block

B. The 3D printed shell

C. The working unit in production materials

D. A dimensioned orthographic drawing of the scanner

2. Osprey manufactures backpacks for hiking. Its Anti-Gravity suspension, introduced in 2014, runs a single piece of tensioned mesh continuously from the lumbar pad around to the hip belt, holding the body of the backpack away from the wearer's back.

A loaded backpack can weigh 15 kg or more. The hip belt is shaped to transfer much of that weight onto the hips and pelvis rather than leaving it on the shoulders.

Osprey's All Mighty Guarantee undertakes to repair any Osprey pack of any age free of charge, whatever caused the damage.



Figure 2: An Osprey pack with Anti-Gravity suspension mesh system



Figure 3: A wearer's torso showing the hip belt positioned on the pelvis

Transferring the weight of a 15 kg pack onto the pelvis rather than the shoulders gives an ergonomic benefit, see Figure 3.

Which benefit is most significant over a long day of walking?

A. It increases the wearer's reach above the head

B. It improves the wearer's field of vision when walking downhill

C. It lowers the wearer's centre of gravity considerably

D. It reduces sustained muscular loading on the shoulders

3. Which requirement is most critical for the material used in the suspension mesh, see Figure 2?

A. Conducting heat away from the wearer's back

B. Retaining tension under a sustained load

C. Resisting attack by common solvents

D. Remaining rigid when the pack is loaded

4. The “All Mighty Guarantee” repairs any Osprey pack of any age free of charge.

Which objective of a circular economy does this most directly serve?

A. Incorporating biodegradable materials into the product

B. Using renewable energy throughout production

C. Extending the useful life of the product

D. Reducing the mass of material in the product

5. The hip belt and shoulder harness adjust over a wide range rather than being supplied in fixed sizes, see Figure 2.

Which strategy for accommodating variation in body size is this?

A. Designing for the average user

B. Designing for the extremes

C. Providing a range of fixed sizes

D. Adjustability

(Questions continue on the following page)

6. The Amazon Echo, first sold in 2014, is a speaker with an array of microphones that listens for a spoken wake word and then responds to spoken requests. It has no screen and almost no buttons.

The device sends a recording of whatever follows the wake word to Amazon's servers to be interpreted. Users can review and delete those recordings, but the default setting keeps them.

Amazon reports that the Echo is widely used by people who find a phone or a keyboard difficult to operate.



Figure 4: An Amazon Echo Plus, with the microphone array and the mute button indicated

(a) A user who has not operated an Echo for six months returns to it and uses it without having to relearn anything.

Which usability objective does this demonstrate?

A. Efficiency

B. Learnability

C. Memorability

D. Satisfaction

(b) Using the Echo depends on the user hearing its spoken reply, see Figure 4.

Which limiting aspect of user capability most restricts who can operate it in this way?

A. Hearing threshold

B. Visual accuracy

C. Grip strength

D. Perception of colour

(This question continues on the following page)

(c) Recordings are retained by default, and a user who does not want them kept must take action to delete them.

Which responsibility of the designer does this default setting most directly engage?

A. The responsibility to ensure a product is safe to use at all times

B. The responsibility to meet international standards

C. The responsibility to minimise material consumption

D. The responsibility to the user and the wider community

(d) The Echo is widely used by people who find a phone or a keyboard difficult to operate.

Which limiting capability does a voice interface most directly remove as a barrier?

A. Fine muscle control

B. Hearing threshold

C. Memory for long sequences

D. Tolerance of background noise

(e) Amazon wants to learn how households actually use the Echo in their kitchens over a period of several weeks.

Which user-centred research method would produce the most useful data?

A. A single focus group held at head office

B. Field research carried out in users' homes

C. A questionnaire completed at the point of sale

D. A review of published literature on smart speakers

(Questions continue on the following page)

7. The Nintendo Switch, released in 2017, uses detachable controllers called Joy-Con. Each contains an analogue stick that reports the direction in which the player pushes it.

From 2019 large numbers of owners reported that their sticks registered movement when untouched, a fault known as drift. The contact surfaces inside the stick wear with use, and the worn material affects the reading.

