

Examiners' Report

June 2016

GCE Design & Technology: Product Design 3 6RM03 01

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Introduction

The structure of the paper followed the previous format in that it contained seven questions, with an average of 10 marks per question and a time limit of 120 minutes. Most questions were broken into sub-sections (called items), in order to access a greater range of the specification. Where possible, the sub-sections were generally related, though this was not always the case. Some questions, generally towards the end of the paper, required a more in-depth answer and commanded a larger number of marks per response. This year the minimum for an item was 2 marks, ranging up to a maximum of 10 marks for a full question. Questions can be structured to include some choice by the candidates, but this year's paper did not have any of this type of question.

The paper was written to test candidate's knowledge, understanding and application of the following:

- Industrial and commercial practice
- Systems and control
- Design in context
- Sustainability

There is a range of command words which are consistent across both AS and A2 papers and are used to help guide the candidates. Understanding the command words will help candidates to structure their answers appropriately.

Give / State / Name

These are usually 1 + mark questions where all the marks can be gained by single 'stand-alone' answers.

Responses to these questions usually require a single statement or single sentence for the 1 mark.

Describe / Explain / Identify / Justify / Outline

These are usually 2 + mark questions with 'linked' answers.

Responses to these questions usually require a statement and a development of that statement for the indicated further marks. The development might be:

- A justification
- An example
- A development

Evaluate / Discuss

These are usually 4 + mark questions.

These require a developed series of statements that contain arguments both for and against. **Full** marks will not be awarded without at least **one** for or against argument.

The following are points which have improved from last year's examination:

- There was an encouraging decrease in the number of blank answers, with most candidates attempting the vast majority of the questions even if some were 'educated guesses'.
- Candidates are generally trying to answer questions more concisely.
- The use of bullet pointed answers seems to help many candidates clarify their responses.

- The majority of candidates are now staying within the clipped areas. Clearly candidates are able to demonstrate greater knowledge of subject content.

The following are points which still need attention:

- Poor handwriting and grammar, which made some answers difficult to decipher. This seemed to be worse than previous years, based on examiner comments.
- Not reading and digesting the question **fully** before answering meant some candidates missed the point of the question and gave answers which did not score many marks.
- Not understanding the basic examination terminology.
- Answers that were not concise and went onto additional sheets, very often did not score further marks on the extra sheets.
- Some candidates still use the 'blank' pages in the booklet for extra space. This is a bad idea as these pages do not get scanned with the answer and unless some indication is made by the candidate, these pages will not get marked.
- It is advised that candidates should use correct technical vocabulary in their answers as far too many answers are limited to 'general' descriptions of processes and procedures.
- It is pointed out that candidates should not write in ink pen as the wet ink often smudges onto the opposite page when turning over the pages, or bleeds through the pages so that when the scripts are scanned there are two sets of very confused text on one page, which is extremely difficult to decipher.

Question 1 (a) (i)

This question was designed to elicit answers about the advantages that can be gained from using a laminate construction for the frame of the chair. It was expected that candidates needed to understand the concept of 'laminating the frame', rather than just cutting the frame out of laminated sheet material.

Most candidates made a good attempt at aspects of this question and referred to strength gains and achieving curved shapes more easily. A number of candidates also referred to increased stability of the structure stating that it is less likely to warp, bow, cup or twist. To access the full 4 marks candidates usually also referred to its flexibility, size not being limited by the size of solid timber.

- 1 Figure 1 shows a chair that uses a laminate construction for the frame.



(Source: Bruno Mathsson, Eva Chair, 1934)

Figure 1

- (a) (i) Give **four** advantages of using a laminate construction, compared to a solid wood construction, for the frame of the chair.

(4)

- 1 Cheaper material to use for the consumer and manufacturers
- 2 Doesn't require any finishes - making it more environmentally friendly
- 3 Easier to work with than solid wood.
- 4 Accessable, easy to get hold of, and make.



ResultsPlus
Examiner Comments

This response scored 0 because it made no points which were correct nor did they answer the question asked. The first point made just stating it is a cheaper material is too vague at this level.

(a) (i) Give **four** advantages of using a laminate construction, compared to a solid wood construction, for the frame of the chair.

(4)

- 1 Less prone to warping or twisting than if it were to be made from solid wood. - less waste with lamination.
- 2 Easier to create and form the curves out of a laminate rather than a solid wood. Lamination is also resistant to disease and rotting.
- 3 Lamination is cheaper and a quicker way of producing the frame. The solid wood is limited to its size and grain.
- 4 Laminate construction provides a good strength to weight ratio.



