IB DIPLOMA PROGRAMME
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MARKSCHEME

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DESIGN TECHNOLOGY

Standard Level

Paper 2

13 pages

If you do not have a copy of the current Design Technology Guide, please request one from IBCA.

Subject Details: Design Technology SL Paper 2 Markscheme

Mark Allocation

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

General

A markscheme often has more specific points worthy of a mark than the total allows (especially for essay questions). This is intentional. Do not award more than the maximum marks allowed for part of a question.

When deciding upon alternative answers by candidates to those given in the markscheme, consider the following points:

- Each marking point has a separate line and the end is signified by means of a semicolon (;).
- An alternative answer or wording is indicated in the markscheme by a "/"; either wording can be accepted.
- Words in (…) in the markscheme are not necessary to gain the mark.
- Words that are <u>underlined</u> are essential for the mark.
- The order of points does not have to be as written (unless stated otherwise).
- If the candidate's answer has the same "meaning" or can be clearly interpreted as being the same as that in the mark scheme then award the mark.
- Mark positively. Give candidates credit for what they have achieved, and for what they have got correct, rather than penalising them for what they have not achieved or what they have got wrong.
- Remember that many candidates are writing in a second language; be forgiving of minor linguistic slips. Effective communication is more important than grammatical niceties.
- Occasionally, a part of a question may require a calculation whose answer is required for subsequent parts. If an error is made in the first part then it should be penalised. However, if the incorrect answer is used correctly in subsequent parts then **follow through** marks should be awarded. Indicate this with **"ECF"**, error carried forward.
- Units should always be given where appropriate. Omission of units should only be penalised once. Indicate this by **"U-1"** at the first point it occurs. Ignore this, if marks for units are already specified in the markscheme.
- Do not penalize candidates for errors in significant figures, unless it is specifically referred to in the markscheme.

SECTION A

1. (a) (i) *Award **[1]** for any of:*
cheaper than hardwood;
readily available;
aesthetic considerations (colour/grain pattern/texture);
sustainable resource;
easier to work; ***[1 max]***

(ii) *Award **[2]** for a suitable outline along the lines of*

very heavy to lift;
so potentially a safety problem;

difficult to hold due to the shape/size;
so not easy to carry;

they cannot be stacked safely on top of each other;
because the back is longer than the seat;

if stacked in a pile they would be top heavy;
and topple;

they would need a lot of storage space;
because of their size; ***[2 max]***

(b) (i) *Award **[1]** for the calculation and **[1]** mark for correct answer.*
height of table = 860;
height of chair is 655; thickness of plank is 20;
(860-20) – 655 = 185mm; ***[2 max]***

(ii) *Award **[1]** for the calculation and **[1]** for the correct answer.*
circumference of inner circle of chair is $2\pi r$ = (2 x 3.142 x 205) = 1288.2 + 40 mm seams;
(πD = 3.142 x 410) = 1288.2 + 40mm;
length of material = 1288.2 +40 = 1328.2mm; ***[2 max]***

(c) (i) *Award **[1]** for stating an appropriate reason.*
cheaper as manufacturer does not have to apply finish;
allows purchaser to finish as they wish;
could then match it with other garden materials. ***[1 max]***

(ii) *Award **[1]** for stating one disadvantage.*
possibility of splinters;
timber may crack causing pinching of the skin;
deterioration may render it less safe; ***[1 max]***

(d) *Award **[1]** per distinct point in a suitable discussion along the lines of*
sizes are based on adult percentiles;
no arms to the chairs so children could fall off;
young children will be tempted to climb onto the chair which might topple on them;
to sit at the table children will need to sit near the edge of the seat so no backrest;
if young children sit with their back against the backrest their legs will be straight;
no chemical treatment so not toxic; ***[3 max]***

2. (a) *Award **[1]** for the definition of clean technology*.
(a definition along the lines of) …"a technology that generates less pollution and less waste and adopts more efficient use of energy and materials". ***[1 max]***

(b) *Award **[1]** for each distinct point in a suitable explanation of one reason.*

image;
a company may want to be seen to be responsible;
and promote a green image in it's advertising;

cost-effective production;
using energy;
materials efficiently can save money;

legislation;
a company may anticipate forthcoming legislation;
want to implement changes at their own pace;

competition;
competitors may be promoting a green image;
by attracting consumers who increasingly want greener products;

market pull;
consumers are becoming more discriminating;
many are looking for greener products; ***[3 max]***

3. (a) *Award **[1]** for the answer.*
60 degrees; ***[1 max]***

(b) *Award **[1]** per distinct point in a suitable explanation along the lines of*
an exploded isometric drawing shows particular features of the inside of the design;
the designer may wish to explain how components fit together (*e.g.* a joint);
there may be hidden detail to show;
the sizes of holes or shafts may not be obvious in other views;
by exploding the drawing it shows the relationship of one part to another;
shows how to assemble components; ***[3 max]***

SECTION B

4. (a) (i) *Award **[1]** for the correct statement.*
people/boats can plan when to arrive at the bridge; ***[1 max]***

