

## **A LEVEL**

*Examiners' report*

# ***DESIGN AND TECHNOLOGY: PRODUCT DESIGN***

**H406**



For first teaching in 2017

## **H406/02 Summer 2019 series**

Version 1

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## Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates. The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

Where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report. A full copy of the question paper can be downloaded from OCR.

## Paper 2 series overview

### General Comments

In the first series of the newly reformed A Level, we were very pleased with the responses that we received from the cohort for H406/02, Problem Solving in Product Design. The candidates appeared to have had a good grounding across this endorsement.

The report below seeks to give pragmatic advice to centres that will be helpful as they prepare their next cohort for this new style of examination.

### Basic concept

This new style of examination has an allowed time of 1 hour 45 minutes.

The examination has a Resource Booklet that is inherently linked to the detail of the examination paper and questions therein.

The recommended reading time for the Resource Booklet is 35 minutes, although it does appear that candidates have spent less time on the booklet to allow more time working on the actual paper.

The total mark for this paper is 70.

The marks for each question are shown in brackets [ ].

Quality of extended responses will be assessed in the questions marked with an asterisk (\*).

Candidates often used sub-headings to communicate effectively on extended answers as well as manufacture/assembly style questions.

Candidates also used sub-headings when questions asked for responses to include specific bullet points, this was an **extremely** useful strategy for them to utilise.

## Question 1

- 1 A range of products is available to care for small caged pets such as guinea pigs. Before determining new design opportunities the designer undertakes initial research into these animals and the current products that are available on the market to house them.

The designer knows pet owners are one of the key stakeholder groups that use the current products on the market.

Critically examine the design requirements that would have been taken into account when designing the Skyline Maxi Small Pet Cage to meet the needs of this key stakeholder group.

Refer to information on **pages 2 and 3** of the Resource Booklet. Do not refer to the bought accessories in your response. **[8]**

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Most candidates answered this question well with the majority using information from the Resource Booklet accurately. Technical data was often utilised to outline a range of valid points that the pet owners required.

Level 4 answers had a comprehensive critical examination of design requirements in relation to the stakeholder group.

A small number of candidates just listed specification points, which were mostly correct, but they did not undertake a critical examination of them.

## Question 2

- 2\*** As identified on **page 2** of the Resource Booklet, there is a lack of products and automated solutions on the market to dispense food automatically to small caged pets when owners go away on holiday. A method of delivering a measured amount of food to the small caged pet is required.

The designer working for 'Pets4You' needs to consider the viability of existing solutions in order to develop a successful product that will earn market share.

Compare and contrast the suitability of the existing products shown in **Fig. 3** and **Fig. 4** of the Resource Booklet for dispensing food to a small caged pet.

In your response you should refer to the list of the owners' requirements listed on **page 4** of the Resource Booklet. **[12]**

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This question was particularly well answered. Product analysis and comparison is a skill that all Product Design candidates should be familiar with and this was very evident.

The best responses simply worked down the list of requirements in the resource booklet comparing and contrasting both feeders and then summarising with a conclusion at the end of the answer. This provided a good structure to their response.

Level 4 answers had a comprehensive examination of the suitability of the listed products for dispensing food against the list of owners' requirements.

Exemplar 1 is a useful example of a fulsome Level 4 answer.

A small number of candidates misread or misunderstood the question and did not approach it from the point of view of the owners. Others simply didn't use the owners' requirements list and subsequently presented a disjointed, unstructured answer which gained very little credit.

