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Diploma Programme
Programme du diplôme
Programa del Diploma

Design technology
Higher level
Paper 1

16 May 2025

Zone A afternoon | **Zone B** afternoon | **Zone C** afternoon

1 hour

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 **[40 marks]**.

2225 – 6509

21 pages

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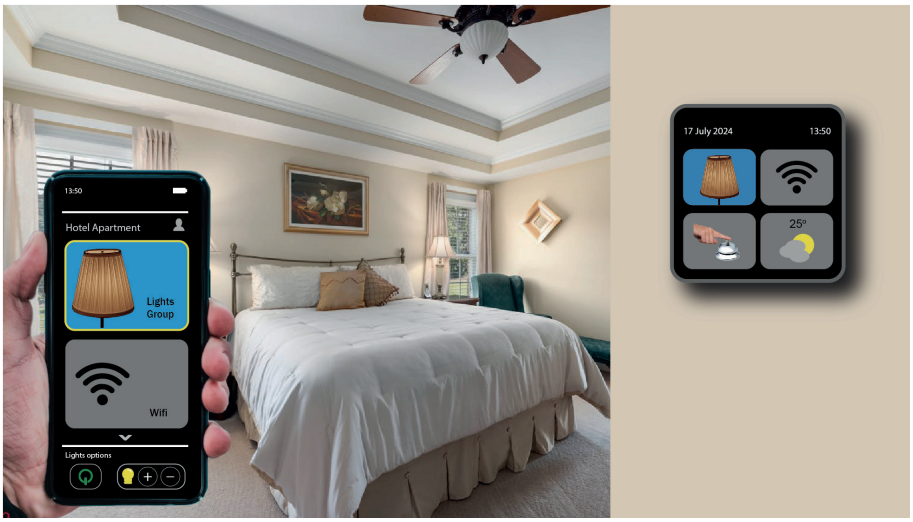
1. The user interface in **Figure 1** is designed to be easily understood by the user.

Which part of the human information processing system deals with the user analysing, organising, and making sense of the information received from the user interface?

Figure 1: Smart technology in a hotel room



A. Sensory process

B. Central process

C. Motor process

D. Input process

2. What best defines clearance in human factors?

A. The physical space that allows the user to interact with the product

B. The distance a product can be extended

C. The ability of a product to cater to a wider range of users

D. The amount of space required for a product to be aesthetically pleasing

3. What is torque in biomechanics?

A. The amount of force required to lift an object

B. The amount of force required to push an object

C. The amount of force required to rotate an object around an axis

D. The amount of force required to stop an object from moving

4. The Tesla Solar Farm is located in Nevada, United States of America, see **Figure 2** for an example of a solar farm. It consists of over 500 000 solar panels.

Figure 2: A Solar Farm

What is a negative impact of the development of solar farms?

A. Loss of jobs in installation and manufacturing

B. Increased dependence on the utility grid

C. Increased use of fossil fuels

D. Increased land use conflicts

5. What is an example of a renewable resource?

A. Coal

B. Natural gas

C. Wind

D. Crude oil

6. Which of the following is a common method used to recover raw materials from the earth's crust?

A. Extraction

B. Recycling

C. Harvesting

D. Refining

7. Which type of obsolescence best describes a product that has been replaced due to changes of consumer tastes?

A. Planned

B. Style (fashion)

C. Technological

D. Function

8. Which of the following is a major consideration in the United Nations Environmental Programme Manual on Eco-design?

A. Encouraging converging technologies to reduce material use

B. Encouraging resource extraction to reduce energy use in manufacturing

C. Encouraging energy-saving technologies to reduce energy consumption

D. Encouraging planned obsolescence to reduce waste

9. How should manufacturers react to legislation and targets for reducing pollution and waste?

A. Invest in research and development to develop clean technologies

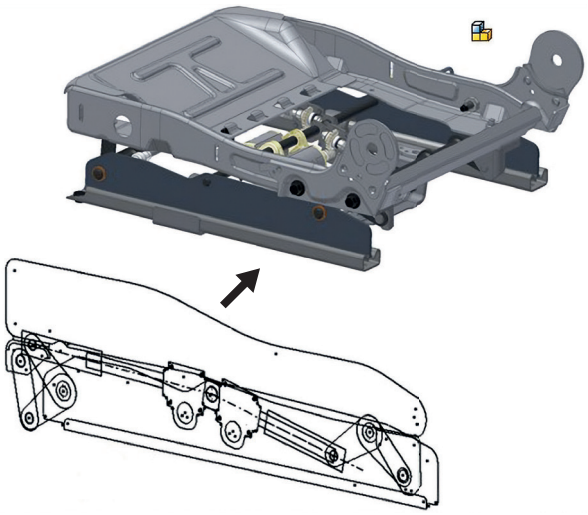
B. Continue with their current practices

C. Increase production levels to meet demand before the legislation takes effect

D. Lobby against the legislation to avoid compliance costs

10. **Figure 3** shows a form of 3D computer-aided design (CAD) modelling where the design originated as a concept and evolved into a complete product.

