

Markscheme

May 2024

Design technology

Higher level

Paper 3

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General Marking Instructions

Subject Details: Design Technology HL Paper 3 Markscheme

Mark Allocation

Candidates are required to answer **ALL** questions in Section A (total **[20 marks]**) ONE question in Section B **[20 marks]**. Maximum total = **[40 marks]**.

Markscheme format example:

| Question | | | Answers | Notes | Total |
|----------|---|----|---|---|-------|
| 4. | b | ii | the displacement and acceleration; are in opposite directions; | <i>Accept force for 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 | Economic; Environmental; Social; | <i>Award [1] for listing each attribute of triple bottom line sustainability in relation to MarinaTex material up to [2 max].</i> | 2 |
| 1. | b | Ecofan; an individual who (enthusiastically) adopts environmentally friendly practices / products; ethical consumers; consumers who purchase products produced in a way that minimises social/environmental damage / consumers who avoid products that have a negative impact on society/environment; eco-champion; an individual that champions environmental issues within organizations; eco-warrior; an individual that actively demonstrates on environmental issues; | <i>Award [1] for identifying a type of consumer MarinaTex would appeal to and [1] for a development up to [2 max].</i> | 2 |

Question 1 continued

| Question | | Answers | Notes | Total |
|----------|---|---|---|-------|
| 1. | c | <p>Literature search; from reports/newspapers/magazines/encyclopedias/articles/websites etc. to conduct research;</p> <p>expert appraisal; using the knowledge and skills from an expert in the field;</p> <p>user trial; by observing people using the product / collection of comments from people who use it;</p> <p>user research; obtaining user responses through questionnaires/surveys/interviews/focus groups;</p> <p>perceptual mapping; by comparing a product to others in the market (in a graphical representation) / understanding how consumers perceive a product in relation to other (competing) products in the market / to help identify market gaps / to establish MarinaTex competitors;</p> <p>environmental scanning; identifying trends/opportunities/threats that can affect the development of MarinaTex / by conducting a study/interpretation of the (political, economic, social technological) events/trends that influence a business/industry/market;</p> | <p><i>Award [1] for identifying a market research strategy that could be used to determine if there was a market for MarinaTex and [1] for a development up to [2 max].</i></p> | 2 |

| | | | | |
|-----------|----------|--|--|----------|
| <p>1.</p> | <p>d</p> | <p>Promotion refers to the ways that can be used to communicate information about MarinaTex (to consumers and other interested parties);</p> <p>such as advertising / publicity / personal selling;</p> <p>attracting consumers / allowing consumers to realize the benefits of MarinaTex / comparing MarinaTex to existing packaging solutions / increasing sales / increasing brand awareness / attracting influencers;</p> <p>through emphasizing MarinaTex's compostability / sustainability / biodegradability / use of waste from the fishing industry/sustainable algae / low energy requirement for production / reduced strain on resources / diverting waste from landfill / circular economy / material strength / low cost / low tech;</p> | <p><i>Award [1] for identifying the importance of promotion in helping consumers to become aware of MarinaTex as an alternative to plastic packaging and [1] for a development up to [4 max].</i></p> <p>Note: do not accept raising awareness or alternative to plastic packaging as this is a repetition of what is in the question.</p> | <p>4</p> |
|-----------|----------|--|--|----------|

| Question | | Answers | Notes | Total |
|----------|---|--|---|-------|
| 2. | a | <p>The shoe is accessible/usable by as many people as possible / The shoe is designed as an everyday shoe; it can be used by people who find it difficult to put on/take off their shoes/ physically impaired / it can be put on and taken off without using hands;</p> | <p><i>Award [1] for identifying one way how the Nike GO FlyEase could be regarded as an inclusive design and [1] for a development up to [2 max].</i></p> | 2 |
| 2. | b | <p>Increased product acceptance/user experience/productivity; as the shoe is useful / easy to use / effective / speeds performance / considers the way people slide into shoes and then kick them off / has a shape that makes it very easy to slip into and out of the shoe / meets users' expectations / enables users to achieve goals / likeable (has attitude) / hands free;</p> <p>Decreased user error/training/support; as the shoe is hands free / intuitive / learnable / requires no fastening / replaces the need for traditional laces / effective / has low memory burden / has a shape that makes it very easy to slip into and out of the shoe;</p> | <p><i>Award [1] for identifying one benefit of the enhanced usability of the Nike GO FlyEase and [1] for a development up to [2 max].</i></p> | 2 |
| 2. | c | <p>Prototype testing sessions: Experiments/tests are carried on a prototype (before making the final product); such as measuring the elasticity/strength of the tensioning band / durability/stability of the hinge / the tensile strength of materials / joining of materials / swapping different materials/types of stitching on joints / collecting quantitative data; prompting all the necessary changes/improvements/adjustments (that can be seen when the prototypes are used);</p> <p>Usability testing sessions: The testing of the shoe with (potential) users to find out how easy it is to use; users will test putting on/taking off the shoe / walking/running/jumping/playing sports wearing the shoe / whether the shoe is secure in both an open position and a closed position / gain (qualitative/quantitative) feedback; identifying any points where the shoe seems to be weak/uncomfortable / requires improvement / informing user centered design UCD;</p> | <p><i>Award [1] for identifying how prototype testing sessions could be used at the design development stage of the Nike GO FlyEase and [1] for each development up to [3 max].</i></p> <p><i>Award [1] for identifying how usability testing sessions could be used at the design development stage of the Nike GO FlyEase and [1] for each development up to [3 max].</i></p> <p><i>Mark as [3] + [3]</i></p> | 6 |

