Diploma Programme
Programme du diplôme
Programa del Diploma

Design technology
Higher level
Paper 1

31 October 2025

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

1 hour

Instructions to candidates

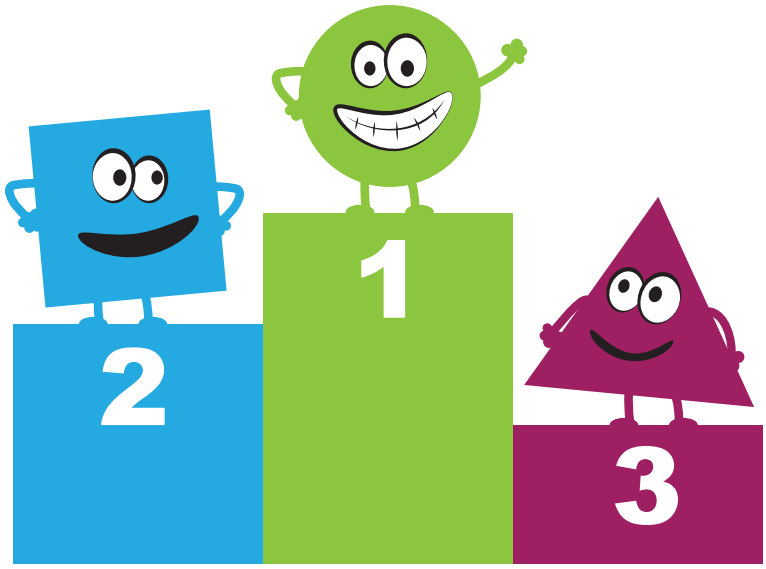
- Do not open this examination paper until instructed to do so.
- Answer all the questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.
- The maximum mark for this examination paper is **[40 marks]**.

8825 – 6501

20 pages

1. Athletes are awarded positions in a race based on the order they cross the finishing line.

Figure 1: Cartoon podium



What kind of data is this an example of?

A. Interval

B. Ratio

C. Nominal

D. Ordinal

2. Which term best describes a person's sense of physical or physiological ease?

A. Alertness

B. Physiological data

C. Comfort

D. Fatigue

3. A work envelope is a fixed three-dimensional space where work activities take place, considering clearance and reach.

What combination of anthropometric data types would be considered for a work envelope?

A. Static and structural

B. Static and functional

C. Dynamic and structural

D. Dynamic and functional

4. The city of Kwinana in Australia has designed a simple and cost-effective solution to deal with the discharge of waste from drainage systems. They have placed large nets over the drainage pipe outlets.

Figure 2: Net over drainage pipe

Figure 3: Drainage net full of river pollution

[Source: City of Kwinana © 2025.]

What type of clean technology are the drainage nets an example of?

A. End-of-pipe technology

B. System level solutions

C. Green design

D. Radical solutions

5. What is the term used to describe “the total energy required to produce a product”?

A. Stored energy

B. Embodied energy

C. Energy security

D. Energy utilization

6. Which design strategy is described as “Designing in a way that takes account of the environmental impact of the product throughout its life”?

A. Eco-design

B. Green design

C. Inclusive design

D. User-centred design (UCD)

7. Which renewable resources can provide a constant stream of energy?

I. Solar
II. Geothermal
III. Hydroelectric

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

8. What is a core philosophy of a circular economy?

A. Cradle-to-cradle

B. Cradle-to-gate

C. Cradle-to-grave

D. Biomimicry

9. **Figure 4** shows a drawing of the components of a typical machine.

Figure 4: Components of a machine

What type of graphical model is shown in **Figure 4**?

A. Orthographic projection

B. 2D sketch

C. Assembly drawing

D. 2-point perspective drawing

10. What is described as the ability to simulate a real situation and interact with it in a near-natural way?

A. Digital human

B. Simulation

C. Finite element analysis (FEA)

D. Virtual reality (VR)

11. Which type of model is normally explored at the start of any designing process?

A. Conceptual model

B. Graphical model

C. Physical model

D. Virtual model

12. “Rope Climbing” is a versatile exercise, that delivers strength and mobility for a full-body workout. A steel frame is fixed to a concrete surface such as a ceiling or wall, while a thick rope is attached to the steel frame for the user to climb.

Figure 5: A gym exercise involving an athlete climbing a rope

Which property makes the rope suitable to use for climbing?

A. Toughness

B. Tensile strength

C. Ductility

D. Hardness

13. Which of the following defines a production method used to manufacture, produce or process components without interruption?

A. Mass customization

B. Continuous flow

C. Mass production

D. Automated production

14. Why is fibreglass considered a composite material?

I. It is made of at least two different materials

II. It is held together with an adhesive

III. It is recyclable

A. I and II only

B. I and III only

C. II and III only

D. I, II, and III

15. Which aspect is an advantage when working with single-task robotic systems?

A. The robot can work autonomously without interaction from a human.

B. The robot can communicate with other robots to share information.

C. The robot can sense when a product is not in the correct orientation.

D. The robot can repeatedly perform the same task to the same quality.

16. Which wasting technique is appropriate for metals, woods and plastics, and involves spinning the material around its central axis while applying a cutting tool to create a vertically symmetrical shape?

