IB DIPLOMA PROGRAMME
PROGRAMME DU DIPLÔME DU BI
PROGRAMA DEL DIPLOMA DEL BI

N06/4/DESTE/SP2/ENG/TZ0/XX/M+

MARKSCHEME

November 2006

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.
- 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 interpretation of chart.*

2.4 tons (must have unit); ***[1]***

(ii) *Award **[1]** for calculation.*

4694 + 2.4 = 4696.4 tons (must have units); ***[1]***

(b) *Award **[1]** for the rationale and **[2]** for the equation.*

difference between 1999 and 1998 = increase divided by original × 100%;

4694 – 259 = 4435 / 259 × 100 = ;

1712 % ; ***[3]***

(c) (i) *Award **[1]** for reason and **[1]** for brief explanation.*

company image;
more appealing to consumers;

anticipate legislation;
so a planned approach to meeting it;

concern for the environment;
to reduce pollution and resources;

attract more customers;
customers who are environmentally conscious; ***[2 max]***

(ii) *Award **[2]** for discussion concerning interpretation of the two pieces of data and **[1]** for recognising that hybrid cars have little effect while household emissions have greater effect.*

correct interpretation of data to show that the hybrid cars have little effect in this context;
working on household emissions is better;
both strategies have an impact from one year to the next;
both strategies have a positive effect; ***[3 max]***

2. (a) *Award **[1]** for the definition of manufacturing process.*

a general term for making products which covers a range of techniques; ***[1]***

(b) *Award **[1]** for each distinct point regarding AGV's.*

computer controlled so reliable;
no need for labour so cost-effective;
can be reprogrammed so flexible;
co-ordinated with other aspects of the system via computer control;
operates only when needed;
less workers required; ***[3 max]***

3. ***Award [1] for a reason and [1] for an outline of the reason.***

shows sequence of assembly of parts;
so aids construction of product;

shows the function of the components;
so aids understanding of how it works; ***[2 max]***

4. (a) *Award **[1]** for showing an understanding why anthropometric data is used in food design e.g.*

bite size;
finger food;
easily held;
shape/size suitable for holding with fingers; ***[1 max]***

(b) *Award **[1]** for identifying what a tolerance is and **[2]** for an application.*

Tolerance is fatigue or comfort;

relates to limits of use *e.g.* operating a machine;
people have different tolerance levels;
implications may lead to inefficiencies or RSI; ***[3 max]***

SECTION B

5. (a) (i) *Award **[1]** for identification of a feature.*

intricate design;
hand finish;
method of assembly;
aesthetic considerations; ***[1 max]***

(ii) *Award **[1]** for consideration and **[1]** for the implication.*

splinters;
can cause injuries;

wood dust;
can be harmful if inhaled;

surface finishes;
can cause toxic fumes;

use of tools and machinery;
can cause injuries ***[2 max]***

(iii) market;
not big enough for mass production but bigger than one-off production;

production;
easy to split production of parts for different workers;

cost-effective;
standard parts and assembly; ***[2 max]***

(b) (i) *Award **[1]** for each point identifying two properties of wood.*

low density;
medium hardness;
medium tensile strength;
medium stiffness;
high toughness;
easily shaped;
light; ***[2 max]***

*Award **[1]** for identification of suitable consideration and **[1]** for the application.*

(ii) texture;
so feels nice;

colour;
so appealing to children;

grain pattern;
decorative appearance; ***[2 max]***

(c) (i) *Award **[2]** for a description covering two points.*

used to shape some of the parts;
to sand to correct size;
to achieve a smooth finish;
to prevent splinters;
to make it suitable for a surface finish to be applied; ***[2 max]***

(ii) *Award **[3]** for each discussion point covering three aspects. Maximum three discussion points **[9 max]**.*

timber used;
needs to be from a sustainable forest;
to conserve timber resources;

surface finish;
should not be toxic;
or cause pollution as a waste material from manufacturing;

method of manufacture;
should be as energy efficient as possible;
to help conserve energy resources;

use of standard parts;
in different designs of the toy;
to minimise energy use in manufacturing;

use of adhesives;
should not be toxic;
or cause pollution;

uses only timber in its construction;
so for disposal can be recycled for other timber based products;
or incinerated without causing pollution; ***[9 max]***

6. (a) (i) *Award **[1]** for identifying production method.*

batch production; ***[1]***

.

