N13/4/DESTE/SP2/ENG/TZ0/XX/M

International Baccalaureate®
Baccalauréat International
Bachillerato Internacional

MARKSCHEME

November 2013

DESIGN TECHNOLOGY

Standard Level

Paper 2

11 pages

Subject Details: Design Technology SL Paper 2 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.

1. A markscheme often has more marking points than the total allows. This is intentional.

2. Each marking point has a separate line and the end is shown by means of a semicolon (;).

3. An alternative answer or wording is indicated in the markscheme by a slash (/). Either wording can be accepted.

4. Words in brackets ( ) in the markscheme are not necessary to gain the mark.

5. Words that are underlined are essential for the mark.

6. The order of marking points does not have to be as in the markscheme, unless stated otherwise.

7. 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 markscheme then award the mark. Where this point is considered to be particularly relevant in a question it is emphasized by ***WTTE*** (or words to that effect).

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

9. 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.

10. Do **not** penalize candidates for errors in units or significant figures, **unless** it is specifically referred to in the markscheme.

SECTION A

1. (a) (i) *Award **[1]** for stating one environmental benefit of the data relating to the shoebox.*
reduced use of wood pulp so less deforestation; ***[1]***

(ii) *Award **[1]** for stating one reason why designers would want information relating to chemistry from the materials analysis database for life cycle analysis.*
to choose materials which have reduced environmental impact on manufacture/disposal;
gain information concerning the bonding/molecular structure/which may be important for mouldability; ***[1 max]***

(iii) *Award **[1]** for listing each relevant life cycle analysis stage which would be affected by the choice of materials for the shoe **[2 max]**.*
pre-production;
disposal; ***[2]***

(b) (i) *Award **[1]** for an outline of one likely change to the design of the shoe mould in order to make it suitable for manufacturing multiple shoe sizes and **[1]** for a brief explanation **[2 max]**.*
adjustable;
previously different sized moulds would have been required for different size shoes; ***[2]***

(ii) *Award **[1]** for an outline of one benefit of having just one mould in relation to the corporate strategy and **[1]** for a brief explanation **[2 max]**.*
contributes to the corporate strategy by reducing environmental impact of the shoe production process;
as less resources are required; ***[2]***

(c) (i) *Award **[1]** for stating which piece of data from Table 1 relates to a policy of "take back".*
collection of old Nike shoes; ***[1]***

(ii) *Award **[1]** for correct distinct point explaining how consumers' attitudes to green issues could have contributed to Nike's adaptation of their corporate strategy **[3 max]**.*
consumers who are very pro-active on environmental issues/ecofans;
can be influential in the marketplace;
and companies want to capitalize on the market/trend for greener products;

consumers are becoming more aware of environmental issues;
and this can impact on their purchasing decisions;
Nike are reacting to this trend; ***[3 max]***

2. (a) *Award **[1]** for a definition of "planned obsolescence".*
a conscious act to ensure that a continuing market is maintained or to ensure that safety factors and new technologies can be incorporated into later versions of a product; ***[1]***

(b) *Award **[1]** for each distinct point in a discussion of the conflict for the designer between moral and social responsibilities in relation to green design issues and wealth creation **[3 max]**.*
designers are often under pressure to produce products as cheaply as possible in order to maximize profit for the manufacturer;
but the designer has to resolve this with providing value-for-money to the consumer and minimizing the impact of products on the environment;
the challenge for designers is to produce environmentally friendly products without seriously compromising quality or profit; ***[3]***

3. (a) *Award **[1]** for stating one reason for adding scrap glass to new raw materials in the manufacture of glass **[1 max]**.*
makes the process more economical;
reduces the amount of energy used;
reduces the amount of raw material required; ***[1 max]***

(b) *Award **[1]** for each correct distinct point of an explanation of why glass is a suitable structural material for making bricks **[3 max]**.*
glass is strong in compression;
bricks are used to construct walls;
walls need to be strong in compression to resist the forces acting on them; ***[3]***

SECTION B

4. (a) (i) *Award **[1]** for stating the ideas generating technique used to decide the name for the chair.*
analogy; ***[1]***

(ii) *Award **[1]** for an outline of one advantage of using fasteners to join the seat to the frame and **[1]** for a brief explanation **[2 max]**.*
re-use;
the seat can be replaced if it becomes worn/damaged;

ease-of-assembly in the factory;
fasteners are a cost-effective method of joining plastic to metal/plywood to metal;

strength;
fasteners ensure that the seat stays fixed firmly to the frame;

recycling;
the chair can be disassembled so parts can be recycled easily; ***[2 max]***

(iii) *Award **[1]** for an outline of one possible disadvantage for the user of using fasteners to join the seat to the frame and **[1]** for a brief explanation **[2 max]**.*
if the fasteners are not fixed so they are flush with the surface of the seat/fixed below the surface of the seat;
they can affect the comfort of the user;

if the fasteners are not fixed flush/below the surface;
they may snag on clothing/cause clothing to tear;

aesthetics;
the user may be able to see the fasteners and think they spoil the look of the object; ***[2 max]***

(b) (i) *Award **[1]** for stating the percentile used to decide the height of the seat from the floor.*
50^{th} (adult); ***[1]***

(ii) *Award **[1]** for each distinct point in a discussion of the design of the frame of the chair in relation to comfort **[3 max]**.*
thin metal arms do not provide comfortable armrests;
curved shape of the back provides support to the back of the user which makes it more comfortable;
level of comfort depends on size/shape of user/duration of use; ***[3]***