## Exemplar 1

When looking at Fig. 4, we can establish that it is a well made and highly optimised design. It has many features which meet the owner's requirements, as for example it has removable tray which is dishwasher friendly. ~~meaning it can~~ As well as this it has an electronic timer, meaning the user can set the time ~~as well as~~ the product dispenses food. This feature is accompanied by a 236ml capacity tray for each day, so user can place a substantial amount of food each day. The food tray also rotates 5 times before completion, meaning it is suitable for up to 5 day holidays, as each day the pet is fed. The BPA-free tray allows the user to place dry food safely, knowing there will be no contamination. However the 5 meal feeder does have some disadvantages as its dimensions are close to those of the top portion of the cage, meaning it may be tough to place it inside. As well as this, it can not be refilled from outside of the cage, however this shouldn't be a grave problem as it can provide food for up to 5 days, whilst keeping each meal separate by dividing it in 5 sections. Apart from that, it ~~is~~ is priced at £50.99 which is ~~considered~~ rather expensive when considering the low cost of the Skyline Maxi Pet cage.

On the other hand, the Guinea Pig feeder priced at £15.49 is a more sensible approach. Its gravity feeding feature allows the user to refill from outside; ~~these~~ its dimensions allow it to pass through a cage like the Skyline Maxi. However, it fails in many areas. ~~The~~ It can be filled with dry food, however meals are not separated, and if the pet eats often, it is unsure ~~to~~ whether it is suitable for 5 day holidays. Overall it is easy to clean and cheap, & whilst keeping eating habits safe through no contamination, although feeding cannot be measured, nor timed.

## Question 3

- 3 The designer takes forward the gravity feed method (**Fig. 3**) and develops a concept design shown in **Fig. 5** of the Resource Booklet.

Use sketches and/or notes to outline suitable methods of manufacture and assembly for the features of the concept design.

You must focus on all parts of the concept design including the lid, tank (including label) and base.

In your response you must include details of:

- materials;
- manufacturing processes;
- finishes;
- assembly methods.

[16]

This question appealed to the vast majority of candidates, with many able to identify that the lid and base would be injection moulded. This often led to a reasonably detailed explanation of the process with a diagram of an injection moulding machine. Better answers demonstrated good technical knowledge of the two part split moulds with sprue/ejection/cooling etc. all detailed.

A number of candidates also presented vacuum forming as a viable alternative for the manufacture of the base with clearly labelled sketches and the mould shown.

Manufacturing the tank caused more difficulty and whilst many candidates did correctly identify the process of blow moulding a good number incorrectly stated other polymer processes, with vacuum forming being a common mistake.

The choice of materials of each component was generally sensible, as was commentary on moulded polymers being self-finishing.

Higher scoring candidates used the structure provided by the question to frame their response and dealt with each aspect in turn.

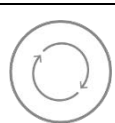
Level 4 answers had a comprehensive demonstration of the manufacturing and assembly process for the features of the concept design.

Unfortunately some candidates only read the first part of the question and described how to make one of the other feeders rather than the concept feeder.

Some candidates did not use the structure of the question to support their answer and as such either did not include details on each component or missed out on the details outlined in the bullet point list that were asked to be included in their response.

Supporting sketches were often weak and lacking in detail.

Printing of the label and assembly methods were often overlooked.



**AfL**

There were three main areas of weakness that could usefully be addressed by centres as they prepare their future cohorts for this style of examination:

Unfortunately some candidates only read the first part of the question and described how to make one of the other feeders rather than the concept feeder. Perhaps supporting candidates as they work through questions in preparation for this exam to underlining or highlighting what exactly is being asked of them in each question may well alleviate this type of situation and

		<p>aid them in being concise and efficient with time-management when responding.</p> <p>Polymer production processes have clearly been taught within the majority of centres. However, it does appear that assembly methods have been given less emphasis. A useful approach would be to cover this element through the NEA. Criteria 1.4 and the very nature of iterative design should allow candidates to explore products in detail. Disassembly of products is a valuable way for allowing candidates to fully appreciate the decisions that are taken in terms of assembling products as well as reinforcing DFMA.</p> <p>Sketching skills, whether in two or three dimensions did not always fully support the level of communication candidates really needed for this style of question. This is another skill that can be approached across the endorsement and will benefit them within their NEA and examinations.</p>
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## Question 4

- 4 Pets4You has teamed up with a supplier of pet food. It wants to encourage consumers to purchase pre-packaged tanks of pet food with a re-fill service.