ResultsPlus
Examiner Comments

This response scored 4 marks for BP2, BP3, BP4 and BP8. However BP8 is only just detailed enough to score the mark as it is not a well worded response.

Question 1 (a) (ii)

This question was designed to give candidates a chance to show their knowledge and understanding of the disadvantages of laminate construction for the chair frames. Some candidates only referred to the possible delamination of the layers.

The range of answers candidates gave was limited to two main areas. Delamination and the visual appearance. A second mark was given when candidates referred to aesthetics explaining that if customers didn't like the laminates showing, then a covering laminate may be needed. It was encouraging to see some candidates including set up costs or the scale of production.

(ii) Give **two** disadvantages of using a laminate construction, compared to a solid wood construction, for the frame of the chair.

(2)

- ~~For~~ The layers of laminate could come apart / separate if it gets wet.
May not be as nice aesthetically ~~as~~ compared to solid wood - faults (knots).



ResultsPlus
Examiner Comments

This response scored 1 mark for reference to layers that could come apart BP5.

(ii) Give **two** disadvantages of using a laminate construction, compared to a solid wood construction, for the frame of the chair.

(2)

- 1 Laminate may not be as strong as solid wood, and therefore will be more prone to breaking.
- 2 Laminate will not provide as high a standard of quality finish which can be achieved with solid wood.



ResultsPlus
Examiner Comments

This response scored 0 because neither fact given is correct

Question 1 (b)

This question was designed to test candidates knowledge about market research in general, but was written in relation to the chair shown earlier in the question. This allowed candidates to 'hang' their answer on the example given if they so wished, but this was not essential for full marks.

Generally a good understanding of market analysis. Some candidates simply wrote everything they knew about the topic, for example, surveys, different types of data and did not apply their knowledge to the question. Some answers developed BP2 – explaining how a Specification which addressed the customers' needs/wants could be produced from market analysis, but this could only earn 1 mark despite some lengthy descriptions taking up most of the allocated writing space. BP3, 4 and 6 were not often seen.

(b) Outline why it is necessary for a company manufacturing these chairs to undertake market analysis.

(4)

Market analysis allows the company to detect market trends and modify their product to suit them. The company can also clearly identify their target market to suit that specific group better. The company can also find the most competitive prices and therefore know what to charge to join the competition. The company can find the cheapest material suppliers and best

distributors for the product to give it a good reputation. The company can also obtain data on the anthropometrics of their target market so that they accurately design the sizes of the chairs.



ResultsPlus
Examiner Comments

This answer covered sufficient points to score full marks under BP8, BP2, BP5 and BP9.



ResultsPlus
Examiner Tip

This is a concise answer which sets out the points clearly.

(b) Outline why it is necessary for a company manufacturing these chairs to undertake market analysis.

(4)

It is important for companies to undertake market analysis as they will be able to identify trends in the market allowing the companies to keep up with competitors and ~~allows for customer~~ this increases customer satisfaction. With market analysis the company will ~~be able to~~ use real time data which is relevant and up-to-date. The companies can ~~use~~ use online market analysis which can be accessed 24/7 ~~gives~~ giving companies a wider reach of opinions for the chair.



ResultsPlus
Examiner Comments

This response only scores 1 mark for BP8. The rest of the answer concentrates on what type of market research the company could do and how they would go about it. This is not the direction the question asks for.



ResultsPlus
Examiner Tip

Careful reading of the question is necessary in order not to 'head off' in the wrong direction.

Question 2 (a)

As this was written as an 'explain' question, it required candidates to link their answers carefully. In general it was fairly well answered, though at times it was quite hard to mark as many candidates seemed to make unjustified statements and only picking up single marks for each element. Responses were spread broadly across the range of acceptable answers with no single response seeming more popular than others.

Most high-scoring answers used BP1, 2 and 9, 10.

2 Automated storage and retrieval systems (ASRS) are used in industry.

(a) Explain **two** advantages of using an automated storage and retrieval system (ASRS).

- 1 ASR Systems are safer than having labourers to do the job as it means employees do not have to risk carrying heavy dangerous loads. (4)
- 2 ASR Systems are quicker than searching a warehouse so increase the efficiency of the company and reduce wasted time and human error.



ResultsPlus
Examiner Comments

This response has two clearly linked pairs of answers BP6 + BP5 and BP1 + BP2.



ResultsPlus
Examiner Tip

Words like 'as' and 'so' in the middle of the answers really help a candidate to go on to add the required justification/example.

2 Automated storage and retrieval systems (ASRS) are used in industry.

(a) Explain **two** advantages of using an automated storage and retrieval system (ASRS).

1 there is no human interaction⁽⁴⁾
so that it can run 24h with
out having multiple employees.

