

MARKSCHEME

November 2003

DESIGN TECHNOLOGY

Standard Level

Paper 2

1. Follow the markscheme provided, do **not** use decimals or fractions and mark only in **RED**.
2. Where a mark is awarded, a tick (✓) should be placed in the text at the **precise point** where it becomes clear that the candidate deserves the mark.
3. Sometimes, careful consideration is required to decide whether or not to award a mark. In these cases write a brief annotation in the **left hand margin** to explain your decision. You are encouraged to write comments where it helps clarity, especially for moderation and re-marking.
4. Unexplained symbols or personal codes/notations on their own are unacceptable.
5. Record subtotals (where applicable) in the right-hand margin against the part of the answer to which they refer (next to the mark allocation for Section A). Do **not** circle sub-totals. **Circle the total mark for the question in the right-hand margin opposite the last line of the answer.**
6. For Section B, show a mark for each part question (a), (b), *etc.*
7. Where an answer to a part question is worth no marks, put a zero in the right-hand margin.
8. Section A: Add together the total for each question and write it in the Examiner Column on the cover sheet.
Section B: Insert the total for each question in Examiner Column on the cover sheet.
Total: Add up the marks awarded and enter this in the box marked TOTAL in the Examiner Column on the cover sheet.
9. After entering the marks on the cover sheet check your addition to ensure that you have not made an error. Check also that you have transferred the marks correctly to the cover sheet. **We have script checking and a note of all clerical errors may be given in feedback to examiners.**
10. Every page and every question must have an indication that you have marked it. Do this by **writing your initials** on each page where you have made no other mark.
11. If a candidate has attempted more than the required number of questions within a paper or section of a paper, mark only the required number of questions in the order in which they are presented in the paper, unless the candidate has indicated the question(s) s/he wants to be marked on the cover sheet.
12. A candidate can be penalised if he/she clearly contradicts him/herself within an answer. Make a comment to this effect in the left hand margin.

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) *[1] for calculation and [1] for correct answer – omit [1] for leaving out units.*
20 s + 15 s + 10 s + 15 s;
60 s / 1 minute *[2 max]*
- (ii) *[1] for correct answer.*
any of processes in prepare raw materials are examples of batch production;
e.g. prepare dough;
prepare toppings;
prepare sauce;
grate cheese; *[1 max]*
- (iii) assemble pizza is an example of assembly line production; *[1 max]*
- (b) (i) smell, appearance / colour could be used in the normal run of production;
not taste / texture which cannot be observed; *[2 max]*
- (ii) standard size pizzas using portion control;
would enable standardized cooking times and result in standardized products; *[2 max]*
- (c) *[1] per correct relevant point.*
instead of placing the pizza in the oven after assembly;
the chef would assemble the next pizza;
and repeat assemble pizza;
until all the order is complete at which point all the pizzas would be cooked simultaneously; *[4 max]*
2. (a) *[1 max] for appropriate definition to the effect of:*
an approach to manufacturing or production which uses less resources and causes less environmental damage; *[1max]*
- (b) *[1] for each distinct point – [3 max] for explanation.*
end-of-pipe refers to the environmental impact caused at the end of a manufacturing process;
it is not a radical rethink of the whole process;
but an incremental development of what already exists; *[3 max]*
3. (a) *[1 max] for appropriate definition to the effect of:*
a composite comprised of sheets of materials joined with adhesives; *[1 max]*
- (b) *[1] for each distinct point.*
the technique is quite complex;
for cost effective automation;
hence, batch production more suitable; *[3 max]*