Using the data in **Fig. 6** of the Resource Booklet, calculate the amount of food in grams (g) needed for an average guinea pig for three months and identify which food product would therefore secure best value. Show your working.

Assume that one month is 31 days.

Amount of food needed ..... g

Best value product .....

[6]

Most candidates were able to arrive at the two correct answers that were required, although some did choose the incorrect supplier.

Candidates should try to methodically present and show their working to ensure clear access to available marks in case an incorrect final answer is given.

Final answers should always be written in the spaces provided to confirm the candidate's response.

## Question 5

### 5 Pets4You is looking to diversify its product range.

A designer has been working on a concept named 'Chewy' as shown in **Fig. 7** of the Resource Booklet.

In order to more thoroughly evaluate the commercial viability of the Chewy product, Pets4You has agreed with a popular retail chain to sell a trial batch of 4000 Chewys through its pet stores.

Use sketches and/or notes to show how the trial batch of 4000 Chewys could be manufactured.

In your response you should include details of:

- materials;
- methods of manufacture;
- how the M6 threaded component would be attached to the wooden block.

Refer to information on **page 7** of the Resource Booklet.

**[16]**

Level 4 answers had a comprehensive demonstration of the manufacturing process for the trial batch.

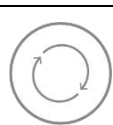
This question proved to be challenging with many candidates clearly not having had a great deal of experience in working with wood of any type.

A wide variety of methods of manufacture were suggested but only occasionally were CNC routing, milling and working on a lathe offered as viable solutions. Generic workshop based alternatives were often presented.

The M6 threaded component was often not included and materials were often incorrect.

Some candidates did not use the structure of the question to support their answer and as such missed out on the details outlined in the bullet point list that were asked to be included in their response.

Supporting sketches were often weak and lacking in detail



**AfL**

Centres are urged to cover all material areas that appear in the specification for this endorsement. It was clear that a large number of candidates did not have the necessary knowledge of woods and on occasion did try to rely solely on their polymer knowledge.

If centres do not have direct access to specific machinery then utilising information available via Youtube for instance is a great tool.

The detail of flatpack/knock-down fixings is another area that centres should seek to ensure is covered in detail as it is a key component of modern day design as well as this specification.

Sketching skills, whether in two or three dimensions did not always fully support the level of communication candidates really needed for this style of question. This is another skill that can be approached across the endorsement and will benefit them within their NEA and examinations.

## Question 6

**6\*** Pets4You feels that it has hit upon a potential best seller with the Chewy product.

It needs the initial trial batch of the Chewys as highlighted on **page 8** of the Resource Booklet to be successful and is therefore considering the overall marketing strategy for this product.

Critically examine the methods that could be used to create more demand for the Chewy product and maintain a longer product popularity.

In your response you should make reference to the following stakeholders and their needs:

- customers;
- Petzone (retailer);
- Pets4You (manufacturer).


**[12]**

Many candidates used the structure provided by the question to form their response and outlined a range of marketing strategies. There were some very detailed answers from candidates who appear to be studying Business alongside Product Design.

Level 4 answers had a comprehensive critical examination of methods that could be used to create more demand and maintain longer product popularity.

Candidates that didn't have an in-depth knowledge of marketing were still able to offer some good suggestions that would increase demand for the "Chewy".

Unfortunately some candidates did not refer to all 3 target groups with the consumer often being overlooked.

	<p><b>AfL</b></p>	<p>Some candidates did not use the structure of the question to support their answer and as such missed out on the details outlined in the bullet point list that were asked to be included in their response.</p> <p>Centres are advised to use this style of question to support candidates as they work through techniques for answering fully. The bullet point list gives candidates a steer on the direction of the question and as such ALL should be covered in the answer.</p> <p>It is worth noting that candidates that spent a few minutes thinking through and planning their answer were generally responding successful. That time to reflect on the bullet points ensuring all were covered often led to a more concise and focussed outcomes.</p>
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