2 the retrieval systems can also
carry far more weight than
a human & more products



ResultsPlus
Examiner Comments

This response scored 2 marks for BP9 and BP5.



ResultsPlus
Examiner Tip

Here, the candidate has not given a justification for either answer (which hits a new BP on the mark scheme – all of answer 1 is covered by BP9) so has only got two isolated facts.

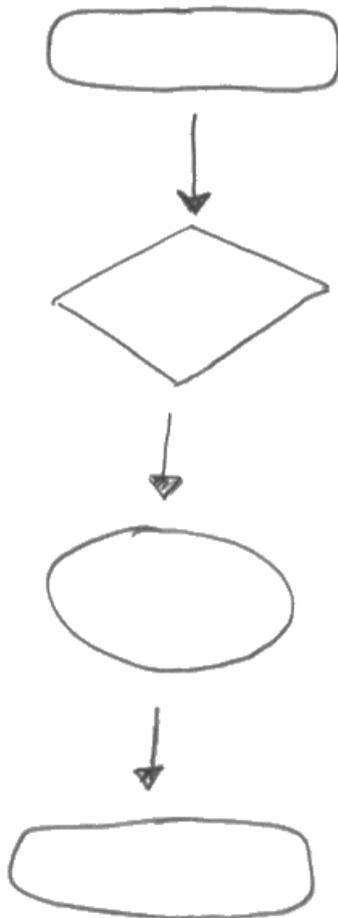
Question 2 (b) (i)

This question required candidates to show a correct flow diagram for a closed loop system. The question did not ask for a labelled diagram so candidates were awarded marks for correctly represented boxes in the correct sequence.

It was very clear that some candidates did not understand the question and did not even attempt an answer. However, the majority of candidates did construct a flow chart with a start, process and end. It was very clear candidates knew that closed loop systems required feedback and even annotated the line to explain what it was. The shapes used in many diagrams showed an understanding of the significance of the different shapes.

(b) (i) Draw a flow chart to represent a closed loop system.

(2)

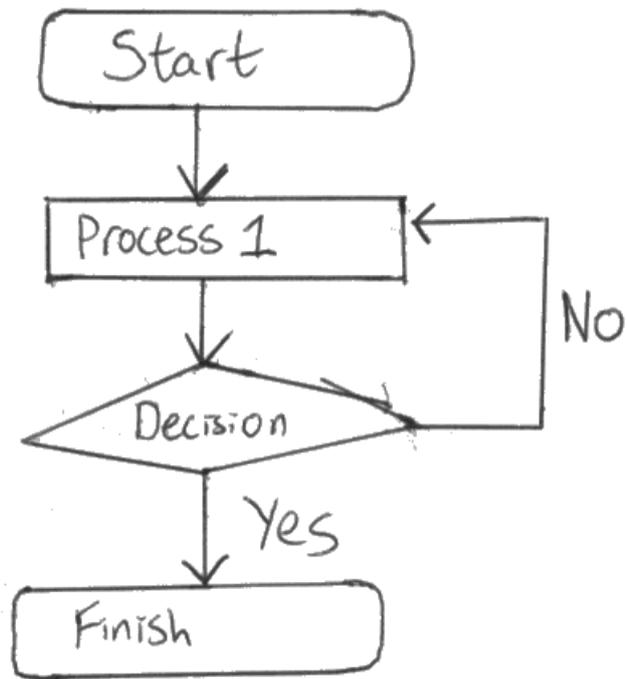


ResultsPlus
Examiner Comments

This response scored 1 mark because although all the boxes are present, there is no indication of the feedback loop required for the second mark.

(b) (i) Draw a flow chart to represent a closed loop system.

(2)



ResultsPlus
Examiner Comments

This is a perfect response showing all the correct shaped boxes (the rounded corners to the start/finish boxes are sufficient to differentiate them from an action box).

Question 2 (b) (ii)

This question was designed to elicit answers which would show that the candidates knew the difference between open and closed loop control systems and therefore be able to give the advantages of closed loop.

Many candidates clearly understood the benefit of feedback in a system, but some candidates described an open loop system giving all the benefits of a closed loop system and visa versa. It was pleasing to see that some candidates were able to think outside the box and appreciate benefits such as customisation, tracking and early detection of faults.

- (ii) Explain **two** advantages of using an automated closed loop control system, compared to an open loop control system, in production.

