

MARKSCHEME

November 2001

DESIGN TECHNOLOGY

Higher Level

Paper 3

Option D – Food technology

- D1.** (a) 15-22 years. *[1]*
- (b) In the early years (1-10) same requirement. *[1]*
From 10 years onwards the gap between male and female widens as they get older until 19-22 years and then narrows *[1]*
- (c) Taste preferences change with different experiences *e.g.* travel. *[1]*
Body changes at different times of life *e.g.* lower metabolism. *[1]*
Life style changes *e.g.* having a baby. *[1]*
Diseases *e.g.* diabetes. *[1]*
Become more knowledgeable about different foods and more experienced at preparing it. *[1]*
Health issues linked to jobs / routines *etc.* *[1]*
([1] for each outline linking nutritional requirements to food choice; maximum of [3])
- D2.** Electromagnetic waves are passed through the food killing off microbes and unwanted pests. *[1]*
The fruit does not go mouldy *[1]* and looks like fresh food but keeps longer. *[1]*
- D3.** Cook-chill products are linked to the increase in food poisoning.
Breakdown of the regular family meal occasion.
People pay less attention to nutritional requirements and a balanced diet.
'Exotic' dishes are readily available anywhere in the world.
People do not have to find a specialist restaurant to enjoy exotic food.
Cook-chill products are more expensive than buying fresh produce.
Speed – meals prepared in minutes.
More time available for other activities.
Reduction in skills / experience of preparing meals.
Diet may be more varied and cross-cultural.
(1 issue × [2]. [1] for a statement only not specifically linked to lifestyle)
- D4.** Advantages:
Standardisation of the product – size, shape and colour.
Stores for a longer period of time.
Available all year round – not subject to seasonal variations.
Stable prices.
Reduction in need for pesticides.
- Disadvantages:
Blander taste than other tomatoes.
Different texture – tougher.
Possibility of future health problems as yet unknown.
Disapproval of gene transfer techniques *i.e.* the ethics of the situation.
([2] for each issue suitably discussed, maximum 4 issues. [1] for good balance of advantages / disadvantages.)

Option E – Computer aided design and manufacturing

- E1.** (a) More work done in less time. *[1]*
More cost-effective. *[1]*
Increased profits. *[1]*
([1] for an appropriate statement; [1 max])
- (b) Less tedious to use than drafting using a drawing board.
Easier to make changes to drawings.
More scope for designers *e.g.* zooming in and out.
Gives a more high tech image to the company and designer.
Increased job satisfaction – better quality drawings.
Allows for more interface with other people, less isolation.
More training and staff development required.
Broader role for the designer – links to manufacturing *etc.*
([2] for one correct response; [1] only for a statement)
- (c) Accuracy:
Less errors due to the elimination of drawing skills.
Less errors due to ease of correction.
CAD allows for zooming in on drawings and enlargement *etc.*
Accuracy depends on the software and output devices rather than manipulative skills.
- Consistency:
Fatigue does not affect the quality drawings so readily.
Different people can work on drawings with no indication of changes of style.
Software sets the parameters *e.g.* pull-down menus.
- [1] for an aspect related to accuracy.*
[1] for an aspect related to consistency.
[1] for identifying from the data that more than twice as many benefits relate to accuracy than consistency.
- E2.** NC machines are controlled by punch tape or cards and therefore have limited functions. *[1]*
CNC are controlled by computers and therefore have greater scope. *[1]*
- E3.** Physical models are 3D and can be handled and are therefore more tangible representations of the intended object.
Computer simulations are 2D and cannot be handled and passed around.
Clients get a better idea of the final outcome from physical models than computer simulations.
Computer simulations are cheaper to create than physical models.
One simulation model can be used as the basis for changes to create other models but different physical models need to be created.
([2] for any issue suitably linked to both types of models; [1] for using an example)

E4. *e.g.* oven

No programming necessary – mimics human logic.

More environmentally friendly – uses less energy by self regulation of temperature.

Take decision making away from users – allows people with disabilities and the elderly to use the product more easily.

Safer – less chance of food overlooking and less need to check food is cooking correctly.

Users do no need to know about food cooking times or read labels *etc.*

More expensive to buy.

Gives a high-tech image – appealing to some consumer groups.

Gives users more time for other activities.

Planned obsolescence – use of sensitive electronics which make the product more difficult and expensive to repair.

([2] for each issue suitably discussed, maximum 4 issues.)

([1] for good choice of product and relating the issues to it.)