A. Turning

B. Casting

C. Fusing

D. 3D printing

17. BMW vehicles feature an anti-lock braking system (ABS). ABS was invented in the early 1920s. It is still a feature of automobiles today and is essential by law in some countries.

ABS works by rapidly squeezing and releasing the brake pads on the wheels many times per second. This allows drivers to slow down under control and prevents the vehicle from skidding in both dry and wet weather enabling the vehicle to stop faster.

Figure 6: A BMW front wheel

Which strategy for innovation led to the introduction of ABS in BMW vehicles?

A. Analogy

B. Chance

C. Market pull

D. Act of insight

18. Why do some innovators decide not to patent their invention, but start producing and selling their product as soon as possible?

A. To prevent others from copying their idea

B. To ensure they are first to market

C. To ensure they can sell the product for a long time

D. To allow others to patent their idea

19. Which point of a product's life cycle is most ideal to launch a new generation of a product?

A. Launch

B. Growth

C. Maturity

D. Decline

20. Over the last 100 years KitchenAid, whose modern day stand mixers are shown in **Figure 8**, have developed their design and manufacturing methods since producing the H-5 version in 1922, see **Figure 7**.

Figure 7: Original KitchenAid H-5 mixer

Removed for copyright reasons

Figure 8: Modern KitchenAid stand mixer

Which characteristic of classic design do KitchenAid stand mixers meet?

A. It has not changed over time with user-friendly features

B. It has been in circulation for a long time

C. It is rare as it has been produced in low numbers

D. It is very popular and is found in most domestic kitchens

21. Which combination of the following statements best describes practical function?

I. A product that focuses on reliability

II. A product that focuses on desirability

III. A product that focuses on functionality

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

22. **Figure 9** shows a user interacting with a paper version of a car interface manipulated by a person acting as a computer.

Figure 9: A user interacting with a paper version of a car interface

What strategy for user-centred design (UCD) does this illustrate?

A. Participatory design

B. Method of extremes

C. Field research

D. Scenarios

23. What is the most important consideration when conducting a use case?

A. The sequence of event steps required to reduce memory burden

B. The sequence of event steps in design and development

C. The sequence of event steps in the daily life of a persona

D. The sequence of event steps a user takes to achieve a particular action

24. What characteristic of a good user-product interface does a standardized control panel indicator demonstrate?

A. Intuitive logic

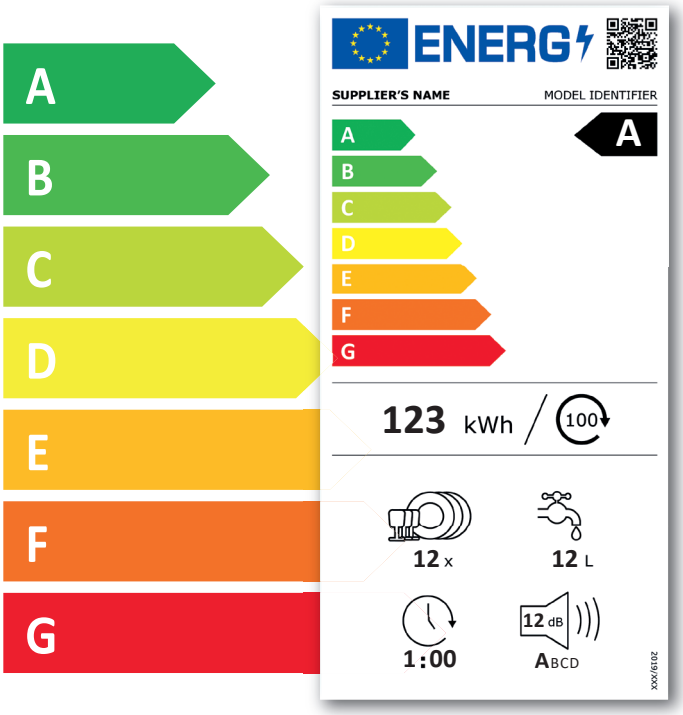
B. Affordance

C. Constraints

D. Mapping

25. Household appliances are given energy labels to inform the consumer of their purchase.

Figure 10: An energy label for a dishwasher



What information does this energy label give consumers?

I. Water consumption
II. Product lifespan
III. Noise level

A. I and II only

B. I and III only

C. II and III only

D. I, II, and III

26. Who is responsible for the product stewardship of a product made from bioplastics?

I. Consumers
II. Retailers
III. Manufacturers

A. I and II only

B. I and III only

C. II and III only

D. I, II, and III

27. Which combination of Datschefski's principles best satisfies triple bottom line sustainability?

A. Cyclic, social and solar

B. Cyclic, safe and social

C. Cyclic, efficient and safe

D. Cyclic, efficient and solar

28. Which of the following contributes to energy security?

A. Macro energy sustainability

B. Green legislation

C. Decoupling

D. Sustainability reporting

29. Puma have designed new packaging for their shoes that reduce environmental impact.

By packaging their shoes in this way, Puma will reduce its water, energy and fossil fuel consumption.

