

Markscheme

May 2026

Design technology

Higher level and standard level

Paper 2

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General Marking Instructions

Subject Details: Design Technology HL and SL Paper 2 Markscheme

Mark Allocation

Candidates are required to answer **ALL** questions in Section A (total **[30 marks]**) ONE question in Section B **[20 marks]**. Maximum total = **[50 marks]**.

Markscheme format example:

Question			Answers	Notes	Total
4.	b	ii	the displacement and acceleration ✓ are in opposite directions ✓	Accept <i>force</i> for <i>acceleration</i> .	2

- Each row in the “Question” column relates to the smallest subpart of the question.
- The maximum mark for each question subpart is indicated in the “Total” column.
- Each marking point in the “Answers” column is shown by means of a tick (✓) at the end of the marking point.
- A question subpart may have more marking points than the total allows. This will be indicated by “**max**” written after the mark in the “Total” column. The related rubric, if necessary, will be outlined in the “Notes” column.
- An alternative wording is indicated in the “Answers” column by a slash (/). Either wording can be accepted.
- An alternative answer is indicated in the “Answers” column by “**OR**” on the line between the alternatives. Either answer can be accepted.
- Words in angled brackets < > in the “Answers” column are not necessary to gain the mark.
- Words that are underlined are essential for the mark.
- The order of marking points does not have to be as in the “Answers” column, unless stated otherwise in the “Notes” column.
- If the candidate’s answer has the same “meaning” or can be clearly interpreted as being of equivalent significance, detail and validity as that in the “Answers” column then award the mark. Where this point is considered to be particularly relevant in a question it is emphasized by **OWTTE** (or words to that effect).
- Remember that many candidates are writing in a second language. Effective communication is more important than grammatical accuracy.
- Occasionally, a part of a question may require an answer that is required for subsequent marking points. If an error is made in the first marking point then it should be penalized. However, if the incorrect answer is used correctly in subsequent marking points then **follow through** marks should be awarded. When marking, indicate this by adding **ECF** (error carried forward) on the script. “ECF acceptable” will be displayed in the “Notes” column.
- Do **not** penalize candidates for errors in units or significant figures, **unless** it is specifically referred to in the “Notes” column.

Section A

Question			Answers	Notes	Total
1.	a	i	Environmental impact on communities; Environmental impact on wildlife; Loss of habitat; Soil erosion/loss of nutrients from soil; Loss of habitat/shelter for wildlife; Deforestation; Non renewable Climate change; Increased levels of CO ₂ ; Reduced biodiversity, Ecosystem Imbalance;	<i>Award [1] for stating one negative environmental impact of using timber to create a product.</i>	1 max
1	a	ii	Directly reuse waste wood/sawdust thereby not requiring more wood and mitigating the as waste; Reused element is used to create new furniture products;	<i>Award [1] for identifying how the reuse waste mitigation strategy applies to the Circular Economy Furniture up to [2 max].</i>	2 max
1	b	i	Ethical consumers; individuals who look for environmentally friendly products produced in a way that minimises social/environmental damage / consumers who avoid products that have a negative impact on society/ sustainable/environmentally friendly; an individual that actively demonstrates on environmental issues; Passionate about environmental friendly products; Eco-champion; an individual that champions environmental issues within organizations;	<i>Award [1] for outlining a type of consumer Circular Economy Stool would appeal to and [1] for an explanation of the consumer [2 max].</i>	2 max