Figure 3: 3D CAD model



[Source: **Image courtesy of Autodesk, Inc. © 2025 Autodesk, Inc. All rights reserved.**]

What is this form of CAD modelling called?

A. Surface modelling

B. Solid modelling

C. Top-down modelling

D. Animation

11. Which of the following can visually communicate conceptual modelling?

I. Graphical modelling
II. Physical modelling
III. Computer aided design (CAD) modelling

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

12. What is a disadvantage of rapid prototyping over physical modelling?

A. Models lack complexity and functionality

B. Protection of data and designs across continents

C. Design development is time consuming

D. Limited to one material

13. The Rolex Submariner watch in **Figure 4** is an example of an enhanced classic design. A new type of ceramic with high hardness was chosen for the production of the watch bezel, the part encircling the watch glass, see **Figure 5**.

Figure 4: The Rolex Submariner Watch

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Figure 5: The Rolex Submariner Watch Bezel

Removed for copyright reasons

What describes the property of high hardness?

A. Resists scratching

B. Resists cracking

C. Resists deformation

D. Resists moisture

14. What is the purpose of tempering metals?

A. To modify aesthetic characteristics

B. To modify physical properties

C. To modify chemical properties

D. To modify mechanical properties

15. Polyvinyl chloride (PVC) is often used as a material for pipes.

What is an environmental concern of PVC?

I. It cannot be recycled easily

II. It releases hazardous toxins when incinerated

III. It can introduce harmful chemicals into the soil

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

16. To manufacture textiles which process converts fibres into yarn?

A. Weaving

B. Knitting

C. Felting

D. Spinning

17. Material selection charts, such as the one in **Figure 6**, can be used to help designers select appropriate materials according to their properties.

Figure 6: Material selection chart

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Materials selected in the chart (**Figure 6**) are based on which combination of material properties?

A.	Elasticity	Thermal conductivity
B.	Stiffness	Weight
C.	Thermal conductivity	Weight
D.	Elasticity	Stiffness

18. Which of the following techniques is typically used to join two different materials?

I. Fastening
II. Adhering
III. Fusing

A. I and II only

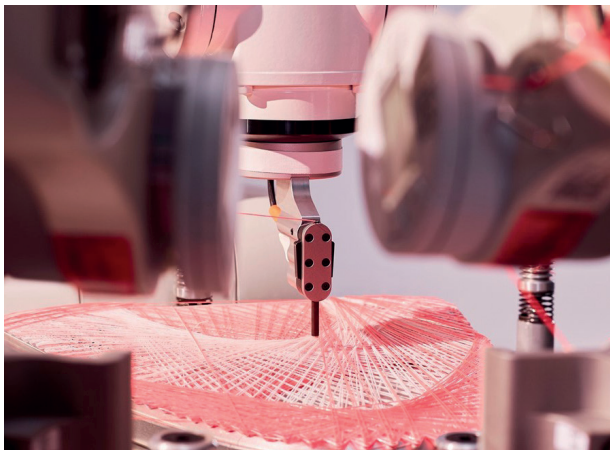
B. I and III only

C. II and III only

D. I, II and III

19. The FUTURECRAFT.STRUNG prototype sneaker in **Figure 7** is the first athletic shoe made using multi-task robots that can be programmed to precisely place every thread according to athlete data.

Figure 7: FUTURECRAFT.STRUNG prototype sneaker and multi-task robot manufacture in progress



What is the main advantage of using programmable multi-task robots in the production of the FUTURECRAFT.STRUNG prototype sneaker?

A. High load capacity

B. Flexible production

C. Low set-up costs

D. Standardized products

20. Japanese design studio, Nendo, developed a drink can with two angled pull tabs, see **Figure 8**. The tabs are designed to control the level of foam produced when opening the can.

Figure 8: Nendo drink can

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What is the primary driver for the invention of the drinks can?

A. To express creativity

B. Desire to make money

C. Scientific curiosity

D. Constructive discontent

21. A product gap can be identified through…

I. Analysis of the market
II. Analysis of the competition
III. Analysis of the user need

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

22. Which strategy for innovation results from research and development (R&D) activities?

A. Act of insight

B. Technology push

C. Market pull

D. Constructive discontent

23. What is a characteristic of the late majority category of consumer?

A. Risk-taking

B. Cautious

C. Influential

D. Trendsetting

24. The adhesive bandage, trademarked as BAND-AID® by Johnson & Johnson, has been a part of medicine cabinets and first aid kits since 1924, see **Figure 9**.

Figure 9: Band Aid (Plaster)

Which combination of characteristics contributed to the BAND-AID® becoming known as a classic design?

A.	Dominant design	Culture
B.	Status	Culture
C.	Dominant design	Ubiquitous
D.	Image	Mass production

25. **Figure 10** shows the original Vespa 98 scooter introduced by the Italian company Piaggio in 1946. **Figure 11** shows a retro-styled scooter released in 2023, combining vintage styling with modern performance.

Figure 10:
Original Vespa 98 scooter

Figure 11:
Retro-styled scooter

What best describes the designer's approach to the retro-styled scooter in **Figure 11**?

