

# **MARKSCHEME**

**May 2002**

## **DESIGN TECHNOLOGY**

**Higher Level**

**Paper 3**

## 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) twister;  
mini milk;  
mini juice;  
calippo;  
vanilla tubs; **[1 max]**
- (b) tasting panel would be selected to match characteristics of target market **[1]**;  
taste panels are used for holistic checking of food products **[1]** and to refine the specification **[1]**, e.g. in relation to size, colour, texture, smell, packaging considerations **[1]**; **[2 max]**
- (c) although some budget / own label products intentionally mimic mainstream products **[1]**;  
generally a new food product is trying to be distinctively different **[1]**;  
comparison enables manufacturer / designer to be able to predict a likely market for the product **[1]**; **[3 max]**
- D2.** **[1]** for appropriate factor, **[1]** for appropriate explanation.  
water content **[1]**;  
concentrating fruit juice before transportation reduces transport costs **[1]**;  
shelf life considerations **[1]**;  
primary processing results in better storage properties **[1]**; **[2 max]**
- D3.** (a) **[1]** for appropriate definition.  
the incorporation of gas into a food product through beating (e.g. eggs);  
or under pressure (e.g. carbonated water);  
or by the action of yeast (e.g. bread); **[1 max]**
- (b) aeration alters the density of bread **[1]**;  
pockets of carbon dioxide gas formed by fermentation of dough produce the open structure of leavened bread **[1]**; **[2 max]**

**D4.** *Up to [4] for each technique plus [1] for balancing statement, up to [9 max]. [2 max] for naming techniques.*

naming of novel techniques *e.g.* gene transfer [1];

OR irradiation [1];

*[3 max] for one technique.*

gene transfer – many people worry about eating foods which have been genetically modified due to potential health risks following ingestion [1];

also due to environmental concerns about tampering with the gene pool [1];

genetically modified foods such as soya are particularly hard to trace through food chain [1];

whether such concerns are sensible remains to be seen [1];

considerable political pressure applied for and against use of genetically modified food, *e.g.* from manufacturers of pesticides and the genetically modified seeds [1];

*[3 max] for one technique.*

irradiation – many people think that foods that have been irradiated to enhance their shelf life may pose a threat to health by being contaminated with ionising radiation [1];

this is fallacious [1];

however foods which have been irradiated have to be clearly marked as such to ensure that they are not sold mistakenly [1];

on balance it is important to undertake careful market research before launching a food product to ensure that it is acceptable to the public [1];

**Option E – Computer aided design and manufacturing**

- E1.** (a) *[1] for any of the following, up to [1 max].*  
scanner;  
digital camera;  
graphics tablet;  
video camera; *[1 max]*
- (b) *[1] for each distinct relevant point plus explanation, up to [2 max].*  
number of employees *[1]* and explanation *[1]*;  
requisite skills *[1]* and explanation *[1]*;  
training issues *[1]* and explanation *[1]*;  
working environment (health and safety issues) *[1]* and explanation *[1]*; *[2 max]*
- (c) using virtual reality products can be marketed (shown to the public) *[1]*;  
even though they have not actually been manufactured *[1]*;  
this clearly results in savings of time, materials, energy *[1]*;  
if produce doesn't sell then no need to produce it *[1]*; *[3 max]*
- E2.** *[1] for appropriate disadvantage plus [1] for explanation, up to [2 max].*  
possible stoppages *[1]*;  
due to nondelivery of components produced by external companies *[1]*;
- E3.** (a) *[1] for appropriate definition.*  
an agreement from a government office giving someone the right to make or sell a new  
invention for a certain number or years. *[1 max]*
- (b) designs can be very easily copied *[1]*;  
and just changed marginally *[1]*;  
this would mean that the person would overcome patent / copyright issues *[1]*; *[2 max]*

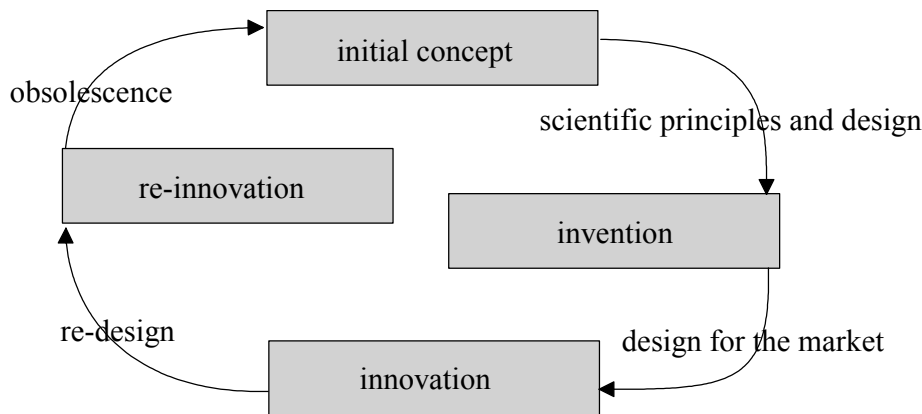
**E4.** *Up to [9 max], [1] for each distinct point.*

