



2010 Product Design

Advanced Higher

Finalised Marking Instructions

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Question 1

(a) 1 mark for each valid reason – max 6 marks, eg

- Different functions are required of the head.
- Elastomer is soft, less chance of injury.
- Elastomer has good grip for trapping ball.
- Thermoplastic is durable.
- Thermoplastic is stiff, providing rigidity for head.

(b) 1 mark for each valid explanation of why the selected process is suitable – max 2 marks. No marks for naming process. Note – process must be suitable, eg

Injection moulding is a suitable process because the stick head:

- is a complex form
- will be manufactured in large quantities
- is made from a combination of 2 materials
- will need to be manufactured to a high degree of accuracy
- will not require secondary processing.

(c) 1 mark for the description of each difficulty and 1 for explanation of how the difficulty may be overcome. Candidate must describe and explain 2 difficulties for full marks, eg

Due to the complex form of the stick head the manufacture of the mould itself will be highly complex. For the mould to be successful careful consideration will need to be given to how the mould goes together and how the product will be released from the mould.

The skelitor nature of the stick head may result in the actual thermoplastic setting before it fills the mould cavity. This could be overcome by heating the mould or having a number of injection points.

There are 2 parts to the stick head that require to be moulded/bonded together and this poses many problems. The level of accuracy required in part B will need to be high to allow a good strong bond with part A, keeping tolerances tight will ensure a good fit.

Other possible answers may refer to attachment of net or quality assurance issues.

(Total 12 marks)

Question 2

- (a) **1 mark for each valid explanation. All three issues must be covered, maximum marks per issue is 3. Therefore mark breakdown could be 3, 2, 1 or 2, 2, 2 – max 6 marks.**

Possible areas to consider for the importance of aesthetics could be:

- Links to already strong brand image.
- Commercial success.
- Competition.
- Its impact on the environment.
- First impressions.
- Inferred quality and effectiveness.
- Customer confidence, suggested interaction and inferred safety.

Possible areas to consider for the importance of function could be:

- Highly functional product with defined use.
- Used to replace tried and tested products that already work well.
- Used frequently.
- Sold as more efficient and effective so the product has to deliver.

Possible areas to consider for the importance of environment (answers may refer to environment dryer is used in or global environment) could be:

- Difficult and possible hazardous conditions.
- Used with little care or consideration.
- Space and placement of the product.
- Fixing of the product.
- Abuse of the product.
- Health and Safety.
- Use of materials.
- Power supply.

- (b) **1 mark available for each valid point – max 4 marks. Maximum of 3 marks if the influence of only one factor is described, eg**

Possible areas of influence on function by aesthetics:

- Form may restrict the standard components used.
- Corporate look of dryer may require certain material/processes to be used.
- The wall fixings are hidden for sleek look – this may impact on function.

Possible areas of influence on function by environment:

- Highly efficient due to frequency of use.
- Easy to use for wide customer base with differing abilities.
- Materials must suit environment and will influence function.

- (c) (i) **Vague description 1 mark, detailed description 2 marks. Marks should not be awarded for simply naming activity.**

Possible activities to consider could be:

- Existing products.
- Like product types.
- Observations (ethnography).
- Questionnaires.
- Surveys.

- (ii) **Vague explanation 1 mark, detailed explanation 2 marks.**

Possible explanation relating to the benefits of modelling through:

- Better understanding of human interactions.
- Physical interaction determines sense of scale and size.
- Better understanding of aesthetics through form.
- Test the product for use, abuse and safety.
- Better understanding and communication with different members of the design team.

- (iii) **Vague explanation 1 mark, detailed explanation 2 marks.**

Possible activities to consider could be:

- Test rigs.
- Prototypes.
- Expert appraisal.
- User trials.

