Diploma Programme
Programme du diplôme
Programa del Diploma

# Design technology
# Standard level
# Paper 1

31 October 2025

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

45 minutes

## Instructions to candidates

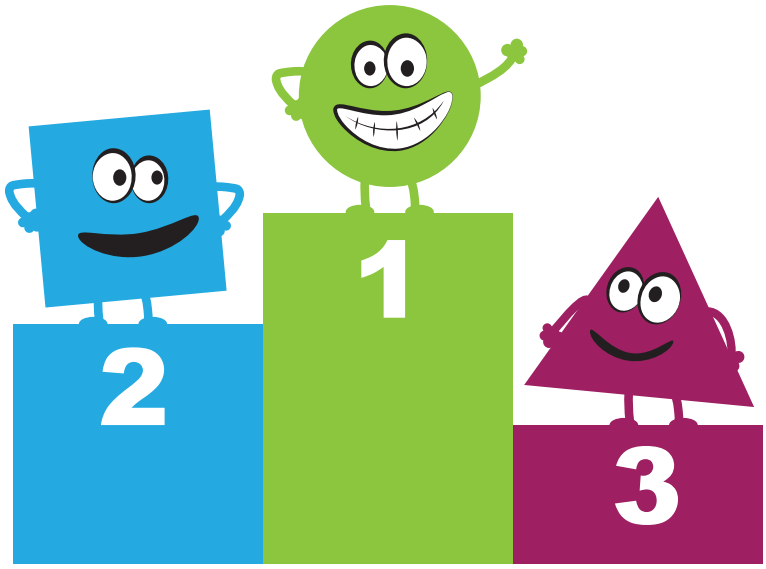
- Do not open this examination paper until instructed to do so.
- Answer all the questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.
- The maximum mark for this examination paper is **[30 marks]**.



8825 – 6502

**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.** What kind of data is generated as the result of a survey that collects response in the form of ratings for any product or service?

A. Percentile

B. Perception

C. Quantitative

D. Qualitative

**4.** Optimizing noise, temperature, visibility and texture is associated with…

A. nominal data.

B. energy utilization.

C. workplaces.

D. Biomechanics.

**5.** 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

**6.** 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

**7.** Which design philosophy aims to eliminate waste from the production, use and disposal of a product, and focuses on products that are made to be made again?

A. End-of-pipe

B. Cradle to cradle

C. Cradle to grave

D. Eco-design

**8.** Which of the following is a non-renewable resource?

A. Solar energy

B. Softwood timber

C. Metal ore

D. Cotton

**9.** What is the definition of *re-use*?

A. Creating improved products from waste material

B. Alternative use of existing components in new products

C. Fixing broken parts of a product to fully function again

D. Using new components to improve product performance

**10.** At which stage of life cycle analysis (LCA) for a product will a user have the most influence?

A. Production

B. Distribution

C. Utilization

D. Disposal

**11.** **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

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

A. Digital human

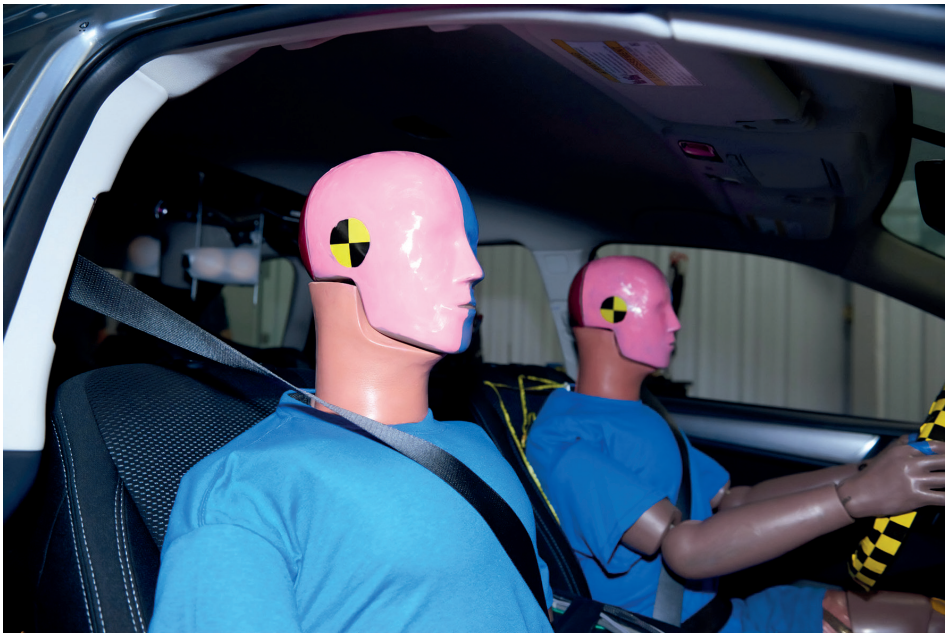
B. Simulation

C. Finite element analysis (FEA)

D. Virtual reality (VR)

**13.** Automobile manufacturers use car test mannequins with sensors attached at key points, see **Figure 5**. The sensors are connected to a computer.