(4)

One advantage of using an automated closed loop control system is that ~~the~~ decisions have been implemented where a quality control check can be introduced. This means if the quality control measure has been determined not to be reached, the process can be completed or fixed to ensure the check has been met. This results in a better quality of products being produced as quality control checks have been put in place to ensure minimal waste and less rejected products on the production line. Another advantage is that a closed loop system is ~~automated~~ mostly automated where as an open loop system is not. This means production of products take less time to manufacture decreasing the amount of time it takes the product to reach the market. This has ~~finite~~ financial benefits such as more money is generated and less storage space is required as the product reaches the market quicker.



ResultsPlus
Examiner Comments

This response showed a good understanding of both systems and therefore the candidate was able to give four correct answers which had sufficient linking to be able to achieve full marks for BP1, BP2, BP6 and BP10.



ResultsPlus

Examiner Tip

This question was marked slightly differently to Q1b. Q1b has two separate answer spaces and therefore leads candidates to write two separate justified/explained points. This question gave the candidate a single open space in which to make two linked explanations. As long as points were linked within the answer, the candidates were given the credit. However, it is much better if candidates think through 'complete' answers, using link words like 'therefore', 'so', 'as a result' and then write their answers accordingly.

- (ii) Explain **two** advantages of using an automated closed loop control system, compared to an open loop control system, in production.

(4)

The designer can identify the faults in the process and also able to make decisions to minimise them. You are also able to identify ~~out to the~~ how you could prevent or fix the error. In closed loop control system, ~~the~~ the stages are advanced ~~with~~ unlike in open loop which is straight forward.



ResultsPlus

Examiner Comments

This answer is basically incorrect and vague. It refers to the designer being able to make decisions and identify/prevent/fix, rather than the closed loop system doing this.

The second paragraph just states that a closed loop is more complex than an open loop, which is not relevant to the question.

Question 3 (a)

This question was focussed on the negative effects of mass production on employment. However, some candidates included the 'effects of mass production on employment' rather than concentrating on the relevant answers expected on the negative effects. Some candidates had a limited understanding of the wider issues, so there were many repeats regarding unemployment.

Possibly influenced by the previous question, some candidates tended to focus on manufacturing in typical UK style circumstances rather than on a global basis and hence the concepts of sweatshops, bad working conditions, poverty and even low wages came up less than expected. Many referred to lower wages rather than low wages, but this was not really correct as they could still be receiving a good wage.

3 (a) Outline the negative effects mass-production has had on employment.

(4)

Mass-production includes using automated machines such as robot which work for 24/7. This can reduce jobs for humans because ^{robots} they work rapidly. Sometimes, humans can also work rapidly but they will get tired, which means the ~~for~~ some processes might pause. Another negative might be stockpiling, this is because products are designed rapidly and then distributed, during this time the previous batch might be still on stock so the newer ones might be thrown away or kept away which can waste materials.



ResultsPlus Examiner Comments

This response scored 1 mark for BP1 but the rest of the answer moved away from the question into unrelated information.



ResultsPlus Examiner Tip

Careful reading of the question enables a more accurate response to be formulated.

3 (a) Outline the negative effects mass-production has had on employment.

(4)

- Unemployment of unskilled workers as automated systems have taken over their jobs
- Workers need expensive re-training to be able to operate new and advanced machinery
- Workers are required to work for longer hours to sustain demand of mass-produced products
- Employees have to carry out repetitive tasks for long periods which can lead to injuries such as RSI
- Element of resentment develops towards the company from its employees as they may not enjoy their work
- Wages may be reduced as costs need to be kept as low as possible for mass-production
- Smaller companies may not be able to compete against companies that mass-produce leading to the closure of businesses and further unemployment
- People are less inclined to work in mass-production factories as there is a negative perception surrounding them



ResultsPlus

Examiner Comments

This response scored 4 marks for BP8, BP1, BP5 and BP4. The fact that the question is an 'outline' style question means that the candidate is able to give unrelated or related points from the mark scheme. In this case the BP style of the response has meant clear points are distinguishable and generally clear.



ResultsPlus

Examiner Tip

In this response there is a linked pair of points in unemployment BP8 as automated systems have taken over their jobs BP1. Although this could easily be interpreted as just BP1 it is clear that the result of the machinery taking over the jobs is unemployment (and not just something like redeployment) so it is worth 2 marks. The other 2 marks are for 2 other 'individual' points.

Question 3 (b)

This question was designed to elicit answers about the *individual* and how they could reduce their carbon footprint. However some candidates moved away from the individual in their responses.

Many candidates wrote a lot and many achieved 4 or more marks. The candidates who lost marks tended to concentrate on the rrrs – BP6, which in a way is an easy response for candidates who have not fully considered the whole issue of their carbon footprint. Transport was another BP that tended to have repeat responses. **Candidates need to understand this exam technique more clearly.**

Other candidates missed out on marks because they did not read the question carefully enough and answered from the point of view of the manufacturer, or were confused about the Life Cycle Inventory.