SECTION B

4. (a) (i) *[1] per appropriate property.*
transparent;
unreactive;
aesthetic properties; *[2 max]*
- (ii) *[2 marks] for either reason.*
it is lighter;
so distribution costs are reduced;
- it is tough;
so does not break easily; *[2 max]*
- (b) (i) shaping a material with the use of a machine; *[1 max]*
- (ii) *[1] for each distinct relevant point – [1] for appropriate brief explanation.*
the bottles can be shaped to make them more comfortable to hold in the hand;
by altering the shape of the die appropriately;
texture can be moulded into the surface finish; *[2 max]*
- (iii) *[1] for each distinct relevant point – [1] for appropriate brief explanation.*
they maximize efficiency;
e.g. by transporting components or finished products from part of the factory to another;
eliminate the need for labour; *[2 max]*
- (c) *[1] per distinct point.*
Green design considerations:
- disposal;
the glass bottle needs to be disposed of with care to ensure it does not cause a potential safety hazard if broken;
to ease recycling and reuse the container should be sorted by material;
- reuse;
the glass bottle can be reused;
the plastic bottle can be reused;
the can cannot be reused;
- recycling;
drinks cans can be made of steel coated in tin or aluminium alloy;
aluminium cans are easily and economically recycled;
steel cans are not;
glass can be easily recycled, plastic bottles can be recycled but not as easily as glass;
- labelling;
the materials should be appropriately labelled to indicate the nature of the material used to make them and the recycling potential;
this is particularly important for the aluminium can and the plastic bottle;
- waste;
the plastic container is potentially more harmful to the environment; *[11 max]*

5. (a) (i) *[1] per appropriate property.*
melts at reasonable temperatures;
so can be injected efficiently into mould to form required shape; *[2 max]*
- (ii) *[1] for advantage plus [1] for brief explanation.*
volume production of the tray is very cost-effective;
because once the die is made it can be reused;
no finishing is required;
which keeps costs low;
as injection moulding is a one stage process;
which reduces lead time;
the injection moulding equipment can be used with different moulds;
so there is some flexibility; *[2 max]*
- (b) (i) *[1 max] for definition to the effect of:*
the most efficient way of designing and producing a product from the
manufacturer's point of view; *[1 max]*
- (ii) *[1] for relevant reason plus [1] for brief explanation.*
simple shape;
makes it easy to produce the positive to produce the negative for the die; *[2 max]*
- (iii) *[1] for criterion and [1] for brief explanation.*
ergonomic issues;
e.g. how the tray resists bending when loaded up;
type of surface finish;
so how easy to handle;
aesthetics;
how fits into design context; *[2 max]*
- (c) *[1] for each distinct point.*
increasing efficiency in the use of materials;
e.g. by using less material in the design without losing functionality;
increasing efficiency in the use of energy, *e.g.* by using a plastic that melts at a lower
temperature;
or can be moulded using lower pressures;
increasing efficiency in the use of other resources;
minimizing the damage or pollution from the chosen materials;
ensuring that the planned life of the product is appropriate to the design context;
and that the product functions efficiently for its full life *i.e.* easy to keep clean / does
not damage easily;
taking account of the full effects of the end disposal of the product;
making sure that the packaging and overall appearance encourage efficient and
environmentally-friendly use;
reusable and recyclable; *[11 max]*

6. (a) (i) *[1] per appropriate feature.*
performance;
safety issues;
reliability;
feasibility of production / cost-effectiveness;
ease of maintenance;
no information on ergonomics;
no information of interior; *[2 max]*
- (ii) *[1] for property and [1] for brief explanation.*
can be shaped;
using simple tools;
can be used in wet (plastic) state or dry;
can be textured easily or different surface finishes applied; *[2 max]*
- (b) (i) *[1 max] for definition to the effect of:*
obtaining users' responses;
- (ii) *[1] for a disadvantage and [1] for brief explanation.*
the users surveyed at the motor show may not be typical of the norm;
motor show attendees are generally more enthusiastic / may be biased; *[2 max]*
- (iii) *[1] for property and [1] for brief explanation.*
one off;
the model would be craft-produced to model the car and could be used to take
measurements at particular points to construct computer models for larger scale
production of the car; *[2 max]*
- (c) *[1] for each distinct point.*
minimal damage or pollution from the clay;
no long term harm;
the clay can be recycled for other models;
so there is no need to further deplete natural resources;
no wastage of any resources that cannot be reused or recycled;
ensuring that the resultant car meets market needs through data collection from
potential users before production;
manufacture of the model car can be achieved very easily using simple tools;
manufacture of the car does not utilize vast amounts of energy;
the planned life of the product is appropriate in environmental terms;
clay is readily available in many different locations;
clay is an abundant resource; *[11 max]*
-