(ii) *Award **[2]** for a suitable outline related to aesthetics.*

image;
contemporary design for a new millennium;

status;
a landmark for the city;

link;
bridge provides a link between traditional environment and modern design;

landscape;
visible over a long distance; ***[2 max]***

(b) *Award **[1]** per distinct point in a suitable explanation along the lines of:*
needs to be drawn into wires for cables;
ductility allows the cables to move with the wind without breaking;
wires can be created in long lengths;
ductile materials are tough; ***[3 max]***

(c) (i) *Award **[1]** each from:*
gain feedback on appearance;
how it may fit into the existing environment;
useful to explain construction techniques;
used in marketing activities;
used to view effects of suggested modifications;
easy to understand what is proposed;
physical models are realistic replications of the real thing compared to other types of models; ***[2 max]***

(ii) *Award **[1]** for each distinct point in a suitable explanation along the lines of:*
unique design so designers cannot copy an existing design;
technically very difficult to achieve;
much R & D required to ensure the mechanism works effectively;
high costs; ***[3 max]***

(d) *Award **[1]** for each appropriate point in a discussion of form and function, **[3]** max for each aspect.*

functioning aspects of the opening mechanism;
difficult to achieve;
difficult to match the unusual shape;

the bridge functions in different ways;
as a footbridge and as an opening bridge;
as well as its function as a landmark;

form and function need to work together;
but within budgetary constraints;
which is difficult to achieve with a unique design;

the form is even more dramatic at night;
when the bridge is lit up;
from a distance its function is not obvious;

an opening bridge is much more complicated to design than a static bridge;
as the mechanism must be very reliable;
but not spoil the form; ***[9 max]***

5. (a) (i) *Award **[1]** for a definition.*
The product's introduction, growth, maturity and decline and its general pattern of production and profitability; ***[1 max]***

(ii) *Award **[2]** for a suitable outline along the lines of*:
rapid changes to its development;
because of an expanding market;
new technology; ***[2 max]***

(iii) *Award **[1]** for a reference to limited life and **[1]** for outlining a reason.*
due to new technology;
failure of key components *e.g.* battery;
damage as it is portable; ***[2 max]***

(b) *Award **[1]** mark for identifying why the technique is appropriate and **[1]** for a brief explanation.*
Laptop is adapted from a desktop PC and the context of its use changes;
the laptop developed from miniaturization technologies;
development of LCD screen adapted from monitor;
touch-pad adapted from mouse; ***[2 max]***

(c) *Award **[2]** each for two suitable outlines along the lines of:*
size of the screen;
to ensure a range of users can view it efficiently;

the effect of light on the screen;
under different lighting conditions;

adjustability;
so users can adjust the angle and brightness/colour; ***[4 max]***

(d) *Award **[3 max]** for three distinct points in a suitable discussion along the lines of*

global marketplace;
- disposal all over the world;
- different disposal regulations in each country;
- full effect on environmental damage is yet unknown – life cycle has been short;
- laptop has short life-cycle therefore many to dispose of;
- exponential growth in sales;

pollution;
- range of materials in each laptop that are dangerous;
- each need disposing in different ways;
- toxic components and chemicals;
- batteries could pollute the environment;
- different regulations in each country;

space;
- limited landfill sites;
- increasing amounts of laptops need disposal;
- re-use;
- repair;
- recondition;
- recycle;
- many different components and materials makes it difficult to recycle;
- design for disassembly;
- laptops are not easy to disassemble which makes recycling more difficult; ***[9 max]***

6. (a) (i) *Award **[1]** for the definition.*
The observation and analysis of comments made by people who have used the product; ***[1 max]***

(ii) *Award **[2]** for a suitable outline along the lines of:*
- enables the collection of consumer responses about using the steam iron;
- identifies strengths and weakness of the product design;
- allows for iterations in the design development;
- relating to shape;
- function;
- grip;
- safety;
- less costly form of evaluation; ***[2 max]***

(iii) *Award **[1]** for each distinct point in a suitable description.*
see water level;
know when to fill it up;
know when its almost empty;

aesthetics;
available in different colours;
because of style; ***[2max]***

(b) (i) *Award **[1]** each for any of:*
easy to mould;
tough;
lightweight; ***[2max]***

(ii) *Award **[1]** for each distinct point in a suitable outline along the lines of:*
high temperature from heating element and sole plate;
thermoset not reformed by heat therefore will not deform body shape if made from thermoset;
low thermal conductivity; ***[2max]***

(c) *Award **[1]** for each point in a suitable outline along the lines of*
batch because each iron production needs to be limited volume;
allows for easy changes in colour for example;
cost effective because no need to hold large stock-piles;
needs of consumer may vary so changes can be easily made;
not a continuous market;
market not large enough for volume production;
customers like choice; ***[2max]***

(d) *Award **[1]** for each distinct point from reuse, repair and recycle **[3]** max for each.*
reuse;
dial from temperature setting gauge could be used in another product;
iron designed so it can be disassembled to enable parts to be reused;
use standard parts such as plug and mains cable so they can be reused;

repair;
design the product so it can be disassembled to aid repair;
use screws to assemble product rather than adhesives or fusing;
use standard parts for items such as control knob and push buttons;

recycle;
make the iron from recycled materials;
make it from materials that can be recycled;
indicate in the injection mouldings the nature of the materials to aid recycling;
design for disassembly; ***[9 max]***