Question 1 continued

Question			Answers	Notes	Total
1.	b	ii	form: curved body/minimalist style/curved solid form/clean lines; function: strong/durable/comfort/easy to use (intuitive) /stable;	<i>Award [1] for outlining how the designer of the circular furniture has achieved a compromise between form and function and [1] for an appropriate development of it up to [2 max].</i> <i>Do not accept 'Aesthetics' without context or reference.</i>	2 max
1.	c	i	Preproduction; fewer/no raw materials extracted / waste mitigation Utilization; products lighter in weight (easier to move); Disposal; easier to dispose/ less materials end up in landfills;	<i>Award [1] for identifying one positive impact of dematerialization on each stage of the Circular Economy Furniture product.</i>	2 max
1.	c	ii	Differentiating a product/business from competitors; this could be high risk; Longer periods of time (time consuming) across all stages to market; marketing/branding; A new invention needs time to become known; Lack of adoption of the invention; Dominant design; High costs of invention could be higher than sale price – creating a deficit; Too costly for the market place/consumer;	<i>Award [1] for explaining the reason why fewer inventions become innovations and [2] for the supplementary information regarding the reason [3max]</i>	3 max
1.	d	i	Aesthetic model – A model developed to look and feel (texture) like the final product; Physical Prototypes;	<i>Award [1] for stating which modelling principle would be used to specifically show the texture of the Circular Economy Stool up to [1 max].</i>	1 max

Question 1 continued

Question			Answers	Notes	Total
1.	d	ii	Reduction in/depletion of non-renewable resources; Increased energy use from raw material extraction/during manufacturing; Environmental degradation of areas/landscapes/trees/deforestation/ extracting too much of natural materials; destroying eco systems; Negative social impact on communities where materials are extracted; Increases pollution (from processing high quantities of material); More wastage; Storage requirements (of materials);	<i>Award [1] for listing each of two consequences of a manufacturing process that uses large quantities of raw materials up to [2 max].</i> <i>Answer in brackets is not required to award the mark.</i>	2
1.	e	i	tensile strength (strong); durable; resistance to damp environments; Longevity; aesthetic properties/Surface aesthetics such as grain of the wood Weather resistant,	<i>Award [1] for listing each characteristic of natural timber to [2 max].</i>	2
1.	e	ii	Product Champion – An influential individual who develops enthusiasm for the idea or invention and promotes it within an organization; Entrepreneur – An influential individual who can take a product to market/ normally takes care of finances and business of the development/ production and diffusion of a product into the marketplace; Comparison A product champion supports the idea/invention before its produced/ An entrepreneur uses their business and finance knowledge to bring the product to market;	<i>Award [1] for comparing product champion and entrepreneur and [1] for stating the comparison [3 max].</i>	3 max

Question			Answers	Notes	Total
2.	a		form/image; the lamp has an aesthetic quality; Longevity, timeless Function: adjusting the light and the angle of the light; that can be transferred to a variety of design products/contexts. form/image; the lamp has a distinctive identifiable shape; that makes it memorable/recognisable/easy to identify;	<i>Award [1] for outlining one characteristic that make a classic design and [1] for each subsequent development of that reason up to [2 max].</i>	2 max
2.	b		Metal alloys - <i>a mixture that contains at least one metal. Alloys can be a mixture of metals or a mixture of metals and non-metals;</i> Pure metals are too soft/brittle/chemically reactive for practical use;	<i>Award [1] for outlining why it is more practical to use a metal alloy (Steel) and award [1] why pure metal (iron) is not practical up to [2 max].</i>	2 max
3.			It legally grants the creator (of an original literary and/or artistic work) sole ownership (for its use and distribution); copyright A legal right that grants the creator of an original work exclusive ownership for its use and distribution; to protects and prevents another person using the product/image/service; for a limited time/within geographical boundaries;	<i>Award [1] for explaining each of three distinct points in an explanation of how copyright can be used as a strategy for the protection of intellectual property (IP).[3 max]</i> <i>Do not award marks for answers referring to patents, products, logos, brands or names. Answer in brackets is not required to award the mark.</i>	3 max

4.			Steel has a high Young's Modulus and is suitable for building structures that require rigidity, Suitable for building bridges; a ratio of stress placed on the material compared to strain. Young's Modulus is a measure of a material's stiffness; A high Young's Modulus indicates a stiff material that resists deformation under load;	<i>Award [1] for identifying a material with a high Young's modulus [1] for defining and [1] for ideas on what it measures Youngs modulus [3 max].</i>	3 max
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Section B