**Figure 5: Car test mannequins**



What is this an example of?

A. Aesthetic model

B. Instrumented model

C. Scale model

D. Data modelling

**14.** Which rapid prototyping technique creates layers of material extruded through a nozzle?

A. Fused deposition modelling (FDM)

B. Stereolithography (SLA)

C. Selective laser sintering (SLS)

D. Laminated object manufacture (LOM)

**15.** "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 6: 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

**16.** 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

**17.** 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

**18.** What kind of material are piezo-electric and magneto-rheostatic properties most associated with?

A. Alloys

B. Composite materials

C. Smart materials

D. Metals

**19.** Which of the following materials is a thermosetting plastic?

A. High impact polystyrene (HIPS)

B. Polyurethane (PU)

C. Acrylonitrile butadiene styrene (ABS)

D. Polyvinyl chloride (PVC)

**20.** What is one reason a product may be craft produced rather than made using automated production systems?

A. Easier to manufacture high volumes of products

B. Easier to manufacture complex products

C. Easier to manufacture products at high speed

D. Easier to manufacture customized products

**21.** What kind of manufacturing technique would stereolithography be best described as?

A. Additive

B. Subtractive

C. Shaping

D. Joining

**22.** 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 7: A BMW front wheel**

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

A. Analogy

B. Chance

C. Market pull

D. Act of insight

**23.** In 1853, David M. Smith came up with a novel idea for a clothes peg (clothes-pin) with two prongs connected by a spring.

**Figure 8: Traditional clothes peg (clothes-pin)**

Which term best describes David M. Smith?

A. Lone inventor

B. Early adopter

C. Product champion

D. Entrepreneur

**24.** Over the last 100 years KitchenAid, whose modern day stand mixers are shown in **Figure 10**, have developed their design and manufacturing methods since producing the H-5 version in 1922, see **Figure 9**.

**Figure 9: Original KitchenAid H-5 mixer**

Removed for copyright reasons

**Figure 10: Modern KitchenAid stand mixer**

Which characteristic of classic design do the 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

**25.** 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

**26.** What is the best description of the category of consumers referred to as ‘Laggards’?

A. A group who widely promote acceptance and sale of a product

B. A group who are seldom willing to take risks with an innovation

C. A group who tends to take more time to consider adopting an innovation

D. A group who are last to adopt new ideas or technologies

Questions 27–30 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 11**.

Several components are swapped in the process, including various retro styled control panel indicators inspired by the original design, see **Figure 12**, and a fast-charging, long-lifespan battery.

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

**Figure 11: Workers in a factory installing parts into Mini vehicles**

**Figure 12: Installed control panel indicator inspired by the original Mini**

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

A. Reconditioning

B. Re-engineering

C. Reuse

D. Recycle

**28.** 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

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

A. Configurational innovation

B. Process innovation

C. Architectural innovation

D. Modular innovation

**30.** 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

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**References:**


**Figure 2:** City of Kwinana © 2025.

**Figure 3:** City of Kwinana © 2025.

**Figure 5:** Insurance Institute for Highway Safety. https://commons.wikimedia.org/wiki/File:CEP1710-58.jpg. Licensed under CC BY-SA 3.0 https://creativecommons.org/licenses/by-sa/3.0/deed.en.

**Figure 6:** 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 7:** ArturNyk, 2023. *The wheel of the blue BMW M135i…* [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:** MichaelJay, 2013. *Single isolated Clothespin -stock photo* [image online] Available at: https://www.gettyimages.co.uk/detail/photo/single-isolated-clothespin-royalty-free-image/178540621?adppopup=true [Accessed 7 March 2025].

**Figure 10:** תואי6. https://commons.wikimedia.org/wiki/File:Kitchen_aid_mixer.jpg. Public domain. Source adapted.

**Figure 11:** With permission from BMW Group.

**Figure 12:** With permission from BMW Group.