(c) (i) *Award **[1]** for an outline of one reason for designing the chair with ball feet and **[1]** for a brief explanation **[2 max]**.*
aesthetics/style;
the round shapes suit the design of the chair/fashionable in the 1950's;

protection for the floor surface;
as metal rod ends would scratch/damage the floor if the chair was dragged along the surface / sat on in one place for a long time; ***[2 max]***

(ii) *Award **[1]** for each correct distinct point for the continued popularity of the design of the Antelope chair over the past 60 years **[3 max]** for each reason.*
design classic;
often copied;
international reputation of the designer;

design development;
modifications made;
to suit style/available technology;

value-for-money;
wide user satisfaction/feedback;
over many years/from different market segments;

simple design which still looks contemporary;
fits into many different types of interiors;
easy to maintain;

popularity of retro designs;
nostalgia for aspects of 50s/60s styles;
many people seek out such products; ***[9 max]***

5. (a) (i) *Award **[1]** for stating one reason for designing the backpack so it floats.*
if used when undertaking watersports and drops in the water it can be retrieved easily; ***[1]***

(ii) *Award **[1]** for each distinct point that identifies one reason for including reflective strips in the design of the backpack and **[1]** for a brief explanation **[2 max]**.*
safety;
if the user becomes injured/lost rescuers can pick up the reflection;
visible at night; ***[2 max]***

(iii) *Award **[1]** for an outline of the importance of density in the design of the backpack and **[1]** for a brief explanation **[2 max]**.*
it will be used mainly for sports activities where the user will be involved with energetic activities;
the backpack needs to weigh as little as possible in order to not interfere with the movement/enjoyment of the activity;

it needs to be lightweight;
materials/frame must be low density; ***[2 max]***

(b) (i) *Award **[1]** for stating one advantage to the user of parts of the backpack joined by fusing **[1 max]**.*
strong joins;
waterproof joins;
less bulky seams; ***[1 max]***

(ii) *Award **[1]** for each distinct point in an explanation of how the structure and bonding of a thermoplastic allows for the technique of fusing **[3 max]**.*
thermoplastics are linear chain molecules with weak secondary bonds between the chains;
when heat is applied to the plastic the bonds rearrange easily;
so a good join is possible without high heat/use of much energy; ***[3]***

(c) (i) *Award **[1]** for an outline of one reason for designing the backpack with no zips and **[1]** for a brief explanation **[2 max]**.*
in order to ensure the backpack is 100 % waterproof;
zips would work loose as the user moves around energetically letting in water;

zips get jammed/do not work well;
in muddy/wet conditions;

ease-of-use;
better for the user in cold/extreme conditions; ***[2 max]***

(ii) *Award **[1]** for each for each reason for producing the backpack in one size **[3 max]** for each consideration.*
the backpack is likely to be adjustable;
so suitable for a range of people;
and can be adjusted for comfort;

economies of scale;
standardised design;
reduces manufacturing costs;

environmental impact;
producing different sizes means that some sizes of backpacks are likely to remain unsold as it is difficult to judge the market;
this would mean wastage of natural resources; ***[9]***

6. (a) (i) *Award **[1]** for stating one evaluation strategy that Charles Ejogo would have used to evaluate the potential market for the Umbrolly.*
user research; ***[1]***

(ii) *Award **[1]** for identifying one reason for ensuring that the price of a brolly from the vending machine is low in relation to value for the consumer and **[1]** for a brief explanation **[2 max]**.*
so purchasers may buy on impulse;
feel confident in buying the product without seeing it first / don't think that they may be wasting a lot of money; ***[2]***

(iii) *Award **[1]** for identifying how constructive discontent was the primary generator of the idea for the Umbrolly and **[1]** for a brief description **[2 max]**.*
Ejogo was discontent with finding himself unprepared for walking in the rain;
and he decided to use his experience to come up with a new idea to solve the problem; ***[2]***

(b) (i) *Award **[1]** for identifying one reason why innovators such as Ejogo may have difficulty in obtaining financial support.*
the innovation of products may be considered high risk / potential investors may be unsure whether the product will be successful/may prefer to wait until there is clear evidence of market; ***[1]***

(ii) *Award **[1]** for each distinct point in a discussion of Ejogo as an example of an inventor/entrepreneur **[3 max]**.*
the invention is the idea/concept rather than the product;
as the product is a combination of existing designs, for example, a brolly and a vending machine;
Ejogo is not a creative designer but a businessman who saw a new opportunity and formed a company; ***[3]***

(c) (i) *Award **[1]** for outlining the impact of research and development costs on the final cost of the Umbrolly and **[1]** for a brief explanation **[2 max]**.*
minimal impact;
the invention does not rely on expensive research and development as it does not employ new technology; ***[2]***

(ii) *Award **[1]** for each distinct point in a discussion of **three** cost implications which will need to be taken into account when establishing a network of Umbrolly machines **[3 max]** for each consideration.*
maintenance;
the machines need to be regularly maintained to ensure they are operating effectively;
but the level of maintenance will vary depending on the level of use/potential abuse;

labour;
the machine will need refilling;
costs will vary depending on location of the machines/how often they need refilling/transport costs;

supply of machines;
as a relatively new innovation the company will want to expand the network of machines;
the costs will vary depending on the pace of innovation/level of investment;

location;
the company will need to identify suitable locations for the machines which have a high level of footfall/used by many people;
and payment/rental to the owners of the premises will also have to be taken into account; ***[9]***