N19/4/DESTE/HP3/ENG/TZ0/XX/M

Diploma Programme
Programme du diplôme
Programa del Diploma

Markscheme

November 2019

Design technology

Higher level

Paper 3

7 pages

International Baccalaureate®
Baccalauréat International
Bachillerato Internacional

No part of this product may be reproduced in any form or by any electronic or mechanical means, including information storage and retrieval systems, without written permission from the IB.

Additionally, the license tied with this product prohibits commercial use of any selected files or extracts from this product. Use by third parties, including but not limited to publishers, private teachers, tutoring or study services, preparatory schools, vendors operating curriculum mapping services or teacher resource digital platforms and app developers, is not permitted and is subject to the IB's prior written consent via a license. More information on how to request a license can be obtained from http://www.ibo.org/contact-the-ib/media-inquiries/for-publishers/guidance-for-third-party-publishers-and-providers/how-to-apply-for-a-license.

Aucune partie de ce produit ne peut être reproduite sous quelque forme ni par quelque moyen que ce soit, électronique ou mécanique, y compris des systèmes de stockage et de récupération d'informations, sans l'autorisation écrite de l'IB.

De plus, la licence associée à ce produit interdit toute utilisation commerciale de tout fichier ou extrait sélectionné dans ce produit. L'utilisation par des tiers, y compris, sans toutefois s'y limiter, des éditeurs, des professeurs particuliers, des services de tutorat ou d'aide aux études, des établissements de préparation à l'enseignement supérieur, des fournisseurs de services de planification des programmes d'études, des gestionnaires de plateformes pédagogiques en ligne, et des développeurs d'applications, n'est pas autorisée et est soumise au consentement écrit préalable de l'IB par l'intermédiaire d'une licence. Pour plus d'informations sur la procédure à suivre pour demander une licence, rendez-vous à l'adresse http://www.ibo.org/fr/contact-the-ib/media-inquiries/for-publishers/guidance-for-third-party-publishers-and-providers/how-to-apply-for-a-license.

No se podrá reproducir ninguna parte de este producto de ninguna forma ni por ningún medio electrónico o mecánico, incluidos los sistemas de almacenamiento y recuperación de información, sin que medie la autorización escrita del IB.

Además, la licencia vinculada a este producto prohíbe el uso con fines comerciales de todo archivo o fragmento seleccionado de este producto. El uso por parte de terceros —lo que incluye, a título enunciativo, editoriales, profesores particulares, servicios de apoyo académico o ayuda para el estudio, colegios preparatorios, desarrolladores de aplicaciones y entidades que presten servicios de planificación curricular u ofrezcan recursos para docentes mediante plataformas digitales— no está permitido y estará sujeto al otorgamiento previo de una licencia escrita por parte del IB. En este enlace encontrará más información sobre cómo solicitar una licencia: http://www.ibo.org/es/contact-the-ib/media-inquiries/for-publishers/guidance-for-third-party-publishers-and-providers/how-to-apply-for-a-license.

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 ✓	*Accept* ***force*** *for* ***acceleration****.*	**2**

1. Each row in the "Question" column relates to the smallest subpart of the question.

2. The maximum mark for each question subpart is indicated in the "Total" column.

3. Each marking point in the "Answers" column is shown by means of a tick (✓) at the end of the marking point.

4. 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.

5. An alternative wording is indicated in the "Answers" column by a slash (***/***). Either wording can be accepted.

6. An alternative answer is indicated in the "Answers" column by "***OR***" on the line between the alternatives. Either answer can be accepted.

7. Words in angled brackets ❮ ❯ in the "Answers" column are not necessary to gain the mark.

8. Words that are <u>underlined</u> are essential for the mark.

9. The order of marking points does not have to be as in the "Answers" column, unless stated otherwise in the "Notes" column.

10. 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).

11. Remember that many candidates are writing in a second language. Effective communication is more important than grammatical accuracy.

12. 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.

13. 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**		If the toothbrush is purchased ✓ this may trigger the sale of the Bogobrush stand / the stand is an incremental product ✓	*Award **[1]** for identifying how the Bogobrush is an example of a trigger product and **[1]** for a brief explanation.*	**2**
1.	**b**		The company is expanding / growing / introducing new products (Bogobrush stands) / the company's sales are economically viable (the company is making profit) ✓ without their products ending up in landfills (without creating waste) / without consuming non-renewable materials / with their toothbrushes biodegrading ✓	*Award **[1]** for identifying why the Bogobrush is a good example of decoupling economic growth and negative environmental impact and **[1]** for a brief explanation.*	**2**
1.	**c**		Social ✓ For every Bogobrush sold, the company gives one to someone in need ✓ supporting human rights/justice/equity / supporting sustainable societies ✓ Cyclic ✓ The toothbrush is made from biodegradable plastics ✓ Which decomposes naturally / which creates zero waste / cradle to cradle (made to be made again) ✓ Safe ✓ The toothbrush is non-toxic in use and disposal ✓ It becomes food for other systems at the end of its life ✓ Solar ✓ Uses a form of renewable energy during production ✓ Does not need energy during use ✓	*Do not accept **efficient**.* *Award **[1]** for each of three distinct points in how **two** of Datschefski's five principles of sustainable design apply to the Bogobrush.* *Mark as **[3]** + **[3]**.*	**6**