A. Retro-form follows function

B. Retro-function follows form

C. A conflict between retro-form and function

D. A compromise between retro-form and function

26. Which of the following best describes the primary goal of usability testing?

A. Identifying all possible design flaws in a product

B. Gathering quantitative data on user satisfaction

C. Assessing how well users can complete specific tasks with a product

D. Determining the value for money of a product

27. **Figure 12** shows a standard high-definition multimedia interface (HDMI).

Figure 12: Standard HDMI

The interconnecting prism shape of the HDMI plug is known as trapezoidal derived from an ancient Greek word meaning ‘a little table’.

What makes the HDMI a good user-led product interface?

A. Feedback

B. Constraints

C. Affordance

D. Ease of use

28. Which of the four-pleasure framework best relates to using a fabric bag instead of a plastic bag for grocery shopping?

I. Socio-pleasure

II. Physio-pleasure

III. Ideo-pleasure

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

29. **Figure 13** shows the basketball player, Giannis Antetokounmpo visiting Guangzhou, China in July 2023 as one of Nike's global ambassadors. He was unveiling a new basketball court at an Elementary School.

Figure 13: Basketball player, Giannis Antetokounmpo

Which element of triple bottom line sustainability are Nike fulfilling by committing to growing the game of basketball worldwide?

A. Environmental

B. Social

C. Economic

D. Decoupling

30. Environmental activists like Greenpeace are likely to be made up of what category of individuals?

A. Eco-phobes

B. Eco-fans

C. Eco-champions

D. Eco-warriors

31. Manufacturers that use 100 % wind energy satisfy which of Datschefski's principles of sustainable design?

A. Cyclic

B. Solar

C. Safe

D. Efficient

32. What does energy security primarily refer to?

A. Diversification of energy sources

B. Development of renewable energy technologies

C. Ensuring an uninterrupted and affordable supply of energy resources

D. Implementation of energy efficiency measures

33. Porsche is a company best known for its production of sports cars. **Figures 14–17** show the range of Porsche accessories from their “Tequipment” department.

Figure 14: Porsche roof box

Figure 15: Porsche Child seat

Figure 16: Porsche Helmet case

Figure 17: Porsche Bluetooth headphones

Which corporate strategy best describes Porsche producing such a range of “Tequipment” products?

A. Market penetration

B. Market expansion

C. Product development

D. Product diversification

34. Where would a company using plastic waste collected by fishermen to create chairs, typically find its primary target audience?

	Market sector	Market segment
A.	Commercial fishing	Fishing enthusiasts
B.	Fishing industry	Fishermen
C.	Furniture manufacturing	Eco-conscious consumers
D.	Plastic recycling	Industrial suppliers

35. Which element of computer integrated manufacturing (CIM) is responsible for tracking materials and products?

A. Cost accounting

B. Quality control

C. Inventory control

D. Purchasing

Questions 36–40 relate to the following case study. Please read the case study carefully and answer the questions.

Figure 18: The Doona™ infant car seat stroller (or pushchair) combination

36. What was the Doona™ designer's driver for invention?

A. Creative expression

B. Constructive discontent

C. Technical curiosity

D. Desire to make money

Figure 19: Original prototype of the Maclaren stroller (pushchair)

The Maclaren stroller (pushchair) **Figure 19** was created in 1965 by a single inventor in response to the needs of his daughter. It was first manufactured in the inventor's own workshop. Millions of these revolutionary lightweight strollers (pushchairs) eventually earned a place in The Museum of Modern Art (MoMA) and London's Design Museum.

37. Which term best explains why the Maclaren stroller (pushchair) is a classic design?

A. Image

B. Value for money

C. Dominant design

D. Culture

38. Unlike the Maclaren stroller (pushchair) see **Figure 19**, the Doona™ infant car seat stroller (pushchair) see **Figure 18** design team adopted the user-centred design (UCD) approach.

Which multidisciplinary team would have been involved in the design of the Doona™ car seat stroller?

A. Anthropologists, structural engineers, archaeologists, geologists, architects, car designers

B. Anthropologists, finite element analysis (FEA) operators, product designers, car safety engineers

C. Behaviouralists, psychologists, palaeontologists, architects

D. Materials analysts, mechanical engineers, paediatricians, graphic designers

39. Which corporate strategy did Doona™ pursue when designing the buggy car seat?

A. Pioneering

B. Imitative

C. Segmentation

D. Hybrid

40. Doona™ Car seat and stroller (pushchair) owners can opt to buy an additional ISOFIX base, Winter cover, Snap-on storage, and Essentials bag.

Figure 20: Doona™ ISOFIX base

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Figure 21: Doona™ Winter Cover

Removed for copyright reasons

Figure 22: Doona™ Snap-on Storage

Removed for copyright reasons

Figure 23: Doona™ Essentials Bag

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How are the accessories available to purchase for the Doona™ car seat and stroller (pushchair) in **Figures 20–23** referred to as?

A. Incremental products

B. Trigger products

C. Product families

D. Product iteration

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