N08/4/DESTE/HP3/ENG/TZ0/XX/M+

International Baccalaureate®
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MARKSCHEME

November 2008

DESIGN TECHNOLOGY

Higher Level

Paper 3

16 pages

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

Subject Details: Design Technology HL Paper 3 Markscheme

Mark Allocation

Candidates are required to answer questions from **TWO** of the Options **[2 × 30 marks]**.
Maximum total = **[60 marks]**

1. A markscheme often has more marking points than the total allows. This is intentional. Do **no**t award more than the maximum marks allowed for part of a question.

2. Each marking point has a separate line and the end is signified 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 writing ***OWTTE*** (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. Indicate this with **ECF (**error carried forward).

10. Only consider units at the end of a calculation. Unless directed otherwise in the markscheme, unit errors should only be penalized once in the paper. Indicate this by writing **–1(U)** at the first point it occurs and **U** on the cover page.

11. Do not penalize candidates for errors in significant figures unless it is specifically referred to in the markscheme.

Option D — Food Technology

D1. (a) *Award **[1]** for property.*
texture;
smell;
taste; ***[1 max]***

(b) *Award **[1]** for reason and **[1]** for a point.*
taste;
too salty or sour a flavour;

health issue;
high salt consumption unhealthy for consumers; ***[2 max]***

(c) *Award **[1]** for definition of dehydration and **[1]** for each point in a brief explanation **[2 max]**.*
dehydration is the reduction of water;
the low water content inhibits growth of micro-organisms;
micro-organisms cant survive without water;
added salt or sugar absorbs any water that micro-organisms need; ***[3 max]***

D2. (a) *Award **[1]** for definition.*
food becoming unfit for consumption; ***[1]***

(b) *Award **[1]** for lifestyle factor and **[1]** for each related point.*
leisure activities;
reduce space;
easy to pack;
lightweight;

living arrangements;
nomadic;
guarantee supply of food;
prevent spoilage;

busy lifestyle;
no time to prepare food;
eat food on the run; ***[2 max]***

D3. *Award **[1]** for factor and **[1]** for a related point.*

travel;
people visiting from other countries;
travelled to a foreign country;

media;
expose to cultures through travel shows;
advertisements of types of ethnic foods;

lifestyle;
living in a multi-cultural society;
ready made meals/takeaway; ***[2 max]***

D4. *Award **[1]** per issue and **[1]** for discussion of related main points **[2 max]** for each of three issues.*

societal/values;
- attitude to tampering with nature by mixing genes among species;
- stress for animal;
- increased food security for growing populations;
- objections to consuming animal genes in plants and vice versa;

environment;
- unintended transfer of transgenes through cross-pollination;
- unknown effects on other organisms (*e.g.*, soil microbes);
- loss of biodiversity;
- conservation of soil, water, and energy;
- "friendly" bio-herbicides and bio-insecticides;

production;
- better yields of meat, eggs, and milk;
- improved animal health;
- improved diagnostic methods;
- increased resistance;
- increased productivity;
- increased hardiness;
- increased feed efficiency;
- loss of biodiversity;
- stress for animal;
- increase food quality;

market;
- assurance of safety of food;
- assurance of "no stress" to animals;
- assurance no or reduced violation of natural organisms' intrinsic values;

financial;
- decreased cost due to less pesticide use;
- increased profits from better yields;

political;
- the role of government in supporting GMO;
- the role of government in managing use of GMO; ***[9 max]***

Option E — Computer-aided design, manufacture and production

E1. (a) *Award **[1]** for an advantage.*
flexibility;
storage;
interface with other CAD/CAM systems;
complex drawings done quickly; ***[1 max]***

(b) *Award **[1]** per point.*
CAD design using input devises and software;
CAD software is compatible with CAM translates into *x y z* co-ordinates;
artefact/scarf is produced through CAM; ***[2 max]***

(c) *Award **[1]** for impact and **[1]** for each related point in a brief explanation **[2 max]**.*
choice;
wider range of designs and colours;
consumer input, monograms or logos;

cost;
is kept low;
takes advantage of economies of scale;

quality;
high due to reduction of human error;
consistency of quality; ***[3 max]***

E2. (a) *Award **[1]** for definition.*
a sophisticated CIM system that manufactures products to individual customer orders; ***[1]***

(b) *Award **[1]** for advantage and **[1]** for each related point.*
higher profits;
increased customer satisfaction;
increased access to mass market flexibility of economy of scale;
gains from benefits of economy of scale;
increase access to mass markets;

market access;
increased access to market flexibility of economy of scale;
increased customer satisfaction therefore retuning customers; ***[2 max]***

E3. *Award **[1]** for the reason and **[1]** for a point relating to that reason **[2 max]**.*

financial;
capital costs;
access to global finances;

markets;
access to global markets;

labour;
traditional working practices;
value systems of the company;
union pressure groups;

technology;
continued availability of technology;
specialised skills and training required; ***[2 max]***

E4. *Award **[1]** per strategy and **[1]** for discussion of related points **[2 max]**.*
design for materials;
the existing manufacturing capability is the dominant factor;
designing specifically for maximum use of manufacturing capability;
split into design for materials, design for process and design for assembly;

design for process;
cost effective for manufacture;
no need to retrain staff;
this is designing to match an existing manufacturing process, *e.g*. injection moulding;

design for assembly;
unitises component-to-component, parts into sub-assemblies, and sub-assemblies into complete products;
better efficiency of machinery;
improved labour and work practices; ***[9 max]***