Section B

| Question | | Answers | Notes | Total |
|----------|---|--|--|-------|
| 3. | a | <p>CAKE is disconnecting economic growth from environmental impact / disconnecting environmental impact while maintaining social/equity benefits / disconnecting two trends so that one no longer depends on the other;</p> <p>through having zero carbon emissions/noise/fume-free bikes / using resources more productively / careful use of materials / redesigning production systems / using electric drivetrains / simplifying maintenance / replacing whole parts if they malfunction / enhancing human well-being / promoting respectful and active discovery;</p> | <p><i>Award [1] for identifying a way how The Cake company promote the concept of decoupling and [1] for a development up to [2 max].</i></p> | 2 |
| 3. | b | <p>Regulation/legislation; setting/policing rules to limit the environmental impact caused by undesirable technologies / limit the sales/fine polluting/damaging technologies;</p> <p>Taxes; penalise environmentally damaging technologies to influence consumer choice of electric vehicles/sustainable products / provide tax exemptions/incentives for sustainable solutions;</p> <p>Education; provide consumers with information/guidance in the choice/availability/importance of products and services that are more sustainable;</p> <p>Subsidies; to make sustainable solutions economically viable;</p> | <p><i>Award [1] for identifying a way in which governments could help promote electric motorcycles as a sustainable form of innovation in relation to existing technologies and [1] for a development up to [2 max].</i></p> | 2 |
| 3. | c | <p>increased standardisation/modularity;</p> <p>attracts a wider target market / meets the needs of different market segments / provides greater choice for consumers;</p> | <p><i>Award [1] for listing each advantage of Cake producing the motorcycle in different models as a product family up to [2 max].</i></p> | 2 |

| | | | | |
|--|--|---|--|--|
| | | <p>enhances CAKE brand/loyalty/image in the market;</p> <p>uses similar materials/manufacturing processes/common parts and assemblies / components from one motorcycle can be used in others models;</p> <p>reduces the number of suppliers needed / reduces storage and inventory;</p> <p>reduces manufacturing costs / increases cost-effectiveness;</p> <p>less design effort;</p> <p>less time to market for products;</p> <p>easy to adapt production to meet demand for a particular model;</p> | | |
|--|--|---|--|--|

Question 3 continued

| Question | | Answers | Notes | Total |
|----------|---|---|--|-------|
| 3. | d | <p>Market research is gathering information about markets / customers / organizations;</p> <p>using market research strategies such as literature search / expert appraisal / user trials / user research / perceptual mapping / environmental scanning;</p> <p>collecting data relating to consumers' wants and needs / consumers' reactions to technology / consumers' reactions to green design/sustainability / (technological) trends / scientific advances / demographics / existing motorcycles;</p> <p>leading to the evaluation of market potential / demand / market gaps / economic trends / competition;</p> <p>to aid CAKE in developing ideas/product families / determining prices / determining the (upper limit of) cost of design/production / identifying suitable promotional strategies / diffusion into the market / determining scale of production;</p> | <p><i>Award [1] for identifying the importance of conducting market research for Cake and [1] for each development of up to [5 max].</i></p> | 5 |

Question 3 continued

| Question | | Answers | Notes | Total |
|----------|---|---|--|-------|
| 3. | e | <p>Quality Assurance (QA): QA aims to prevent/reduce defects/errors; it is process oriented; covers all activities from design to documentation / helps set CAKE standards of quality for all stages; including quality of (raw) materials/assemblies/components/production services/management/inspection processes/training/delivery; [3max]</p> <p>Quality Control (QC): QC aims to detect defects/errors/ eliminate waste from defects; it is product oriented / by conducting regular checks/tests; to ensure that CAKE motorcycles are designed/produced to meet or exceed requirements/expectations; to prevent defective motorcycles from being placed on the market (that potentially endanger the consumer) / endanger CAKE's brand name; [3max]</p> <p>Statistical process control (SPC): SPC uses statistics to monitor/control outputs / obtains statistics during manufacture; to ensure production is within the acceptable tolerances / to ensure a process is operating efficiently; to detect when the process (mean) has moved away from the target (center line) / detect when item to item variability has increased / to discover deviations in a process; leading to the correction of the manufacturing techniques / reduction in errors /waste/lead time; [3max]</p> | <p><i>Award [1] for identifying a how Quality Assurance (QA) contributes to quality management at the Cake company and [1] for each development up to [3 max].</i></p> <p><i>Award [1] for identifying a how Quality Control (QC) contributes to quality management at the Cake company and [1] for each development up to [3 max].</i></p> <p><i>Award [1] for identifying a how Statistical Process Control (SPC) contributes to quality management at the Cake company and [1] for each development up to [3 max].</i></p> <p><i>Mark as [3] + [3] + [3].</i></p> | 9 |