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Design technology

Standard level

Paper 1

11 May 2023

Zone A afternoon | Zone B morning | Zone C afternoon

45 minutes

Instructions to candidates

- Do not open this examination paper until instructed to do so.
- Answer all the 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 this examination paper is **[26 marks]**.

1.

Question removed

2. **Figure 1** shows the Herman Miller Mirra 2 chair.

Figure 1: The Herman Miller Mirra 2 chair



- What anthropometric data is most appropriate for the design of the Herman Miller Mirra 2 chair?
- A. 5th–95th percentile
 - B. 5th percentile
 - C. 50th percentile
 - D. 1st–99th percentile
3. Which of the following is a source of primary data?
- A. Journal article
 - B. Literature search
 - C. Internet search
 - D. Interview
4. In which way is dynamic data used in the clothing industry?
- A. In the design of sports shoes
 - B. When advertising products
 - C. To determine collar size
 - D. To determine market size

Turn over

5. Fashion designers can develop collections with the use of virtually simulated garments, see **Figure 2**. With this technology, they are able to significantly reduce the number of physical garments made while improving their range of designs.

Figure 2: A range of virtually simulated garments



What may be an eco-design reason to include these new innovations into the fashion cycle?

- A. Promotes circular economy
- B. Avoids overproduction and environmental footprint
- C. Avoids dematerialization
- D. Promotes a linear economy

6. Social and environmental factors need to be considered when obtaining renewable and non-renewable resources.

Which of the following economic factors also needs to be considered?

- I. Set-up cost
 - II. Dematerialization
 - III. Decommissioning
- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III
7. To redesign components or products to improve their appearance or performance is known as...
- A. re-engineering.
- B. retro-styling.
- C. repairing.
- D. re-using.
8. Eco-design focuses on which of the following issues?
- I. Materials
 - II. Energy
 - III. Pollution
- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

Turn over

9. Design for the environment (DfE) software is used to help designers in the assessment of:
- I. Environmental implications
 - II. Particular facets of a design
 - III. Cost strategies
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III
10. At what stage of the design cycle would system level solutions appear?
- A. After conceptual design but before detailed design
 - B. After conceptual design and detailed design
 - C. Before conceptual design and detailed design
 - D. Before conceptual design and after detailed design

11. Microsoft has been trying to address the fact that virtual interaction does not lead to a positive user experience because you can't touch anything. This has led to the development of the Microsoft CLAW, see **Figure 3**.

Figure 3: The Microsoft CLAW

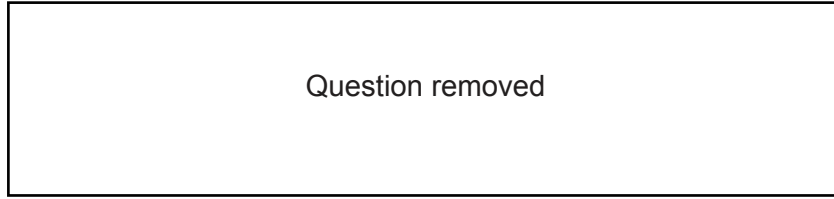


What technology has Microsoft incorporated into the Microsoft CLAW in order to get a sense of touch?

- A. Haptic
- B. Animation
- C. Virtual reality (VR)
- D. Fidelity

Turn over

12.



13. What type of model exists in the mind and is used to help us know and understand ideas?

- A. Concept model
- B. Data model
- C. Aesthetic model
- D. Physical model

14. **Figure 4** shows a two-cycle engine assembly drawing which was created in MicroStation Modeler.

Figure 4: A two-cycle engine assembly drawing



Which of the following statements are true of solid modelling?

- I. They are representations of the product assembly
 - II. They contain no data about internal components
 - III. They provide a comprehensive set of data for the product assembly to be realized
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III

Turn over

15. **Figure 5** shows custom coloured headphones from Custom Sounds.

Figure 5: Custom coloured headphones



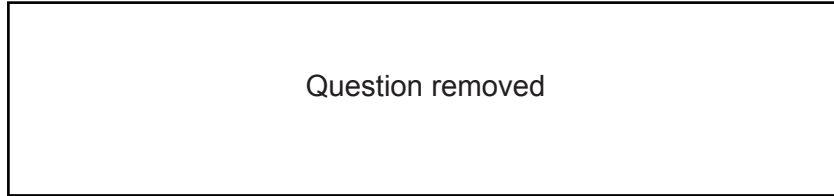
This interactive website allows you to pick and choose colours for each part of your headphones. What type of process is this?

- A. Continuous flow
 - B. Mass customization
 - C. Just in case (JIC)
 - D. Feedback loop
16. Robots are classified in different generations.
- An autonomous networked robot is classified as...
- A. 1st generation.
 - B. 2nd generation.
 - C. 3rd generation.
 - D. 4th generation.