Question			Answers	Notes	Total
5.	a		• 2D and 3D graphical models; • Perspective, projection and scale drawings; • Sketching versus formal drawing techniques; • Shows how parts fit together; • CAD models; • Physical modelling (low fidelity);	<i>Award [1] for listing ways designers visualize their design concepts up to [2 max].</i>	2 max
5.	b		converging technologies merge a number of different technologies into one product; there is less of a need to produce a number of different products to fulfil different purposes/needs; this leads to a reduction in total resources required in manufacture/waste/energy/pollution; use of standardized materials in production	<i>Award [1] for explaining each distinct point in an explanation of why converging technologies contribute to eco-design up to [3 max].</i>	3 max
5.	c		Production: materials for the components can be sourced from recycled materials;	<i>Award [1] for explaining three distinct points of how the environmental impact</i>	6 max

		reducing the requirement for raw materials; meaning less energy is required to produce the smart cane; automated production/robotic systems; minimises errors/increases efficiency in production; resulting in less (material and energy) waste produced; Disposal: the smart cane can be designed for disassembly; allowing the materials/components to be separated easily; for repair/maintenance/reuse/re-engineering/re-conditioning/recycling; the manufacturer may consider using product recovery strategies; by the use of standard/recyclable components; which would reduce the volume of waste sent to landfill;	<i>can be minimised during production of the smart cane up to [3 max].</i> <i>For production, do not accept 'recyclable' or 'renewable' materials.</i> <i>Award [1] for each of three distinct points of how the environmental impact can be minimised during disposal of the smart cane up to [3 max].</i> <i>Do not award marks across clusters.</i> <i>Mark as [3] + [3]</i>	
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Question		Answers	Notes	Total
5.	d	Sustaining innovation: sustaining innovation is the development of new/improved products; the smart cane sustains innovation by adding additional functionality; which offers the user a range of features previously unavailable on a traditional cane; sustaining innovation is minor improvements to new generations/versions of an existing product; that can be constantly updated (hardware/software); sustaining market/consumer demand;	<i>Award [1] for explaining how sustaining innovation, applies to the development of the smart cane. up to [3 max].</i> <i>Award [1] for explaining how disruptive innovation, applies to the development of the smart cane up to [3 max].</i> <i>Award [1] for explaining process innovation, applies to the development of the smart cane up to [3 max].</i>	9 max

		Disruptive innovation: disruptive innovation challenges existing companies through radical change; incorporating technologies previously found in other devices (smartphones/tablets); which manufacturers ignore/embrace; Process innovation: an improvement in the organization and/or method of manufacture; new manufacturing processes are required to create and assemble miniaturized components; which results in speed/efficiency of manufacture;	<i>Mark as [3] + [3] + [3].</i>	
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Question			Answers	Notes	Total
6.	a		<i>Lottie includes a large number of parts, assembly drawings will reduce assembly errors/make it easier for manufacturer to understand how parts fit together</i> <i>The assembly drawings are quick;</i> <i>Enables designers to communicate in different ways to manufacturer etc;</i> <i>Visual models and how they are assembled are easier to understand;</i> <i>Creating a talking point for other designers to develop;</i>	<i>Award [1] for outlining why assembly drawings are suitable for communicating with the dolls manufacturer. [1] for a development up to [2 max].</i>	2 max
6.	b		the target audience for Lottie Doll™ are parents of school children; Schools and teachers; whom are specifically marketed to purchase this product; Children;	<i>Award [1] for explaining potential target audiences for Lottie doll™ and [1] for a brief explanation up to [3 max].</i>	3 max
6.	c		<i>A physical model is a smaller (or larger) physical copy of an object; created to gather feedback from the design team/manufacturers; to assist / guide further developments / improvements;</i> <i>A scale model can be used as a marketing tool; to conduct user and market research; enabling designers to develop it further enhancing interest in Lottie Doll;</i> <i>Scale models help visualise the idea/concept; to help communicate the aesthetics of Lottie with focus groups/potential users; identifying need for development of color/shape/form/textures/size;</i>	<i>Award [1] for an explanation of the reasons why a physical scale model would be used in the development of the Lottie Doll™ Award up to [3] per cluster</i> <i>Award [1] for an explanation of the reasons why a physical model would be used to development Lottie doll. Award up to 3 per cluster [3].</i> <i>Mark as [3] + [3].</i>	6