Option F – Invention, innovation and design

- F1.** (a) Use of new materials. *[1]*
Use of new technology for manufacturing. *[1]*
Style. *[1]*
([1] for an appropriate statement; [1 max])
- (b) Holding the redesigned handlebars pulls the rider forward *[1]* and creates a more aerodynamic riding position. *[1]*
Changing the shape of the handlebars *[1]* gives the rider better grip. *[1]*
([1] for identifying appropriate feature of redesign and [1] for outlining how it benefits the design.) [2 max]
- (c) Lighter – especially beneficial for racing.
Increased durability *e.g.* for specialist activities such as mountain biking.
Less corrosion compared to the conventional use of steel.
Better image – more stylish.
Other opportunities for different manufacturing techniques *e.g.* monocoque design.
Less components possible.
([1] for identifying an advantage; [1] for relating it to a particular design feature; [1] for explaining its relevance to the use of the bicycle)
- F2.** Addition of features which make cooking easier.
More environmentally friendly *i.e.* use less energy; use recyclable materials – use reusable parts.
Appeal of classic designs *e.g.* Aga / Rayburn
Development of microwave ovens which also operates as a conventional oven to make food taste traditional.
Design of ovens to fit into built-in kitchen designs *i.e.* integrate in relation to size, materials, colour.
Use of remote controls as with other products.
Incorporation of fuzzy logic as for either domestic products to make them easier to use.
([1] for a suitable aspect of oven design; [1] for relating it to a market pull situation)
- F3.** Rapid development of new technologies and materials.
New markets with increased globalisation.
Product life cycle becomes increasingly shorter.
More research and development taking place.
Effect of planned obsolescence on the product life cycle.
More competition spurring R&D and innovation.
Greater market pull situation for more innovative products.
More countries changing from developing to developed.
([1] for identifying an issue; [1] for relating the issue to the pace of change; [1] for using a suitable example)

F4. Innovations could include:

Video conferencing; Internet; satellite links; use of PC *etc.*

Advantages:

Less need for carers as the home environment can be equipped for their particular needs.

Use of specific computer software to allow them to communicate *e.g.* voice synthesiser.

Increased self-esteem as the nature of the disability *i.e.* not a focal point.

Flexible working hours.

Available at home for any regular medical treatment or visits.

No problems with transport arrangements.

Except for the initial capital costs – cheaper *i.e.* no transport costs.

Cheaper too for companies who do not need to make arrangements for disabled workers.

More opportunities for employment.

Disadvantages:

Possibility of isolation – lack of physical / social contact with people.

Feeling of alienation – constant interaction with machines only.

Limited experience of society at large.

No division between home life and work.

Possibility of exploitation – no protection by unions *etc.*

Susceptible to breakdown of communication systems.

([2] for each issue suitably discussed. Maximum 4 issues, 2 for each specific innovation. [1] for a good balance of advantages / disadvantages.)

Option G – Health by design

- G1.** (a) Coloured *[1]*
- (b) More similar to spectacle lenses.
Natural evolution from what went before.
Easier to manufacture.
Suitable for people with the eye disease astigmatism.
Easier to handle by consumers.
Long lasting if maintained well.
Technology for developing soft lenses not yet established.
([1] for identifying a correct factor. [1] for relating the factor to a context)
- (c) Wider choice for consumer, to suit different eye conditions, for cosmetic reasons e.g. change colour of the eye.
Different eye conditions require different lenses.
New materials and technologies constantly developing.
New markets – more widespread use of contact lenses.
Users purchase more than one type for variations in use / lifestyle issues.
Different lenses targeted at different market segments.
([1] for each reason suitably outlined; maximum of 3 reasons)
- G2.** Brittle so breaks easily and can be dangerous.
Expensive to produce.
Less easy to read than a digital read out.
([1] for each statement; maximum of 2 statements)
- G3.** Possibility of use of measured doses more hygienic – no need to clean it.
Easy to use by patients themselves.
No need for expensive packaging for long term storage.
Can be used anywhere.
([1] for each benefit; maximum [3])
- G4.** Use of cleaner energy sources e.g. electricity.
More R & D into safety issues, both for drivers, pedestrians and other road users.
Reduce exhaust emissions.
Reduce amount of energy required to manufacture and use vehicles, therefore less pollution and waste from producing energy on a world-wide scale.
Reduce amount of raw materials used in vehicle manufacture.
Make vehicles recyclable so reducing the need to create more raw materials and therefore less waste and pollution.
More ergonomically designed vehicle interiors to reduce fatigue and increase comfort.
More adjustability for seating and controls for safety and comfort.
Increased use of communication devices to reduce stress levels e.g. information of traffic.
Hold-ups.
([2] for each issue suitably discussed, maximum 4 issues. [1] for a degree of innovation in looking to the future.)
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