(b) A 'carbon footprint' is a measure of the impact human activities have on the environment.

Outline strategies an individual can employ to reduce their carbon footprint.

(6)

- Get the bus/train instead of using your car, this way for every 20 people getting on the bus, that is 20 less cars polluting the environment.
- Use energy sources such as solar-panels therefore you are not constantly burning fuels the have an affect on global warming.
- Reuse things such as shopping bags, so you are not constantly adding waste to landfills etc.
- Use products that can be recycled.



ResultsPlus
Examiner Comments

This response scored 3 marks for BP5, BP2 and BP6.

(b) A 'carbon footprint' is a measure of the impact human activities have on the environment.

Outline strategies an individual can employ to reduce their carbon footprint.

(6)

Reduce emissions by switching to emission-free transport methods e.g. cycling, walking or instead try carpooling, public transport. They should only use the car for trips that require great distance of travel.

Efficient use of household appliances e.g. taking shorter hot showers and infrequent baths, only having lights on in the house at night when needed.

Instead of using a central heater to warm up the house, a portable electric heater can be used instead, where needed.

Double glazing can be installed to prevent wasted heat energy during winter.

Convert to renewable energy sources to power the home, such as solar panels.

Carbon offsetting through the ~~use~~ planting of more trees, to helping conserve forestry in larger scale projects.

A person can take up recycling and reuse to prevent the amount of emissions produced through incineration.



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Examiner Comments

This response, despite covering several examples from the same BPs, covered 6 separate areas – BP5, BP4, BP3, BP2, BP9 and BP6.



ResultsPlus

Examiner Tip

It is suggested that for a question which requires separate areas to be identified questions such as this, that a BP style of answer may help candidates to separate these areas clearly.

Question 4

This question was designed to elicit responses about how companies should consider various stages of their manufacturing and how they affect the environment.

The table was used as an aid for candidates to structure their responses, but because many of the possible responses were correct for a number of the boxes, the answers were marked as correct if they fitted the box they were used in, rather than having to stay within the structure of the mark scheme.

Many candidates clearly understood the six R's and were able to talk most confidently about the distribution, use and end of life stages. However, they seemed much less confident, even ambiguous at times, with their responses to raw material extraction and manufacture.

There was some repetition of answers in separate sections, usually referring to recycling. There was a wide range of marks to access. The layout of the table and numbered answers helped the majority of candidates achieve in each section, with marks mainly being lost through repetition of answers rather than any lack of knowledge.

This was a well answered question.

- 4 Companies try to reduce the environmental impact of a product at all stages of its life cycle.

Give **two** environmental considerations for each stage.

An example answer is already given for raw materials.

(10)

Life cycle stage	Environmental considerations
Raw materials	Example answer: Use a smaller quantity of material in the production of a product. 1 Use as few different materials as possible 2 try to use recycled (and recyclable) materials
Manufacture	1 Employ manufacturing machinery which can perform a number of tasks at once. 2 Make full use of materials at manufacture to reduce waste.
Distribution	1 locating manufacturing facility as close to retailer as possible, reducing transportation 2 package the product as efficiently as possible, meaning more items can be distributed at once.

Use	<ol style="list-style-type: none"> 1 The product should require as little power as possible to operate. 2 A durable product that can take years of use without needing to be replaced/ repaired.
End of life	<ol style="list-style-type: none"> 1 The product should be entirely recyclable/ decomposable/ reusable. 2 The product should take as little time/ energy to break down as possible.



ResultsPlus
Examiner Comments

This response scored 10 marks for the following BPs – 11,3,9,2,15,14,7,22,19,25 and BP24. An excellent answer with numerous correct points showing a wide range of knowledge of this topic.



ResultsPlus
Examiner Tip

Because many of the mark points from the mark scheme are correctly applicable to a range of the answer spaces provided, candidates have been given credit for correct responses even if they are in different boxes to the mark scheme.

Question 5

This question was designed to elicit knowledge about the differences between FMS and dedicated automated machinery. Candidates showing a limited knowledge of the differences were unable to separate out the pros and cons of the two systems. As a result advantages and disadvantages were repeated using different words.

In a question of this type, it is vital for candidates to make an overall plan in which they decide what to include and what to leave out. If not the resultant answer is often a series of random responses which hop from one point to another with little linking.

Some candidates had a good knowledge of this topic, but few managed to secure full marks. Many of these candidates understood the flexible feature of FMS and most scored BP1, BP8 and BP10. Some candidates presented the evaluation in a 'reverse argument' which made marking more difficult. The advantages were usually well covered and BP9 often presented as DAM being faster. The least responses were for BP12. Often candidates brought in JIT and QRM, especially to achieve marks for 'less storage'. All candidates covered advantages and disadvantages. High set up costs continue as a standard response for this question and others.