Question			Answers	Notes	Total
6.	d		Mechanical properties: toughness; the ability of a material to resist the propagation of cracks/impact resistant; allows for safe use of the doll under a variety of circumstances during play; compressive strength; the ability of a material to resist being pushed/squashed/adjustable; the structure/form/materials of the doll are designed to support the (use of the) user; Physical properties: hardness; holds its shape will resist scratching; retains an attractive appearance for longer/easier to clean; <i>ABS is easy to mould (due to thermoplasticity);</i> (high) density; is the mass per unit volume of a material; makes the doll stable enough to play with it roughly; Aesthetic characteristics: transparency; gives the doll an attractive smooth appearance/can be coloured for facial features; makes the doll unique/stand out from other similar toys;	<i>Award [1] for explaining how the mechanical properties, of ABS plastic to make it suitable for The Lottie Doll up to [3 max].</i> <i>Award [1] for explaining how the physical properties characteristics of ABS plastic to make it suitable for The Lottie Doll the... up to [3 max].</i> <i>Award [1] for explaining how aesthetic characteristics of ABS plastic to make it suitable for The Lottie Doll the... up to [3 max].</i> <i>Mark as [3] + [3] + [3].</i>	9

Question			Answers	Notes	Total
7.	a		Waterproof; Recyclable; Flexible; Comfort; Versatile, easy to colour and recolour; Mouldable; Matt and gloss Durable Lightweight; Low stiffness;	<i>Award [1] for listing why properties of rubber that make it a good choice for the shoes... up to [2 max].</i>	2 max
7.	b		Prototypes are used to test a concept or process/act as an object to be replicated/learned from; This helps evaluate the strength of the straps of the shoe; Evaluation/feedback and testing; And determine the optimum combination and size of rubberised sole and straps;	<i>Award [1] for explaining the reason why prototypes would be used in the design and development of the Shoe That Grows... up to [3 max].</i>	3 max

Question 7 continued

Question			Answers	Notes	Total
7.	c		Materials: Rubber is renewable/can be replanted and regrown/and replenished within the passage of time/is sustainable; reduces the need for virgin material; lowering the embodied energy/environmental footprint of the product; Waste: the shoes can be disassembled/taken apart easily; through the use of temporary fasteners; which facilitates repair/reuse; Rubber and plastic straps can be easily separated into their own material groups; for recycling; minimising incineration/waste sent to landfill;	<i>Award [1] for explaining how the designer has reduced the environmental impact of the shoes through consideration of materials up to [3 max].</i> <i>Award [1] for explaining how the designer has reduced the environmental impact of the seat through consideration of waste up to [3 max]</i> <i>Mark as [3] + [3].</i>	6 max

Question 7 continued

Question			Answers	Notes	Total
7.	d		Relative advantage: How improved an innovation is over the previous generation; The Shoes present an improvement over previous shoes as they are made to expand with the child The shoes can be donated to children in poverty; the product lives longer / more efficiency as it is not disposed off when the child's feet outgrow it. Compatibility: The level of compatibility that an innovation has to be assimilated into an individual's life; The shoes have the same dimensions/characteristics/properties as existing shoes, but compatible enough to grow with the child; It is important to consumers that the shoes are fit for purpose and protect the child from harm; Observability: The extent that an innovation is visible to others; Consumers can observe the shoes TV/magazines/social media/websites; Which helps to diffuse the product into the market;	<i>Award [1] for explaining the definition of Relative advantage in relation to the shoe that grows 3 max].</i> <i>Award [1] for explaining each point to explain Rogers Compatibility for the shoe that grows up to [3 max].</i> <i>Award [1] for explaining each point to explain Rogers Characteristics for Observability for the shoe that grows. up to [3 max].</i> <i>Mark as [3] + [3] + [3]</i>	9 max