(Total 16 marks)

Question 3

(a) 1 mark for each valid point made about the research strategy – max 6 marks, eg

- Methods of gathering information
Observation of Hospital Procedures (what happens at present), questionnaires directed to prospective new parents, field research into hospital procedure – hygiene/sterilisation.
- Who would be consulted
Doctors/consultants, prospective new parents, nurses/midwives.

(b) 1 mark for each valid description, alternatively 2 marks could be awarded for a more detailed description. A description of at least 2 techniques/methods the designer has used is required for full marks, eg

- The designer has made the Joey clamp & cutter more appealing by hiding the cutter within the case, this acts to remove the physical act of cutting from the process which may cause apprehension to some.
- Appears easy to use.
- Simplifies process.
- The Koala clamp also comes in a range of colours, removing the utilitarian look of a creamy coloured clamp and allowing the new parents to choose which colour they would like.
- The Koala clamp also has a smiley face on it which, even though we don't like to admit it makes us feel a little happier about using the product. This is a strategy often used by designers to tap into our subconscious.
- The previous methods used cold stainless steel surgical instruments many would find out of place at the birth of a child, by replacing the instruments with a friendlier looking plastic object the surgical aspect of the process may be reduced.

(c) 2 marks each for a description of 2 possible starting points – max 4 marks.

The answer below illustrates full marks.

Designers often use technological push as the starting point for innovative products. This involves the use of existing materials or technology within another field to produce a new product. The time and money spent researching and developing carbon fibre was initially funded by the aero space industry, helping to develop space craft. The same technology was then used by Formula One race teams to make race cars safer and lighter. The production costs of the material were still very high and only high end products could justify the expense and use. As time has gone on and production costs reduced, carbon fibre has been used to revolutionise sports equipment from tennis racquets to bicycle helmets. This is an example of technological push.

Designers can also use analogy as the starting point for innovative products. Analogy is where parallels are drawn between one situation/product and another. This is best described using examples – when skiing and cycling the foot is required to be fixed to either the ski or the pedal and must come free in the event of a fall. Early designs for both bindings did not allow release during a fall and often resulted in serious injury. The French company LOOK, was originally a ski equipment manufacturer. The company produced quick release bindings for skis from the 1950's to the present day. In the 1980s LOOK pioneered the use of "clipless pedals" for cycling applications, based on the equipment originally developed for ski bindings. The invention was touted as a safety improvement as it made it easier for a cyclist to release their feet from the pedals.

Note: Updating products is not an appropriate answer.

(Total 13 marks)

Question 4

- (a) **1 mark for each description of potential benefit (max 3 marks) or drawback (max 3 marks) – max 4 marks total, eg**

Benefits:

Large public exposure – any publicity on a large scale is often looked at as good publicity, get your product/brand exposed to the largest market share.

The public can be fickle and will happily use products that have been endorsed by celebrities without much consideration to the merits of the product.

Drawbacks:

Limited life span – the event has a very limited time in the public eye.

If the event/personality suffers bad publicity the product will be associated with this – doping scandals in the 2008 Tour de France saw a number of team sponsors withdraw their finance due to links with drugs in sport.

High costs – because these events are highly sought after the costs of association are often very high.

Celebrity endorsements can be very similar to fad/fashion in their nature – what the public see as in vogue this week can change very quickly.

- (b) **2 marks each for a description of 2 possible method – max 4 marks, eg**

Companies often use large scale launch events to promote new products – often leaking little details about the new product prior to launch. The Apple corporation did this with great success during the build up to the launch of the iPhone. Details about the phone, its looks and the features were leaked to the press, mostly via the Internet, prior to the very large scale launch event. The resulting hype ensured the phone was sold out prior to the actual launch event.

Another means of maintaining market share is to make good use of television advertising space. Citroen have recently used transformer style cars in their award winning TV adverts, these adverts were played during prime time viewing and appealed to the children of the families that would buy the cars. Research had been carried out prior to the production of the advert and found that if the cars can be made to appeal to the children in the families then they in turn would pester daddy to get one and this may be enough to tip the balance in Citroen's favour.