Question			Answers	Notes	Total
2.	**a**		Motion / movement ✓ Transporting ✓ Waiting ✓ Defects ✓	*Do not accept **inventory**, **overproduction**, or **over processing**.* *Award **[1]** for listing each waste eliminated by the new factory layout up to **[2 max]**.*	**2**
2.	**b**		Value stream mapping is used to analyse current (existing) processes ✓ to visually spot (identify) wastes (weaknesses, aspects that do not add value) / to suggest an improved factory layout / to speed up assembly / to understand the flow of materials / to analyse information flow throughout the complete manufacturing process ✓	*Award **[1]** for identifying why Petra Care used value stream mapping to improve the efficiency of assembling the wheelchairs and **[1]** for a brief explanation.*	**2**
2.	**c**		This company only assembles standard wheelchairs ✓ and does not require changeover ✓ Small scale production ✓ which does not justify the change ✓ Petra wishes to keep its employees ✓ who would otherwise lose their jobs if they adopt CIM ✓	*Award **[1]** for identifying why this factory did not adopt computer integrated manufacturing (CIM) and **[1]** for a brief explanation.*	**2**
2.	**d**		Stabilize / Setting in order means tools are arranged ✓ to make them easy to find and put away ✓ Sorting means unnecessary tools have been removed from the workplace ✓ leading to a more organized workplace ✓ thus, reducing waiting (time wasted looking for tools) / reducing motion / speeding up the process of assembling the wheelchairs ✓	*Award **[1]** for identifying how **sorting** and **stabilizing** apply to the organization of the tools and **[1]** for each distinct explanation up to **[4 max]**.*	**4**

Section B

Question			Answers	Notes	Total
3.	**a**		A perceptual map will show how consumers perceive Samsung's Gear Sport (evaluate consumers' perceptions) ✓ to determine its competitors in the market / to provide an understanding of best fit with current products / to determine its position compared to other brands / to identify market gaps / to better understand market segments (target markets) / to appeal to a larger target audience ✓	*Award **[1]** for identifying a benefit of using perceptual mapping research strategy for Samsung's Gear Sport and **[1]** for a brief explanation.*	**2**
3.	**b**		Psychological pricing strategy ✓ to give the impression of paying less / which considers the psychological effect of pricing on consumers' perception of the product's value ✓	*Award **[1]** for identifying the pricing strategy Samsung adopted and **[1]** for a brief explanation.*	**2**
3.	**c**		Waterproof / salt proof ✓ for swimmers who wish to track their fitness under water (who wish to swim in the sea or ocean) / for users who get caught exercising in the rain ✓ Anti-scratch screen ✓ to withstand the elements / for athletes involved in intense (vigorous) sports ✓ Battery lasts 3–4 days and 6 days with low usage ✓ for users who forget to charge their Gear Sport / when users do not have access to a charging point ✓ Pairs seamlessly with cordless earbuds ✓ for users who enjoy listening to music (audio recordings) while exercising ✓	*Award **[1]** for identifying how the design of the Samsung Gear Sport has considered its use environment and **[1]** for a brief explanation.*	**2**

Question			Answers	Notes	Total
3.	**d**		For product development Samsung creates new, modified and updated products targeting existing markets ✓ It may be a less risky strategy than diversification ✓ Product development is less costly as it usually means incremental rather than radical design ✓ Diversification engages Samsung in new products targeting new markets ✓ it has the potential of bringing higher profits than product development ✓ Samsung's reputation offsets the high risks involved in diversification ✓ **Evaluative comment:** Both strategies allow Samsung to grow ✓ Samsung's reputation (brand name, standards, quality) attracts potential customers to purchase regardless of corporate strategy ✓	*Award **[1]** for each distinct point of why product development would be used as a corporate growth strategy by Samsung up to **[2 max]**.* *Award **[1]** for each distinct point of why diversification would be used as a corporate growth strategy by Samsung up to **[2 max]**.* *Award **[1]** for an evaluative statement up to **[5 max]**.*	**5**
3.	**e**		**Visibility:** The Samsung Gear Sport screen's diameter is 30.2cm (large) ✓ all the controls are visible (easily accessible to the human eye) ✓ text and infographics are simple / clear / not cluttered / colour coded / illuminated ✓ **Memory burden:** The Samsung Gear Sport includes many features and options ✓ but the user interface is well organized / intuitive / simple ✓ which reduces memory burden (does not burden users to remember how various functions work) ✓ **Affordance:** The Samsung Gear Sport user interface clearly indicates how it should be used ✓ the side buttons afford pressing ✓ the bezel (dial) affords turning (rotating) ✓ the screen affords touching ✓	*Award **[1]** for how the Samsung Gear Sport user interface considers visibility up to **[3 max]**.* *Award **[1]** for how the Samsung Gear Sport user interface considers memory burden up to **[3 max]**.* *Award **[1]** for how the Samsung Gear Sport user interface considers affordance up to **[3 max]**.* *Mark as **[3]** + **[3]** + **[3]**.*	**9**