multinational companies are able to deploy resources in the most efficient processing locations [1];  
this can be from an energy perspective *e.g.* using cheap electricity such as hydroelectric power [1];  
OR from a raw materials perspective OR from a labour force perspective OR from a distribution perspective [1];  
modern communications systems enable the different parts of the company to communicate with each other [1];  
designs can be developed centrally and updated [1];  
and even large design files can be downloaded to the production location [1];  
expertise from across the company can be deployed in the design of a product [1];  
and teams of designers can work concurrently on designs [1];  
and using email [1];  
an expert in one part of the world can advise on a design [1];  
OR production problem in another part of the world using video conferencing techniques [1];  
modern communications techniques can save on travelling [1];  
which can reduce costs [1];  
and environmental impact [1];  
and can speed up the process [1];

**Option F – Invention, innovation and design**

- F1.** (a) the business of putting an invention in the market place and making it a success; [1]
- (b) technological push: the impetus for a new design emanates from a technological development;  
 market pull: the initial impetus for the development of a new product is generated by a demand from the market; [2 max]
- (c) *Award [1] per distinct point up to [3 max].*  
 this product is designed in response to the market for gadgets combining designer sportswear and digital technology;  
 the technological push for this product stems from the development of MP3 technology and proliferation of Internet sites featuring downloadable music;  
 it is difficult to determine absolutely whether market pull;  
 technological push is the impetus for the design of new products;

- F2.** *Award [2] for complete and correct diagram / labels.*  
*Award [1] for incomplete but correct diagram / labels.*  
*Award [0] for incomplete and incorrect diagram.*



- F3.** (a) [1] for the definition to the effect of:  
 the process of discovering a principle, a technical advance in a particular field often resulting in a novel product;
- (b) candidates should identify one scientific invention important in the telephone, e.g. electricity, electromagnetic principles, analogue signals, fibre optics, plastics [1];  
 the candidate should then explain how this influenced the development of the telephone [1]; [2 max]
- F4.** [1] for identifying a positive impact up to [3] for explaining why.  
 positive impacts in relation to, e.g. communications, transport, new materials and processes or information technology; [4 max]  
 negative impacts, as above; [4 max]  
 balancing statement that on balance the positive impacts outweigh the negative impacts; [1]
- The candidate may choose to respond about a particular disability or may refer to relevant case studies (e.g. telephone, or ovens) - either approach is acceptable.*

**Option G – Health by design**

- G1.** (a) more reliable;  
cheaper;  
reduces contamination;  
are more quantitative; *[1 max]*
- (b) when immersed in urine containing glucose the enzymes are activated *[1]*;  
and react with the glucose causing a colour change in the dye *[1]*; *[2 max]*
- (c) *[1]* per distinct point, up to *[3 max]*.  
diabetics are able to regulate their own glucose intake *[1]*;  
and thus continuous monitoring by doctors is not necessary *[1]*;  
this enables considerable freedom for the individual *[1]*;  
and also more effective monitoring and treatment *[1]*; *[3 max]*
- G2.** identify a development in manufacturing techniques – *e.g.* mass production *[1]*;  
OR CAD / CAM *[1]*;  
has meant that accurate syringes can be produced more cheaply *[1]*;  
and used safely through negating the need for sterilisation *[1]*;  
and risk of breakage that was an issue for metal / glass syringes *[1]*; *[2 max]*
- G3.** (a) *[1]* for appropriate diagram, *[1]* for correct labelling of:  
mercury, scale; *[2 max]*
- (b) *[1]* for a correct disadvantage, *[1 max]*.  
easily broken, *e.g.* in a child's mouth *[1]*;  
needs to be sterilised between users *[1]*;  
not quick to take temperature (30 s 1 m) *[1]*;
- G4.** *[9 max]* *[1]* for each distinct point.  
increase in CO<sub>2</sub> levels *[1]*;  
can lead to greenhouse effect *[1]*;  
global warming *[1]*;  
increase in particulate matter *[1]*;  
can lead to smog *[1]*;  
block stomata in leaves of trees *[1]*;  
can lead to premature leaf fall *[1]*;  
or prevent photosynthesis *[1]*;  
increase in particulate matter can lead to bronchitis or asthma or other respiratory diseases *[1]*;  
increase in SO<sub>2</sub> *[1]*;  
can lead to formation of H<sub>2</sub>SO<sub>3</sub> *[1]*;  
acid rain *[1]*;  
effect on forestry *[1]*;  
problem usually distant from source *[1]*;  
*e.g.* in another country *[1]*; *[9 max]*
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