Other answers may include:

- Rebranding
- Limited editions
- Expand consumer base
- Product placement

- (c) **1 mark for a description of each consequence – max 2 marks, eg**

The answer below illustrates 2 marks – 1 for effect on product and 1 for effect on brand image

Product recalls can have a devastating effect on brand image and careful management of the situation is required before and after the recall. If the situation is not handled correctly the brand could experience a downturn in sales due to public confidence in the company falling as a result of the recall. This downturn in confidence may not only affect the product being recalled but also all products within the company range.

(d) 1 mark for a description of each part of the strategy – max 2 marks, eg

The key to a successful product re-launch after a recall is to minimise the publicity on the recall and maximise the publicity on the re-launch.

When products are recalled it tends to be a fairly low key process, with as little fuss being made as possible so that only the people who need to know about it are actually aware of the recall. When the product is re-launched it should be done using an advertising campaign focussing on the new improved version. This campaign should make lots of reference to new features, new colours, new options and how much better the new version is over the old one, without actually saying that the previous version had been recalled.

(e) 1 mark for each description of how the company has made good use of branding. The answer must use examples – max 2 marks, eg

One company which has made good use of their trademarked logo is McDonalds. Their ‘Golden Arches’ are used on all the product packaging they use and on all the exteriors of the buildings. The same symbol has also been used in association with a number of large scale sporting events around the world, helping spread the company brand. This has lead to these 2 very simple arches being recognised across the world as a symbol for the McDonalds fast food chain.

Adidas has used their 3 stripe logo for decades and this has only changed slightly in all these years. By keeping the logo the same for a long period it has helped the brand image project an image of long lasting stability and good quality. The company has incorporated the logo into the actual structural design of its sports shoes and also uses the same branding on all its sports wear to help protect the property rights of the company. This strategy has lead to the Adidas logo being instantly recognisable in the global market place.

(Total 14 marks)

Question 5

(a) (i) **1 mark for each valid point – max 3 marks, eg**

- Unknown projected sales.
- Retooling costs.
- Investment in plant and training of staff.
- Risk of failure.
- Increased testing and quality control.

(ii) **1 mark for each valid point – max 3 marks, eg**

- Consumer often resistant to change.
- Feel safe with what they are familiar.
- Often need the confidence in other opinion.
- Opt for the tried and tested.
- Often wait for word of mouth endorsement from others.
- May not want to invest in learning something new.
- Price can often be high to cover cost of risk to manufacturer.

(iii) **1 mark for each valid point – max 3 marks, eg**

Description could include

- Product failure.
- Bad reputation.
- Loss of market position.
- Different market and customer base.

(b) (i) One clearly identified change to an identified product that clearly explains how materials have been influential. **1 mark**

Two clearly identified changes to an identified product that clearly explains how materials have been influential. **2 marks**

Candidates could achieve full marks for an extended and detailed description of one change made possible through materials.

(ii) One clear description as to how an advance in technology has influenced the evolution of an identified product. **1 mark**

Description as to how two advances in technology have influenced the evolution of an identified product. **2 marks**

Clear description as to how three advances in technology have influenced the evolution of an identified product. **3 marks**

(c) Explanation considering one issue that is likely to impact on the future development of the family car. **1 mark**

Explanation considering two issues that is likely to impact on the future development of the family car. **2 marks**

Explanation considering three issues that are likely to impact on the future development of the family car. **3 marks**

Candidates could achieve full marks for an extended and detailed explanation of one or two influences on the development of the family car.

