



MARKSCHEME

November 2006

DESIGN TECHNOLOGY

Higher Level

Paper 3

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Subject Details: Design Technology HL Paper 3 Markscheme

Mark Allocation

Candidates are required to answer **ALL** questions in each of **TWO** Options (total *[20 marks]*). 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 penalise candidates for errors in significant figures, unless it is specifically referred to in the markscheme.

Option D — Food technology

D1. (a) *Award [1] each for two points.*

sun drying causes dehydration;
the drying of the fish prevents microbial growth; [2]

(b) *Award [1] for the method, [2] for an explanation of two points about the method.*

method:
cooking;
canning;
irradiation;
chemical preservation;
control of food atmosphere;
smoking;

explanation:
minimizing contamination;
killing microorganisms;
preventing microbial growth; [3 max]

D2. *Award [1] each for two points.*

selling the fish fresh adds no value to the product;
processing the fish on the farm value-adds to the product;
income is retained in the community;
provides more jobs for the local community;
stocks can be stored for a longer period; [2 max]

D3. *Award [1] each for two points.*

promote a sales slogan;
provide nutritional information;
attract customers to the product;
highlight the “green” process of drying;
help ensure cleanliness in handling the product;
allow for distribution to wider markets; [2 max]

D4. *Award [1] for the modification and [1] for the result.*

the over ripening gene is blocked;
tomatoes ripen but stay firm; [2]

D5. *Award [3] each for three reasons, [1] for the reason and [2] for the explanation.*

pollution;

- pesticides and nitrates leech into the soil;
- pesticides and nitrates leech into the groundwater;
- pesticides get into the food;

health;

- effects of pollution on farmers;
- effects of pollution on farm workers;
- effects of pollution on community;

resistance;

- pests become resistant to pesticides;
- need to develop new pesticides;

dependence on off-farm inputs;

- income used on pesticides and fertilizers;
- farm dependence on credit;
- decreases self reliance;

change in social attitudes;

- greater awareness of agricultural policies;
- political pressure from “green” parties;
- people prepared to pay more for organic produce;

[9 max]

Option E — Computer-aided design, manufacture and production

E1. (a) *Award [1] for reason and [2] for explanation.*

because CAD is a computer based design method;

enables designers to work concurrently;

provides for flexibility in designing;

accessibility by all designers to ongoing projects;

[3 max]

(b) *Award [1] for each advantage [2 max].*

facilitates team work;

saves time;

maximizes specialist knowledge;

[2 max]

E2. *Award [1] for a device [2 max].*

printer;

plotter;

rapid prototyper;

CNC machine;

screen/projector

[2 max]

E3. *Award [1] for the reason and [1] for brief summary.*

the design is computer based;

and so can be easily modified to suit customers needs;

enhance the efficiency of the process;

[2]

E4. *Award [1] for an opportunity and [1] for a description.*

global coverage;

can work or contact people in any area;

standardization;

similar standards in all countries;

[2 max]

E5. Award [1] for each of three reasons, and [2] for explanation.

distribution;

to provide distribution outlets in different countries;
closer to the markets;

agreements;

facilitate trade agreements with different countries;
make use of benefits from trade agreements;

government incentives;

benefit from government incentives;
beneficial taxation regulations;
legislation may be less restrictive;

cost of labour;

labour costs in some countries are low;
plentiful labour supply;

raw materials;

some production benefits from being close to raw materials;
may benefit being close to sub contractors;

land;

land may be cheaper;
plentiful supply of land;

availability of technology;

technology may be more accessible;
technology R &D costs may be lower;

[9 max]

Option F — Invention, innovation and design

F1. (a) *Award [1] for a reason and [1] for a brief summary.*

optical fibres and clear plastic are the invention;
these have been combined into a bag and successfully marketed; [2]

(b) *Award [1] each for three points in the explanation.*

ahead of competitors by introducing a new product first;
financially risky;
potentially large profits; [3]