(ii) *Award **[1]** for describing the property and one mark for giving a reason.*

property = tough;
malleable;
ductile;
reason = hard wearing;
easily formed (raised or drawn for example);
good finish; ***[2 max]***

(iii) *Award **[1]** for high design costs and **[1]** for the reason.*

design cost is a significant proportion of the final cost;
leading designer will always be expensive;
limited market for such an unusual product so no great economy of scale; ***[2 max]***

(b) (i) *Award **[1]** for any ergonomic consideration for example:*

weight of kettle;
handle size;
texture of handle;
shape of handle;
pouring angle;
filling angle; ***[1 max]***

(ii) *Award **[1]** for describing radical and incremental design and **[2]** for the reason.*

incremental design:
a number of small changes that on their own may seem insignificant
radical design:
how a new material (for example) for the product may be a huge change; ***[1]***

reason:
for combination of incremental and radical is that a kettle must still function as a kettle and that must be obvious to the consumer, incorporates lots of small changes from previous products;
but one radical change in its form; ***[3 max]***

(c) (i) *Award **[1]** for outlining one disadvantage and **[1]** for a reason.*

its style is very contemporary;
and may not fit in with its surroundings;

as a kitchen appliance;
it needs to match other appliances in relation to style; ***[2 max]***

(ii) *Award **[3]** for each discussion point covering three aspects. Maximum **[3]** for discussion points.*

safety;
the kettle must function safely and comply with regulations;
for example not be hot to handle or cause scalding;

stability;
in designing its form;
the designer also has to ensure it will not fall over easily;

use of materials;
in order to achieve clean lines and a good surface finish;
the designer has had to choose a suitable material;

controls;
need to be integrated into the form;
in order to achieve an uncluttered look;

ease-of-use;
the designer has had to pay attention to ergonomics;
despite its sculptural form;

production;
choice of materials to match manufacturing techniques;
so quality of finish and fully functioning product; ***[9 max]***

7. (a) (i) *Award **[1]** for advantage.*

glass is recyclable; ***[1]***

(ii) *Award **[1]** for suggestion and **[1]** for reason for example.*

ecophobe does not care about environmental issues;
so unconcerned about choice of material; ***[2]***

(iii) *Award **[1]** for identifying an attitude and **[1]** for the reason.*

increasing number of consumers are worried about the effect of packaging on the environment;
so would avoid purchasing plastic packaging (unless biodegradable) and go for glass which can be recycled; ***[2]***

(b) (i) *Award **[1]** for choosing the correct percentile.*

50th percentile of hand or finger; ***[1]***

(ii) *Award **[1]** for each distinct point made – max **[3]**.*

size of hands;
power of grip of consumer;
shape of container;
diameter of cap;
weight of full package;
texture of cap; ***[3 max]***

(c) (i) *Award **[1]** for reference to user research and **[1]** for specific method.*

Research: user research (a must);
Method:
supermarket surveys;
questionnaires;
user interviews; ***[2 max]***

(ii) *Award **[1]** for each of three techniques and **[2 max]** for reasons of using the techniques.*

sketching;
quick visual image to develop ideas;
for developing divergent thinking;
used to convey idea to client;

physical modelling;
good for client to touch;
real visual image;
idea of proportions;
may have real colours and look like the final product;

virtual representations;
CAD;
virtual realisation;
client can "walk around product";
easy to make changes;
concurrent engineering;

orthographic projection;
real engineering drawings;
needed for mould makers or production engineers;
shows all dimensions;

[9 max]