(Total 17 marks)

Question 6

- (a) (i) Clear description of one feature for the trolley that will have been influenced by human sizes and range of movements. **1 mark**
- Clear description of two features for the trolley that will have been influenced by human sizes and range of movements. **2 marks**
- General description of two features. **1 mark**
- (ii) Clear description of one design consideration for the trolley that will have been influenced by physical effort and strength required to use the trolley. **1 mark**
- Clear description of two design considerations for the trolley that will have been influenced by physical effort and strength required to use the trolley. **2 marks**
- General description of two features. **1 mark**
- (b) **One mark for each valid point, max 3 marks, eg**
- Data is only guide
 - Need for real models
 - Range of sizes
 - Unexpected activity
- Other answers which do not relate to ergonomics may be accepted if points are valid.
- (c) Vague explanation as to how one aesthetic property could be used to create a safe, modern, efficient, hygienic and easy to use trolley. **1 mark**
- Explanation as to how two aesthetic properties could be used to create a safe, modern, efficient, hygienic and easy to use trolley. **2 marks**
- Detailed explanation as to how two or more aesthetic properties could be used to create a safe, modern, efficient, hygienic and easy to use trolley. **3 marks**
- (d) Explanation of one reason the trolley may not have been a commercial success. **1 mark**
- Detailed description of one or more reasons the trolley may have not been a commercial success. **2 marks**
- Explanation could include:
- Too focused on the users needs.
 - Failed to consider the supermarkets needs.
 - High manufacturing costs.
 - The actual benefit offered by the alternative product.

(e) One mark for each advantage or disadvantage clearly described. Max 4 marks.

- Ease of communication
- Proximity of colleagues
- Team approach
- Increased information
- Costs
- Loss of individuality
- In house styling
- Less flexibility

(Total 16 marks)

Question 7

This question is set to test the candidate's ability to present a reasoned argument to a design issue. Although there is an underlying body of design knowledge required to answer it there is a very wide range of possible answers. Therefore the question is marked holistically. The features which are looked for are knowledge of the subject matter, ability to comprehend the question and to construct an answer which uses clear examples to support the stance taken.

The table below is designed to assist with the placing of answers within the full mark range.

0-3	4-6	7-9	10-12
An answer which falls into this category may do so for a number of reasons. It could be that: • It demonstrates very little knowledge or understanding of the subject matter. • There is little or no reference to products. • No stance is taken. • Much of it does not answer the question. • The answer is simply too thin.	• Knowledge of the subject matter and an understanding of the main aspects will be demonstrated. • The answer will be relevant to the question. • Reference to at least one product. • Although examples are used stance taken is unclear.	• Knowledge of the subject matter and a secure understanding of the main aspects will be demonstrated. • The answer will be relevant to the question and demonstrate a good level of comprehension. • Reference to a few products or selected references to a number of products. • A clear stance is taken and examples are used to support it.	• Detailed knowledge of the subject matter and a secure understanding of all aspects will be demonstrated. • The answer will be relevant to the question demonstrating a high level of comprehension. • Very detailed reference to a few products or selected references to a wide range of products. • Examples are clearly used to illustrate and support stance taken.

Points made may include:

(a) Strengths

- Ability to visualise in 2/3D.
- Creation of virtual modelling.
- Time saving.
- Ability to edit.
- Ability to render.
- Level of accuracy.
- Ability to send file to CNC machines.
- Rapid prototyping.
- Cost saving.
- Ability to transmit files.
- Ease of presentation.
- Use for research.
- Use for gathering information.
- Use for QA.
- Streamlining of processes.
- Large memory.

Weaknesses

- Risk of loss of files.
- Hardware issues.
- Cost.
- Lack of emotional link.
- Loss of creativity.
- Loss of human factor.
- Loss of jobs.
- Give wrong impression to clients.
- Can't touch product.
- Similarity of products.

(b)

- Consumer expectations.
- Changes in products may be improvements.
- Balance between incremental change and holding back design features.
- Resistance of manufacturers to hold stock for older models.
- Disposable society.
- Fulfilling consumer wants and needs.
- "Retro" products.
- Boosting of sales whilst avoiding market saturation.
- Seasonal changes.

NB Marks will not be awarded for simply stating points such as those above. Points must be part of a reasoned discussion.

[END OF MARKING INSTRUCTIONS]