Option F — Invention, innovation and design

F1. (a) *Award **[1]** for definition.*
the process of discovering a principle;
a technical advance in a particular field often resulting in a novel product; ***[1 max]***

(b) *Award **[1]** per reason.*
safety;
efficiency;
availability;
reliability; ***[2 max]***

(c) *Award **[1]** for a reason and **[1]** for each related point in a brief explanation **[2 max]***
businessman;
understood markets;
able to get formal backing;
had a business;
was a business man;

OR

creativity;
invented artefacts;
made technological advances; ***[3 max]***

F2. (a) *Award **[1]** for definition.*
the initial impetus for the development of a new product is generated by a demand from the market; ***[1]***

(b) *Award **[1]** for area of change and **[1]** for each related point.*
product life cycle;
last longer;
therefore less waste is generated;

performance;
brighter light-use less bulbs;
less heat is generated;
more efficient;

environment;
designed for disassembly;
recycling incentives/systems;
use recycled materials; ***[2 max]***

F3. *Award **[1]** for lifestyle and **[1]** for a distinct point.*

green;
- no cars;
- less pollution;

healthy;
- become fit;
- reduce weight;

sporty;
- professional sports person;
- leisure sports person;

active;
- weekend riders;
- all terrain activities; ***[2 max]***

F4. *Award **[1]** for strategy and **[1]** for each point in a brief explanation of impacts **[2 max]**.*

diversification;
- developing new products;
- selling products to new companies;

market penetration;
- increasing sales to existing customers;
- finding new customers for existing products;

market development;
- finding new applications for existing products;
- opens up new markets;

product development;
- creating or modifying existing products aimed at existing consumers;
- aimed at new customers; ***[9 max]***

Option G — Health by Design

G1. (a) *Award **[1]** per pollutant.*
Sulphur Dioxide (SO_2);
Nitrogen Oxides (NO_2);
Carbon Monoxide (CO);
Benzene Ozone (O_3); ***[1 max]***

(b) *Award **[1]** per point.*
provides an environment for a chemical reaction to occur;
the toxic combustion products are transformed to less toxic by-products; ***[2]***

(c) *Award **[1]** per role and **[1]** for each related point in a brief explanation of that role **[2 max]**.*
improve standards;
tighter emission controls;
higher safety standards;

force multinational companies to invest in R&D;
R&D is expensive so companies may be reluctant to invest in R&D;
R&D cuts into the company's profits so companies may be reluctant to invest; ***[3 max]***

G2. (a) *Award **[1]** for definition.*
a design methodology in which designers use the users as a resource to increase their understanding; ***[1]***

(b) *Award **[1]** for implant and **[1]** per relative advantage.*
arteries;
soft;
wont dissolve;
extensible;

ear;
wont melt;
extensible;
wont dissolve;
soft;

nose;
wont melt;
extensible;
wont dissolve;
soft; ***[2 max]***

G3. *Award **[1]** for implication and **[1]** for description.*

survival;
difficult to find food and work;

dependence;
family or friends need to provide for the blind;

blindness is operable;
some blindness is caused by cataracts but people have no money for an operation; ***[2 max]***

G4. *Award **[1]** for issue and **[1]** for a brief explanation of points **[2 max]** for each of three issues.*

product information;
compare specifications of products;
find best suited product for their needs;

access;
to products that earlier proved difficult to get;
wider range of products;
access to products not found locally;

user research;
user centred design;
access through the internet;
products will be better suited due to direct feedback from disabled people;

distribution of products;
order online;
delivered directly and quickly to location;

economies of scale;
shift from one-off to batch/automated production;
cheaper products;
higher quality products;

become a market segment;
competitive market so better quality product;
cheaper products;
more lucrative to design products for disabled people; ***[9 max]***

Option H — Electronic products

H1. (a) *Award **[1]** for voltage including units.*
9 V / 9 volts; ***[1]***

(b) *Award **[1]** for function **[1]** description.*
protection for transistor;
steps down the output from ICI;
controls input to base of he transistor; ***[2 max]***

(c) *Award **[1]** per point.*
open circuit system;
the circuit is open, no current;
when it becomes closed current flows; ***[3 max]***
sounding the alarm;

H2. (a) *Award **[1]** for stating component.*
thermistor; ***[1]***

(b) *Award **[1]** for difference and **[1]** for description.*
closed loop provides feedback, open loop does not;
control measures can be taken on basis of feedback signal in closed loop circuits; ***[2]***

H3. *Award **[1]** per distinct point.*
pass near an antenna;
powered by induction; ***[2]***

H4. *Award **[1]** for issue and **[1]** for a discussion of points **[2 max]** for each of three issues.*

choice;
- limited as they incorporate the technologies into one product;
- wider product range;

market pull;
- desire to own cool technology;
- the need to have technologies combined into one;

financial;
- affordability of the cool technology;
- more expensive because of extra technology;

technology;
- attitudes toward technology;
- development pace;
- competition;

product life cycle;
- more features can go wrong;
- planned obsolescence; ***[9 max]***