17. Which of the following are decorative textile manufacturing processes?
- I. Lacemaking
 - II. Yarn
 - III. Embroidery
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III
18. Wool is commonly used for blankets, jumpers, rugs and structural insulation. Which of the following statements identify the properties of wool?
- I. Excellent absorbency
 - II. Good elasticity
 - III. Fast drying
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III
19. Concrete is classified as...
- A. an aggregate.
 - B. a compound.
 - C. a composite.
 - D. a cement.

- 20.** Which of the following is an advantage of craft production?
- A. Every product is identical
 - B. Set-up costs are minimal
 - C. It's based on automated processes
 - D. It's produced on a large scale
- 21.** Which of the following could be characteristics of a composite?
- I. Made up entirely of non-metals
 - II. Are made from two or more constituent materials
 - III. Can have different characteristics than their original materials
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III
- 22.** Wood recycling is the process of turning waste timber into usable products. Recycling timber is a practice that was popularized in the early 1990s.
- Which of the following issues triggered this trend?
- A. Demand for MDF
 - B. Deforestation and climate change
 - C. Warping of existing wood
 - D. Oxidization resistance

23.



24. Which of the following describes the maturity phase in the product cycle?

- I. Sales start to reduce
 - II. Sales peak but remain steady
 - III. Maximum profit is achieved
-
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III

Turn over

25. The Dr. Martens 1460 boot, see **Figure 6**, is an iconic design first worn in its modern British-made form in 1960. The air cushion sole from which the boot gets its name was called “Dr. Maertens” and was a German invention from 1945. The German “Dr. Maertens” sole was originally incorporated in shoes in Germany and Austria and sold to women. In 1960, a British shoe making company bought the licence for the outsole and designed the boot which we now know as the iconic “Dr. Martens” boot. This included Anglicising “Dr. Maertens” to “Dr. Martens”. The British company made design innovations to the boot to emphasise that this was something new, including adding a distinctive yellow stitch, a two-toned grooved sole edge, a black and yellow heel loop and a unique sole pattern.

Figure 6: The Dr. Martens boot



The Dr. Martens boot is now worn by a diverse range of individuals all over the world. This constant presence in a changing context is known as...

- A. affordance.
 - B. obsolescence.
 - C. omnipresence.
 - D. personae.
26. Art Deco is considered a classic design from the 1920s and 1930s. The style became popular decades later due to the mass production of products using different materials, such as metals, plastic and glass. Later products made in this style were classified as...
- A. image-styling.
 - B. Bauhaus.
 - C. retro-styling.
 - D. De Stijl (the style).

Questions 27–30 relate to the following case study. Please read the case study carefully and answer the questions.

The kitchen is often referred to as the centre of the home. A smart refrigerator, see **Figure 7**, can help manage the consumption of food which will reduce the amount of food waste a household generates.

Different members of the same household can program the smart refrigerator to keep a record of what kinds of food and drink products are being stored and consumed.

It is also possible to use interactive online programs such as *Expert Follow the Chef* with the smart refrigerator. This enables individuals to learn various cooking skills and experiment with ingredients from around the world.

Figure 7: A smart refrigerator



27. Psychological factors have been considered to improve the design of the smart refrigerator.

Which of the following are the four psychological factors used in the design of the smart refrigerator?

- A. Comfort, health, performance and user's safety
- B. Health, comfort, performance and price
- C. Comfort, performance, price and user's safety
- D. Performance, health, price and user's safety

Turn over

28. Designers need to develop innovative solutions to meet the growing demand for sustainable consumption.

Which waste mitigation strategy applies to the design of the smart refrigerator?

- A. Re-use
- B. Repair
- C. Re-engineer
- D. Recondition

29. Designers have used life cycle analysis (LCA) to reduce the ecological impact of the smart refrigerator.

Which of the following is a stage of life cycle analysis (LCA)?

- A. Incremental
- B. End-of-pipe
- C. Maturity
- D. Utilization

30.

Question removed

References:

- Figure 1** Mirra 2 chair images provided by Herman Miller
- Figure 2** "Stop Looking! Fashion Runway 2011" by henryjose is licensed under CC BY 2.0. To view a copy of this license, visit <https://creativecommons.org/licenses/by/2.0/?ref=openverse>. Source adapted.
- Figure 6** Images with permission from Dr. Martens.
- Figure 7** LG OFFICIALLY LAUNCHES FIRST IN RANGE OF SMART GRID-READY SMART APPLIANCES (image) by LG. www.flickr.com/photos/lge/5633727630/in/photostream/. Creative Commons Attribution 2.0 Generic (CC BY 2.0). <https://creativecommons.org/licenses/by/2.0/>.

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