- *5 Evaluate the use of a flexible manufacturing system, compared to dedicated automated machinery, in production.

(10)

The advantages of the use of flexible manufacturing systems (FMS) compared to automated machinery are that they can adapt quicker to changes in market demands and trends enabling QRM. FMS's allow customers to customise products increasing their appeal and sales. FMS's also have less wasted materials as only the amount required is ordered. FMS's also have less capital tied up in stock and less need for large, costly storage spaces. FMS's production is also more efficient as it is planned out so that the movement of materials is ~~minimised~~ ^{minimised}. The breakdown of a machine in dedicated automated machinery will also still production. Along with the advantages of a flexible manufacturing system there are also disadvantages in comparison to automated machinery in production. FMS's ^{use} CNC machines which are slower than automated machinery.

reducing productivity. FMS's also ~~require~~ require highly skilled technicians ~~and~~ to work with the machines which can be quite expensive. FMS's also are heavily reliant on the efficient delivery of their raw materials. Managing a variety of different productions runs can ~~prove to be very difficult~~ in a FMS can prove to be very difficult.

Overall ~~for~~ for a manufacturer a FMS may prove to be the better method of production mainly because they will have less ~~expensive~~ need for expensive storage space and less capital tied up in stock.



ResultsPlus Examiner Comments

This response showed good understanding of the topic and scored 7 marks for:

- adapt quicker to changes BP1 (1)
- customise products BP6 (1)
- increasing sales BP3 (1)
- less capital tied up in stock BP5 (1)
- slower than automated machines BP9 (1)
- skilled technicians quite expensive BP10 (1)
- managing FMS can prove difficult BP12 (1)

*5 Evaluate the use of a flexible manufacturing system, compared to dedicated automated machinery, in production.

(10)

A flexible manufacturing system allows certain tolerances for a product and checks that a product is within these tolerances. This is an advantage because it maintains a consistency of quality throughout each of the products. It is a disadvantage that it is all controlled through machines because it doesn't have any human senses to tell whether part of it is wrong such as small areas of paint on the wrong section etc.

Automated machinery may only be compatible with certain things so there is no set language per machine to communicate therefore a degree of human intervention is needed. Automated machinery will also not allow for any tolerances as they will only do what they are programmed to do exactly but will give a more accurate and precise finished product. There are 2 main types of flexible manufacturing which are routing flexibility and machine flexibility.



ResultsPlus
Examiner Comments

This response scored 0 because although there are some correct facts about FMS they are also correct facts for dedicated automated machinery. Therefore no marks can be given as the question is basically asking for the pros and cons of one system against the other.



ResultsPlus
Examiner Tip

An 'evaluate' style question is going to require pros and cons of one against another. Therefore it is essential to make a quick plan on separate paper. Also the best answers only give the argument from one side or the other, that is, the pros and cons of FMS or the pros and cons of DAM. Some candidates' answers gave a valid point and then just repeated it from the reverse point of view, which scores no marks.

Question 6 (a)

This question was designed to elicit answers about the 'characteristics' of Art Nouveau and this question seemed to split candidates between those who did well and those who did very poorly. Those candidates who responded to the question and gave examples of design characteristics scored good marks, however those that chose to simply write all they knew about Art Nouveau often did not score as well.

Those not scoring well also tended to pick up on elements such as the form versus the function argument and the use of materials or specific designers rather than the differing design characteristics. This might have been led by the next part of the question.

Many candidates displayed knowledge about actual examples but did not contextualise this into the mark scheme headings. 'Other cultures' was probably the least popular answer.

Some candidates showed limited knowledge of the Art Nouveau movement, with several answers that were more relevant to Bauhaus and other movements from the specification. This suggests that candidates should give equal depth to all movements.

6 Art Nouveau or 'new art' was an international design movement that developed in the late 19th century.

(a) Using examples, explain **three** design characteristics found in Art Nouveau designs.

(6)

1 NATURE = WAS used regularly in design due to the various fine arts before it. Designs involved plants, roots, ~~and~~ exotic insects and animals such as peacocks. These forms were developed into elongated, curvy, 'whiplash' lines in many designs.

2 THE FEMALE FORM = The female form was used regularly throughout designs. This included pre-rachelt women who had long, flowing hair. Artists of the Art Nouveau movement that used these styles included those of Charles Rennie Mackintosh.

