

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	Ordinal scale;	<i>Award [1] for identifying the data scale that can be used [1 mark]</i>	1 max
1.	a	ii	Easy access to parts; Parts are reusable, repairable or replaceable;	<i>Award [1] for identifying how design for disassembly extended the lifespan of the insulated chair and [1] for a brief explanation up to [2 max].</i>	2 max
1.	b	i	The chair offers good balance/shape and form; As the surface and material finish is important it offers the users sensory textures and heat for further comfort Color contrast - Dark and silver, metallic Modern/High Tech/Futuristic - Integrated blue lights	<i>Award [1] for identifying each of the aesthetic characteristic up to [2 max].</i>	2 max
1.	b	ii	subjective; Which can reduce its accuracy/reliability; Based on personal thoughts/feelings/opinions; Which means it may be difficult to reproduce in trials; costly to set up; Which means the group size could be limited; requires engaging with many stakeholders; Which can be expensive/time consuming;	<i>Award [1] for identifying the limitations for qualitative data explanation up to [2 max].</i>	2 max

			The sample to gather qualitative data is (relatively) small; Which makes it harder to generalise for a population;		
1.	c	i	Protection/Exclusive rights to manufacture / first to market advantage; Brand recognition / consumer trust; Differentiating a business from competitors; Allowing sale or licensing, providing an important revenue stream; Offering customers something new and different; Prevents being copied/stolen Marketing and branding Establishing a valuable asset that can be used as security for loans;	<i>Award [1] for stating each of the two benefits of using Intellectual Property (IP) to protect the Portable Insulated Chair</i> [award 2 max]	2 max

Question			Answers	Notes	Total
1.	c	ii	FEA can test the impact of a force on the chair; FEA produces (colour coded) results to highlight areas of stress/strain; identify weaknesses FEA allows the designer to modify the structure/materials ensuring the product can resist impacts/stresses;	<i>Award [1] for identifying how Finite Element Analysis (FEA) can help the designers of the insulated chair to develop durable products and [1] for each distinct explanation up to [3 max].</i>	3 max
1.	d	i	Carbon fibre offers weight reduction/lightweight; High stiffness and strength/strong; The ability to make complex shapes quickly and easily; Perceived value/quality (due to its connections to motor sports);	<i>Award [1] for one benefit of using carbon fibre within the Portable Insulated Chair</i>	1 max

Question			Answers	Notes	Total
1.	d	ii	The material goes from being elastic to plastic/undergoes plastic deformation/bends; This means it will not be able to return to its original shape/deforms permanently;	<i>Award [1] for each part of a description of what happens when the stress on a material causes it to exceed its yield point up to [2 max].</i> <i>Do not accept 'break'.</i>	2 max
1.	e	i	Broader Perspective: different backgrounds/disciplines come together, bringing wide range of knowledge/skills; Improved Decision-Making: expertise allows for more discussions/conversations; Higher chance of innovative solutions: experience allows for more ideas/solutions/creativity/pitfalls;	<i>Award [2] for each single correct benefit of working in an interdisciplinary team [2 max].</i>	2 max
1.	e	ii	designed for disassembly/accessible screws/fits in backpack - portability or use of carbon fibre - light in weight - increased portability gradual heat to keep the user warm in low temperatures - positive impact on health novel texture of the fabric - increases comfortability/user experience	<i>Award [1] for each innovation of the Portable Insulated Chair as a result from technology push. [3 max].</i>	3 max

Question			Answers	Notes	Total
2.	a		lightweight; low cost/cheap; easily shaped/moulded; non toxic/food safe; widely available; recyclable/reshaped; waterproof/non absorbent; transparent/ See-through; impact resistant	<i>Award [1] for identifying each reason why polyethylene terephthalate (PET) is often used for food packaging. [up to [2 max].</i>	2 max
2.	b		take risks/like/want to try new things/products; tend to set fashions/trends/influence others;	<i>Award [1] for identifying a reason why consumers of first-to market technologies are likely to be innovators and [1] identifying how innovators can be trend setters</i>	2 max
3.			enhanced comfort/ reduced fatigue; requires less physical effort/less stress; reduced risk of harm/ injuries; enhanced reach/ accessibility; maps the size/scales of the user's hand;	<i>Award [1] for identifying each physiological benefit to the user of interactions through a mixed reality interface up to [3 max].</i>	3 max

Question			Answers	Notes	Total
4.			challenge the traditional taxi industry. offer app-based/on-demand booking. use cashless payment and digital tracking. create a new business model using private drivers/platform services. reduce demand for traditional taxi services. force existing taxi companies to adapt.	<i>Award [1] for each distinct reason linked to disruptive innovation, up to [3 max].</i> <i>Do not award generic statements such as “it is new technology” unless linked to disruption of the existing taxi/car sharing market.</i>	3 max

Section B

Question			Answers	Notes	Total
5.	a		FCEV - low tailpipe emissions of harmful pollutants/does not release CO₂/no greenhouse gases/less air pollution/environmentally friendly ICE - release harmful gasses/releases CO₂/greenhouse gases/more air pollution/contributes to global warming	<i>Award [1] Each environmental benefit compared with the standard oil powered vehicles Award. [2].</i>	2 max
5.	b		Marketing/Brand Awareness; - Launching new product attracts attention; - Improves/increases brand awareness Technical curiosity/New Invention/Scientific discovery; - Investigating/development of new materials/processes; - To improve/innovative on existing cars; Desire to help others; - Carbon emissions are a cause of climate change; - Has a negative impact on people around the world; Constructive discontent; - Analysing a situation that benefits from redesign; - By reducing carbon emissions/pollution/impact on climate change;	<i>Award [1] for each distinct point in an explanation of a driver for invention of the BMW i5X up to [3 max].</i> <i>Do not award marks between clusters.</i>	3 max
5.	c		Aesthetics selecting the right ecological or sustainable material; small changes/additional features can be added over time; leading to new aesthetic variations/versions/generations;	<i>Award [1] for each of three distinct points under headers Aesthetic and Marketing strategies</i> <i>[3 max for each way] that BMW can extend the maturity phase of the product lifecycle.</i>	6 max