F2. *Award [1] for each of two points in the outline.*

designer gone back to original purpose of a bag;
developed a new solution using new materials; [2]

F3. *Award [1] for one impact and [1] for a point in a brief summary.*

batteries;
non recyclable;
environmentally damaging;

materials;
high energy costs in manufacture;
not recyclable unless dismantled; [2 max]

F4. *Award [1] each for two factors.*

easy and fast travel;
rapid communications;
fast trading arrangements such as money transfer;
global consumerism;
global research and development; [2 max]

F5. Award [1] each for three ways, [2] for each discussion.

income;

distinct lower and higher price ranges;
people with different income levels;

age group;

young people have certain tastes;
older people have certain tastes;

lifestyle;

rural and urban lifestyles for *e.g.* have different values and tastes;
importance of making a fashion statement to the lifestyle;

geographical location;

hot desert location would have different requirements from a cold location;
coastal region may require a different “look” from a mountainous region;

fashion;

different areas (city, country) may subscribe to different fashions;
prevailing fashions may differ from country to country;

gender;

females are the main market segment;
males will have different criteria for handbags;

[9 max]

Option G — Health by design

G1. (a) *Award [1] for each of two points.*

provide a biological link with between the natural and unnatural material;
a framework for the growth of new tissue; *[2]*

(b) *Award [1] for each of three types of testing.*

tested with living cells/tissue;
chemical testing for contamination or breakdown;
testing for chemical leaching;
morphological examination of surface materials;
physical/mechanical tests for strength and toughness; *[3 max]*

G2. *Award [1] each for two properties.*

dense;
hard;
strong;
stiff;
tough;
impermeable;
non-corrosive; *[2 max]*

G3. *Award [1] each for a disadvantage and [1] for an advantage of soft lenses.*

advantages:
comfort;
disposable;
less chance of infection;
less cleaning;

disadvantages:
less durable;
don't maintain shape;
absorb pollutants; *[2 max]*

G4. *Award [1] for understanding economies of scale, [1] for why.*

large economies of scale can keep the product cost down;

high R&D and setup costs can be spread over more product sales;
product can be mass produced; *[2 max]*

G5. *Award [1] each for three reasons, [2] for explanation of each reason.*

sight more critical to survival;

less provision for visually impaired;

subsistence lifestyle more dependent on sight;

support systems less likely to be available;

technologies less developed;

people in remote areas may be unable to afford travel to treatment;

treatment;

less likely to be available;

less people could afford treatment if available;

communications;

poor communications;

people in remote areas unlikely to know about available treatments;

[9 max]

Option H — Electronic products

H1. (a) Award [1] for name and [1] for drawing of symbol.

thermistor



[2 max]

(b) Award [1] for explanation and [1] each for two examples.

explanation:

the rules govern the heating system and allow it to operate automatically;

examples:

IF temperature is cold THEN fan speed high;

IF temperature is hot, THEN fan off;

[3 max]

H2. Award [1] for two steps in the process up to four steps [2 max].

silicone base;

cover with photoresist;

expose circuit pattern;

wash / dissolve the photoresist;

etch the circuit pattern;

strip / wash the photoresist;

[2 max]

H3. Award [1] each for two appliances.

washing machine;

microwave oven;

oven;

refrigerator;

dishwasher;

coffee machine;

[2 max]

H4. *Award [1] for each of two components.*

information source;
modulator;
transmitter;
propagation medium;
receiver;
demodulator;
receptor;

[2 max]

H5. *Award [3] each for three effects, [1] for each point up to [9 max].*

by-pass traditional music marketing;
 download from the internet, so less marketing control;
 distribution may be more global and rapid;
 specialist interests easily catered for without significant increase in costs;

recording company control;
 artists can produce and distribute their own music;
 consumers have more control;

personal listening devices;
 new market for a range of listening products;
 smaller MP3 players suit lifestyles;

royalties;
 less control over sales;
 artists may not get royalties;

[9 max]