Nintendo began repairing affected Joy-Con free of charge, including controllers outside their warranty, and has continued to sell the same stick design.



Figure 5: A Joy-Con controller on a Switch, with the analogue stick modules alongside

(a) Nintendo repaired affected controllers free of charge, including those outside their warranty.

Which responsibility of the designer does this response address?

A. The responsibility to meet international standards

B. The responsibility to reduce material consumption

C. The responsibility to the needs of the user

D. The responsibility to ensure safety in use

(b) A design team carrying out a product analysis wants to establish how widespread the drift fault is.

Which source of information is most useful?

A. The manufacturer's published specification for the controller

B. The number of repair claims recorded by the manufacturer

C. Reviews of the controller written at the time of release

D. The retail price of a replacement controller

(This question continues on the following page)

(c) The fault arises because contact surfaces inside the stick wear away with use, see Figure 5.

Which material property is most relevant to this failure?

A. Toughness

B. Density

C. Thermal conductivity

D. Hardness

(d) Nintendo repairs a faulty Joy-Con rather than replacing the console it belongs to.

Which circular economy strategy does this represent?

A. Recycling of the materials

B. Repair of the product

C. Dematerialization of the design

D. Downcycling of the components

(e) Nintendo has continued to sell controllers using the same stick design after the fault became widely known.

Which stage of the design process has not been revisited?

A. Design a solution

B. Empathize with the user

C. Define the project

D. Present a solution

(Questions continue on the following page)

8. Microsoft released the Kin ONE and Kin TWO phones in April 2010. They were aimed at teenagers who used social networks heavily. The phones had no app store and could not run any third-party software.

Despite the lack of features, customers were required to buy a $30/month data plan which was priced the same for an iPhone 3GS, which allowed users to download many applications and use a robust mobile internet browser.

Microsoft withdrew the phones from sale about seven weeks after launch, after which accessories and replacement parts were no longer produced.



Figure 6: The Microsoft Kin ONE and Kin TWO

(a) Which of the following is best recorded as a **weakness** in a product analysis of the Kin, see Figure 6?

A. The popularity of social networks among teenagers

B. The price of the data plan set against the phone's capability

C. The number of competing smartphones already on sale at launch

D. The reputation of the manufacturer at the time

(b) The Kin was designed for teenagers but required a data plan priced for full smartphones.

Which failure in user-centred design does this best illustrate?

A. The usability objectives for the product were never defined

B. The research gathered qualitative rather than quantitative data

C. The product was tested on a sample that was too small

D. The persona's spending power was not reflected in the product

(This question continues on the following page)

(c) After the Kin was withdrawn from the market, accessories and replacement parts were no longer produced.

Which form of obsolescence does this create for an owner?

A. Style obsolescence

B. Technological obsolescence

C. Functional obsolescence

D. Planned obsolescence

9. Labubu is a collectable figure designed by Kasing Lung and sold by Pop Mart. The figures are sold in sealed boxes, called '*blind* boxes', so a buyer does not know which figure from a set they have bought until the box is opened. Some figures in each set are produced in far smaller numbers than the rest, making them 'rare'.

Demand rose very quickly from 2024, and figures first sold for a low price began to be resold for many times their store price.

What is Labubu? Why is she so popular? We have answers.

This viral sensation has people lining up overnight to get their hands on one.

Updated Aug. 20, 2025, 9:36 PM GMT+8

Rebecca Rodriguez
Former Editorial Projects Manager





Labubu is the "it girl" — here's why. Courtesy of Rebecca Rodriguez



Figure 7: A Labubu new article and 'blind boxes'

(a) Some figures in each set are produced in far smaller numbers than the rest, see Figure 7.

Which design decision does this represent?

A. Designing for a wide range of user needs

B. Designing scarcity into the product

C. Designing for durability in use

D. Designing to meet a safety standard

(This question continues on the following page)

(b) A design team wants to judge whether demand for Labubu figures is likely to continue.

Which evidence is most useful?

A. The retail price of a single sealed box

B. The number of different figures in the current set

C. The previous work of the designer

D. Resale prices tracked over a period of time

(c) Buyers often purchase several sealed boxes in order to obtain one particular figure.