Figure 11: New packaging by Puma

Which corporate strategy is this an example of?

A. Product development

B. Market penetration

C. Product diversification

D. Market development

30. Which market sector focuses on the values, culture, characteristics and purchasing power of consumers?

A. Psychographic

B. Geographical

C. Commercial

D. Client-based

31. Which aspect of the marketing mix encourages online retailers to consider distribution networks?

A. Product

B. Place

C. Price

D. Promotion

32. Which market research strategy provides a better insight into brand loyalty?

A. Environmental scanning

B. Expert appraisal

C. Perceptual mapping

D. User trial

33. Mercedes-Benz is committed to a cycle of continuous improvement. They have implemented “The Ideas Factory” which aims to discover talent and develop employee capabilities whilst fostering participation and engagement.

Figure 12: Mercedes-Benz continuous improvement cycle

[Source: © Mercedes-Benz]

What is “The Ideas Factory” an example of?

A. Product family

B. Kaizen

C. Value stream mapping

D. Workflow analysis

34. A just in case (JIC) strategy can help manufacturers avoid which one of the 7 wastes?

A. Unnecessary inventory

B. Transporting

C. Waiting

D. Overproduction

35. What is the main advantage of computer integrated manufacturing (CIM)?

A. Automated manufacturing

B. Increased rate of production

C. Reduced errors

D. Inventory control

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

The Mini Recharged Program is a first-of-its kind initiative that allows owners of classic Mini vehicles to convert their cars from gas (petrol) driven, to electric-powered, see **Figure 13**.

Several components are swapped in the process, including various retro-styled control panel indicators inspired by the original design, see **Figure 14**, and a fast-charging, long-life span battery.

The installation process is designed to be reversible, in case the owner decides to change back to the original Mini.

Figure 13: Workers in a factory installing parts into Mini vehicles

Figure 14: Installed control panel indicator inspired by the original Mini

36. The Mini Recharged Program is an example of what waste mitigation strategy?

A. Reconditioning

B. Re-engineering

C. Reuse

D. Recycle

37. Which design for manufacture (DfM) strategy is used in the Mini Recharged Program?

A. Design for materials

B. Design for process

C. Design for assembly

D. Design for disassembly

38. Which innovation strategy for design is used in the Mini Recharged Program?

A. Configurational innovation

B. Process innovation

C. Architectural innovation

D. Modular innovation

39. What is the main consideration of the designer when applying retro-styling?

A. To respect the original form of an underlying structure

B. To respect the original materials and joining method

C. To respect the original manufacturing methods

D. To respect the original intended function

40. How does Mini ensure quality control (QC) in the Mini Recharged Program?

I. Regulation of raw materials, assembly, components, production and inspections

II. Checks to ensure the control panel indicators match the speed of the vehicle

III. Testing of the battery for a desired range before installation

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

Disclaimer:

Content used in IB assessments is taken from authentic, third-party sources. The views expressed within them belong to their individual authors and/or publishers and do not necessarily reflect the views of the IB. Any trademarks™ or registered® trademarks included are used for illustrative purposes only, and use does not imply any affiliation with or endorsement by the International Baccalaureate.

References:

Figure 2: City of Kwinana © 2025.

Figure 3: City of Kwinana © 2025.

Figure 5: SolStock, 2019. *Gym Rope Climbing – stock photo* [image online] Available at: https://www.gettyimages.co.uk/detail/photo/gym-rope-climbing-royalty-free-image/1155927572?phrase=climbing%20rope%20gym&adppopup=true [Accessed 7 March 2025].

Figure 6: ArturNyk, 2023. *The wheel of the blue BMW M135*i… [image online] Available at: https://www.gettyimages.co.uk/detail/photo/the-wheel-of-the-blue-bmw-m135i-model-f40-produced-royalty-free-image/1805477199?phrase=BMW%20M3%20wheel%20and%20brakes&searchscope=image%2Cfilm&adppopup=true [Accessed 7 March 2025].

Figure 8: תואי6. https://commons.wikimedia.org/wiki/File:Kitchen_aid_mixer.jpg. Public domain. Source adapted.

Figure 9: With permission from Tactivos, Inc.

Figure 10: © European Union, 1995–2025. https://ec.europa.eu/commission/presscorner/detail/deck09/MEMO_19_1596. Licensed under CC BY 4.0 https://creativecommons.org/licenses/by/4.0/. Source adapted.

Figure 11: Images with kind permission from fuseproject.

Figure 12: © Mercedes-Benz.

Figure 13: With permission from BMW Group.

Figure 14: With permission from BMW Group.