			Marketing strategies continuing to market/advertise/promote the car; allows BMW to widen exposure of the brand; to reach a greater range of potential consumers;	<i>Mark as [3] + [3].</i>	
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Question			Answers	Notes	Total
5.	d		Pre-production: Designers and engineers can fully experience the car and assess ergonomics digitally before production; virtual reality models can easily be manipulated across teams; VR facilitates collaboration between pre-production and design teams in different locations around the world; Manufacture: VR allows BMW to create virtual layouts and planning of the materials, and parts. Reduction of materials and time to market Manufacturing safety points of the car considered Marketing: VR experiences can be used for marketing and sales purposes; VR experiences can offer instant changes to colour, style or interiors for marketing to different demographics quickly and easily; VR experiences can generate interest and excitement within the showroom or online;	<i>Award [1] for each distinct point in an explanation of how the use of virtual reality (VR) models at the pre-production, manufacturing and marketing stages of the BMW iX5 ICE vehicle [3 max] per cluster.</i> <i>Mark as [3] + [3] + [3].</i>	9 max

Question			Answers	Notes	Total
6.	a		Relative advantage: is defined as the degree to which the innovation is perceived as better than the idea it supersedes. The Hippo Roller supersedes previous water containers or barrels, that were not easy to carry or hold.	<i>Award [1] for identifying the definition ... and [1] for the relative advantage connected to hippo Roller [2 max].</i>	2 max
6.	b		5th to 95th Percentile hand grip; for people aged / of the general population; allows the vast majority of the population to use the Hippo Roller;	<i>Award [1] for noting the percentile range and [1] for demographic range and [1] the reason for this percentile range in connection to the hippo roller [3 max].</i>	3 max

Question			Answers	Notes	Total
6	c		Hydrostatic Pressure: roller/drum is filled with water, the water exerts pressure on the inner walls of the container; pressure increases with depth and acts equally in all directions; a flat surface would result in bulging or bursting rollers due to the significant internal force; internal supports help to maintain cylindrical shape; External challenge: barrel-shaped/cylindrical/cylinder form is inherently strong in resisting when rolling down using external gravitational force; cylinder, like a sphere, distributes internal forces evenly across its surface/easier to roll/minimizing stress that could lead to failure; smooth but rigid plastic drum glides over the surface of the earth resisting wear over a long period. cylindrical form/shape distributes external forces/ impact evenly/ prevents failure;	<i>Award [1] for each of three distinct points that suggest external force and external challenge.</i> <i>Mark as [3] + [3].</i>	6 max

Question			Answers	Notes	Total
6	d		Distribution of Load: Allows 90-litre load to be rolled along the ground; - effectively distributes the load/weight over a much larger surface area - physically easier/more efficient to transport water Impact on Posture: Has a low centre of gravity; - a long handle - allows the user to walk in a natural position/upright Reduction of fatigue: Uses rolling friction/no more carrying; - reduces muscular fatigue/energy used - less trips required/have more physical energy /time available	<i>Award [1] per point for distribution of load up to [3 max].</i> <i>Award [1] per point for posture up to [3 max].</i> <i>Award [1] per point for reduction of fatigue up to [3 max].</i> <i>Mark as [3] + [3] + [3].</i>	9 max

Question			Answers	Notes	Total
7.	a		need to be separated; as they may fall into different recycling categories/have different recycling requirements; which can be time/energy consuming/costly;	<i>Award [1] for identifying a reason why products that are made of more than one material can be difficult to recycle and [1] for a development up to [2 max].</i>	2 max
7.	b		Haptic technology provides the user feedback via the sense of touch/vibration; - light up arrow provides visual feedback - non-visual guidance	<i>Award [1] for each point to guide the senses [3]</i> <i>Do not award marks between clusters.</i>	3 max
7.	c		Relative advantage: How improved an innovation is over a previous generation; - it uses haptic technology/artificial intelligence (AI); - track/capture data on user interaction/ guidance using vibration/ reduces mobile phones distractions; Observability: The extent to which the product is seen/visible to others; - The compass has a distinct/ recognizable shape; - Making it easily identified;	Award [1] for each point for relative advantage and 1 point for each observability [3 max]. Mark as [3] + [3].	6 max

question			Answers	Notes	Total
7.	d		Pre-production Extracting the raw materials needed; - the outer case is manufactured from one biodegradable material; - reducing energy needed in extraction/ the energy intensive extraction required for conventional plastics; Production manufactured by user/utilises a smaller number of machines/processes; - reducing manufacturing time/overproduction; - reducing energy consumption of running multiple (types of) machinery/less embodied energy required/ creates a more efficient workflow/system; Disposal outer case is one material/biodegradable/easier to dispose; - simplifying the recycling process/reduces waste management - reducing the energy required to dispose the material/separate different materials;	<i>Award [1] for each point explaining pre production up to [3 max].</i> <i>Award [1] for each point explaining production [3 max].</i> <i>Award [1] for each point explaining disposal up to [3 max].</i> <i>Mark as [3] + [3] + [3].</i>	9 max