Which sustainability concern does this practice most directly raise?

A. The energy consumed during manufacture

B. Consumption beyond the buyer's actual need

C. The recyclability of the packaging materials

D. The working conditions in the factories

10. Mattel introduced Barbie in 1959 with a single body shape. The doll was criticised for decades for presenting proportions that no person has.

In 2009 Mattel released the Barbie Fashionistas line of dolls which were more poseable. The original six Fashionista dolls did not represent any body type diversity and minimal racial diversity.

In 2016 Mattel added three new body types to the Fashionistas range: curvy, tall and petite. Since 2019 the range has included dolls with a prosthetic limb, a wheelchair, hearing aids and vitiligo (a condition affecting skin pigmentation). These dolls are sold within the standard range at the standard price.

Mattel develops them with medical charities and with people who have the conditions represented.



Figure 8: The four Fashionistas body types shown together

(This question continues on the following page)



Figure 9: A selection of modern Fashionistas dolls.

(This question continues on the following page)

(a) Mattel develops these dolls with people who have the conditions represented.

Which user-centred research approach is this?

A. Secondary research using published data

B. Benchmarking against competing products

C. Involving users directly in the design process

D. Testing a finished product with a focus group of buyers

(b) Before 2016 the whole Barbie range was based on one body shape.

Which user-centred design error does this best illustrate?

A. Designing from a population stereotype rather than from research

B. Failing to define the product's usability objectives

C. Testing the product with a sample that was too small

D. Collecting qualitative data in a case where quantitative data was needed

(c) In 2016 Mattel added curvy, tall and petite body types to the range, see Figure 8.

Which inclusive design strategy is this?

A. Designing for the extremes of the population

B. Adjustability of the finished product

C. Designing for the average user

D. Providing a range of sizes

(d) The dolls representing prosthetic limbs and hearing aids are sold inside the standard Barbie product range at the standard price, rather than as a separate line, see Figure 9.

Why does this matter most for inclusive design?

A. It reduces Mattel's manufacturing costs

B. It avoids marking out the users it represents as separate

C. It simplifies the design of the packaging

D. It allows a wider choice of accessories to be offered with it

(This question continues on the following page)

(e) Mattel wants to judge whether the Fashionistas range has achieved what it set out to do.

Which evidence is most useful?

A. The number of body types now offered across the whole range

B. Feedback gathered from the groups the dolls represent

C. The retail price of each doll in the range

D. The number of dolls manufactured each year

(f) The dolls are moulded in a polymer that must hold fine detail, resist breaking when dropped, and be safe if mouthed by a small child.

Which combination of properties is most critical?

A. Toughness and non-toxicity

B. Hardness and thermal conductivity

C. Elasticity and electrical resistance

D. Density and resistance to corrosion

(g) Before a new doll goes into production, Mattel produces a hand-finished model in the final colours and materials, which is reviewed and approved.

What is the main purpose of a prototype of this kind?

A. To test the product with a large group of users

B. To check that the moulding tool will operate correctly

C. To gather data on how children actually play with the doll

D. To confirm the appearance of the design before production

(h) The wheelchair accessory was modelled using computer-aided design (CAD) and printed before any tooling was made, see Figure 9.

Which advantage does this give the design team?

A. The design can be changed cheaply before tooling is committed

B. The printed model is exactly as strong as the production component

C. The printed model can be sold directly to customers

D. The design no longer needs to be tested with users

(i) Mattel has introduced dolls moulded partly from recycled plastic.

Which of Datschefski's five principles of sustainable design does this most directly serve?

A. Safe

B. Social

C. Cyclic

D. Solar

Markscheme

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1.	A	**6e.**	B	**10a.**	C
2.	D	**7a.**	C	**10b.**	A
3.	B	**7b.**	B	**10c.**	D
4.	C	**7c.**	D	**10d.**	B
5.	D	**7d.**	B	**10e.**	B
6a.	C	**7e.**	A	**10f.**	A
6b.	A	**8a.**	B	**10g.**	D
6c.	D	**8b.**	D	**10h.**	A
6d.	A	**8c.**	C (D is debatable)	**10i.**	C
		9a.	B		
		9b.	D		
		9c.	B		