3 OTHER CULTURES = Art Nouveau incorporated a number of other cultures such as the Japanese arts which included outlines of their designs and the use of symmetry. Art Nouveau however, also ~~the~~ incorporated

cultures such as Ariban and Celtic in many designs.



ResultsPlus
Examiner Comments

This response showed a very clear understanding of the topic and was able to state points and give relevant linked examples. This scored 6 marks and covered information from all six boxes in the mark scheme.

6 Art Nouveau or 'new art' was an international design movement that developed in the late 19th century.

(a) Using examples, explain **three** design characteristics found in Art Nouveau designs.

(6)

- 1 Strong / sturdy pieces of art able to withstand pressures such as pressure put on a seat by a humans weight.
- 2 Very little material used to create each piece of art, such as the bar stool created by on the next page.
- 3 Environmental impacts are considered in the making of this art. Materials that are chosen are materials that usually can be recycled or reused.



ResultsPlus
Examiner Comments

It would appear that this candidate had little or no knowledge and understanding of the Art Nouveau period. Consequently they have tried to use other knowledge they have to answer this. This is particularly evident in response 2 which tries to use the picture of an Art Nouveau design in Q6b to direct their thinking and their response.

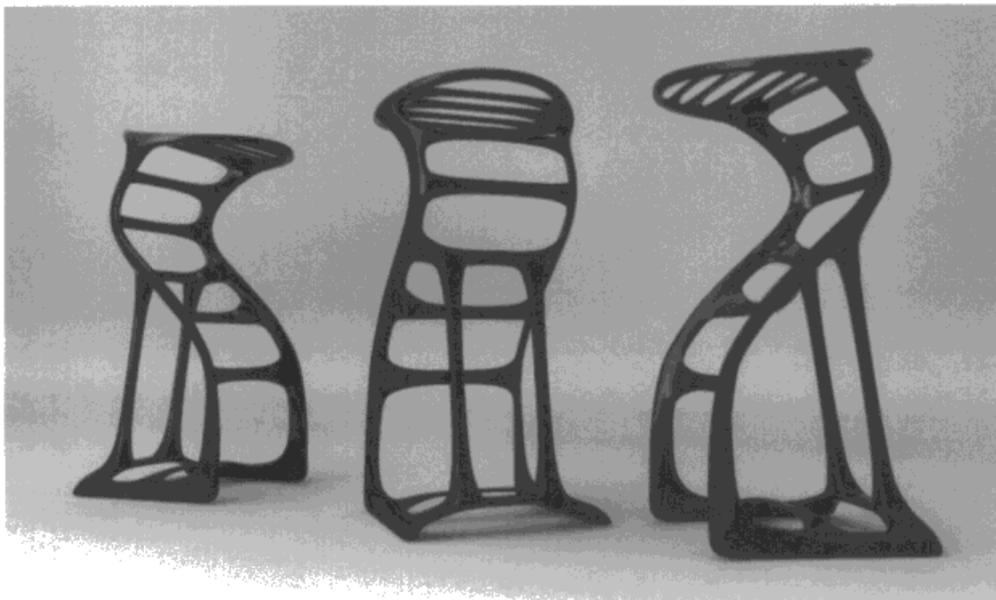
Other points may be true but are not characteristics, which is what the question asks for.

Question 6 (b)

This question differed slightly from previous years in that it asked candidates to discuss both 'form and function' rather than one versus the other. As a result some candidates managed to get themselves muddled, probably due to a lack of planning, and consequently not scoring as well as they should have achieved. Firstly, some candidates simply stated repeatedly about form versus function, but did not really saying anything at all about either. Other candidates took a negative response stating for example it was not comfortable, not strong, and not stable. A further group seemed just to state that function had not been considered. Those answering well, picked up the majority of marks available, focusing on BP1, 4, 8, 9 and 10.

The visual aid of a photo seemed to help candidates to score some marks by simply describing the photo. However some candidates stated that this design was poor both in terms of form and function because it did not have a back. The question clearly states it was a stool.

(b) Figure 2 shows an example of a bar stool that has been designed in the Art Nouveau style.



(Source: © Michael Stolworthy)

Figure 2

Discuss how the designer considered both form and function when designing the bar stool.

(4)

One way in which the designer considered form is by making the chair out of one piece of plastic. This is aesthetically pleasing because almost no defects or imperfections are left from the manufacturing process.

Another way the designer considered form is

by using longer curved edges in the design. It makes the design look sleek and streamlined and modern.

A way in which the designer considered function is that there are slats running down the centre section of the chair which could be used as foot ~~rest~~ rests for people of all sizes.

Another way is that there are supporting braces which make the design more stable and also more comfortable.

