Design & Technology
(Product Design)

DTBase©

OCR A-Level

New and Emerging Technologies in Product Innovation (2.2a)

Materials required for questions

- Pencil
- Rubber
- Calculator

Instructions

- Use black ink or ball-point pen
- Try answer all questions
- Use the space provided to answer questions
- Calculators can be used if necessary
- For the multiple choice questions, circle your answer

Advice

- Marks for each question are in brackets
- Read each question fully
- Try to answer every question
- Don’t spend too much time on one question

Good luck!

Q1. Why is understanding technological developments essential for product designers?

A So products can be manufactured using outdated methods

B So designers can focus only on aesthetics rather than function

C Because new technologies shape what is feasible, efficient, and competitive in future design solutions

Q2. When evaluating new and emerging technologies, which factor most strongly influences long-term product evolution?

A The branding history of earlier product models

B The potential of technologies to enable entirely new functions or user experiences

C The personal preference of the design engineer

Q3. How does awareness of technological change support innovation?

A It ensures products do not change too quickly

B It increases manufacturing cost without improving performance

C It allows designers to anticipate opportunities for improvement before competitors

Q4. Why must designers consider *future* technological scenarios, not just current ones?

A Because products created today may be used in future contexts where expectations and technologies have advanced

B Because current technology is irrelevant

C Because predicting the future eliminates all design uncertainty

Q5. Hearing aids are becoming increasingly more sophisticated. Discuss the influences new and emerging technologies could have on the design of the hearing aid. **(6 marks)**

Answers

Q1. C
Q2. B
Q3. C
Q4. A

Q5.
Indicative content:
Influences of new and emerging technologies: Possible responses could include:
New and emerging technologies could develop the size, shape, materials and functionality of the design, to improve usability, manufacturing and ergonomics. Ways in which these technologies could influence the design could include:

- The ways that the device is programmed, they could consider the use of blue tooth to transmit settings and programs from a mobile phone to the device. This could include reference to the control of the volume level or settings for public places. The development of lithium batteries to enable the device to have a smaller battery size reducing to enable the device to be light enough and small enough to be worn daily increasing comfort.
- The development of rechargeable batteries and their life removing the need to replace the battery, removing waste and having longer intervals in between charging.
- The design could utilise contactless charging could be used to re-charge the earpieces while the user sleeps, this could be integrated into a bed enabling the user to be able to sleep in the hearing aids.
- The development of mouldable materials for the earpiece means that the user can customise the ear moulds to their ears for fit.
- Earpiece needing to fit the ear, ability to change this as the user grows makes it better as it can "grow" could be 3d printed. AI could be incorporated to allow intelligent volume control that responds to volume level of surrounding environment. Two-way audio allows users to make and take phone calls.
- IoT (Internet Of Things) use of phone to control hearing aid from a phone/device, set levels of volume etc.
- Use of smart and modern materials, graphene, shape memory polymer, conductive materials, graphene. Nano technologies allow use of

superhydrophobic coatings and wax repelling surfaces to keep the device clean; or for reduction in size of transistors/ chips etc.

- Implants – cochlear implants, neuralink, BCI (brain computer interface) being developed by Elon musk trials in humans Jan 24 and FDA approval - fine threads to help transmit brain signals.
- Any other valid suggestion.