(Total for Question 6 = 10 marks)

Form: One piece

Form: Sweeping curves / Shiny



ResultsPlus
Examiner Comments

This response showed a wide range of knowledge and covered 5 possible marks and scored the maximum 4 marks for BP7, BP4, BP8, BP9 OR BP1.



ResultsPlus
Examiner Tip

The response is well written and planned in that it separates out the various points into sentences and paragraphs.

Discuss how the designer considered both form and function when designing the bar stool.

(4)

The designer considered form by making the stool look like it is flowing and using a design which resembles the helix structure of DNA. Function is considered here as there is support from the back of the product and a more condensed piece of material on top. Both of these means that use and stability is ensured whilst still keeping the Art Nouveau styling. The base of the product is also weighted towards the back which boosts function.

~~Specialist employees to set up and maintain the systems, this can be costly to the employee.~~

~~Robotics are also not the best problem solvers and so errors could stop manufacture.~~



ResultsPlus
Examiner Comments

This response covers just 2 mark scheme points BP4 and BP9, so scored 2 marks.

Question 7

This question was designed to elicit responses showing knowledge about the use of robots in automated manufacturing systems. Unlike Q5 this question does not ask the candidate to compare two different systems so answers should be directed towards the pros and cons of robots.

Some candidates used bullet points here to effectively organise their thoughts well without the need for writing extended pieces, whilst others put their ideas forward in well planned paragraphs. There were many excellent answers showing that candidates both understand and are interested in the use of robots. As a consequence, many candidates achieved high marks on this question with only a few candidates achieving just one or two marks for the more basic concepts.

There is a tendency for candidates to add an introductory sentence or paragraph to the longer answer questions, but this is not necessary.

*7 Evaluate the use of robots in automated manufacturing systems.

(10)

- shorter lead times
- can operate 24/7
- Enable a computer aided quality control
- Higher complexities can be achieved
- Robots can be updated - allows for a wide range of products to be produced
- Repetitive accuracy - fewer rejects
- speed of movement to create products is faster than human workforce - increases productivity
- Robots operate
- can work in hazardous conditions - removing risk of injury to humans
- High initial set up costs
- Robots do not have such responsive sensors - inability to make decisions
- Increases unemployment
- Staff require retraining to operate systems

- decreased moral of workers, ^{since their} jobs are replaced by robots
- High maintenance costs
- use of robots reduces labour costs



ResultsPlus
Examiner Comments

This response is well planned and covers a possible 12 points from the mark scheme so scored a maximum of 10 marks for BPs, 2,5,4,1,2,7,10,11,14,15,16 and 6.

*7 Evaluate the use of robots in automated manufacturing systems.

(10)

Advantages

- can work 24/7
- less chance of error
- products are produced faster
- They don't require any breaks.
- Robots will have higher accuracy.

Disadvantages

- will be high set up costs.
- Skilled workforce required to run and maintain them.
- If a machine breaks down repairs can be costly.
- If one machine breaks down the rest won't be able to work.
- Down time can be long if repairs needed.



ResultsPlus
Examiner Comments

This response scored 3 marks for BP2, BP1 and BP10. There are several points which are correct but they are repeats so score no extra marks.

Paper Summary

Based on their performance on this paper, candidates are offered the following advice:

Maximising marks:

- Make sure that candidates understand the trigger words in the question.
- Avoid unstructured answers. The use of bullet-pointed statements even in extended evaluate type questions can help **some** candidates to score better marks.
- Questions will come from **all** parts of the specification so ensure that the candidates have covered **all** of the specification.
- Make sure that candidates use technical language where appropriate.
- Use past question papers and mark schemes as part of the preparation for the exam.

Exam technique:

- If at all possible, candidates should **not** go outside of clip with their answers.
- Candidates must think/plan **before** answering.
- Candidates should spend a moment reflecting on whether they have justified/given an example for questions which require one.
- As a general rule, there are **two** lines given per mark awarded for an answer.
- There should be sufficient space in the answer booklet to score **full** marks without going onto a separate sheet.
- If the candidate is word processing their answers, they should try to structure them so that they are in the same format as the question paper, that is, if there is a 'give **four**' type of question, then the answers should ideally be on four separate lines.
- The most common 'fault' is repeating facts in different words, which wastes time and often results in unnecessary extra pages being used and rarely covers new material, and therefore scoring no further marks.
- If an answer does exceed the space given, it is helpful if the candidate puts some sort of indicator for the examiner.
- No summary is necessary at the end of the 'essay' style questions as these generally just repeat what has already been written earlier in the answer and therefore scores no further marks.
- Candidates should NOT hand in sheets of notes attached to their answer script.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

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