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# **GCSE EXAMINERS' REPORTS**

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**GCSE (NEW)  
DESIGN AND TECHNOLOGY**

**SUMMER 2019**

Grade boundary information for this subject is available on the WJEC public website at:  
<https://www.wjecservices.co.uk/MarkToUMS/default.aspx?!=en>

### **Online Results Analysis**

WJEC provides information to examination centres via the WJEC secure website. This is restricted to centre staff only. Access is granted to centre staff by the Examinations Officer at the centre.

### **Annual Statistical Report**

The annual Statistical Report (issued in the second half of the Autumn Term) gives overall outcomes of all examinations administered by WJEC.

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# ENGINEERING DESIGN

## GCSE (NEW)

Summer 2019

### UNIT 1

#### General Comments

This course is very similar to the previous Systems and Control specification. Engineering Design is a small focus area compared to some others and the change in GCSE examination procedures has meant that the entry this year is from schools in Wales only leading to a small cohort. With the mathematical and scientific content within this specification and Examination Unit, it is understandable that some centres use this focus area as a STEM theme, and even More Able and Talented course for specific groups of learners. Although this entry is smaller in number, there are often candidates of higher ability when compared to other focus areas.

The 2019 Engineering Design was generally well received by candidates. There were many high-level responses throughout question papers reflecting the high levels of knowledge, understanding and skills possessed by candidates in this subject. Virtually all candidates attempted all questions, with few blank spaces, indicating that pupils had prepared effectively and managed the two-hour time period effectively undertaking the examination paper.

There are many useful resources available when analysing candidate performance in this unit, particularly the Item Level Data which is centre specific and allows a full statistical breakdown of candidate performance question by question, with all marks awarded for individual questions. Centres can also compare their performance against ALL centres to identify strengths and weaknesses in delivery of this specification. The Online Examination Review (OER) is also available via the WJEC website. This e-resource contains marked exemplar responses from scripts, where examiners marks are available, together with marking criteria and reasons why marks have been awarded and where responses lack the depth to access further marks. This is a powerful teaching tool for classroom activity with candidates. CPD face to face events have also resumed, where attendance to these sessions are encouraged.

#### Comments on individual questions/sections

**Q.1** Most candidates scored well on this question.

- (a)** Generally, well answered. Candidates clearly understood the relationship of the organisation to standard setting.
- (b)** Both parts well answered, candidates realising the importance of legal frameworks and processes and candidates responded in several ways.
- (c)** This question was not very well answered with several candidates responding with guesses relating to the possible uses and meanings of the words push and pull. Answers should always refer to engineering designs and the possible markets for the final products arising from these designs.

**Q.2** Most candidates scored well on this question.

- (a) Nearly all candidates understood the implications of sustainability for future generations.
- (b) There was a range of response to this part of the question, mostly relating to the detail given in the explanations. Some centres had clearly covered this as part of the topic, and candidates knew the meaning of disposable and biodegradable. Others evidently knew very little and could only hazard a guess. Marks tended to be lost here, many not giving a detailed advantage and disadvantage.
- (c) Candidates that had knowledge of how these smart materials actually operated gave complex explanations of both function and sustainability. Several candidates knew the importance of microencapsulation but did not fully answer the question set in terms of sustainability. This was a challenging question, only some candidates related the function in terms of life cycle and relationship to the environment.

**Q.3** Probably the best answered question in the paper.

- (a) A very well answered start to the question. It was evident that nearly all candidates had experience of CAD and could describe their experiences whilst constructing a coherent answer. A wide range of good responses.
- (b) No issues for almost all here.
- (c) There were several issues relating to suitable answers here. Although candidate's knowledge of materials meant that the bike stem holder part of the question achieved good responses it was clear that not all had an equivalent understanding when it came to discussing the bolts and the reasons for them. The last part of the question also proved challenging for a significant number of candidates. Naming a process and describing it led to some selecting totally inappropriate methods that either could not work at all or were practically unsuitable. Candidates achieving 3-mark responses seemed to have had experience of the manufacturing steps from personal experience.

**Q.4** Most candidates gave this question a good go, but they failed to address the exact requirements of the question.

- (a) Many of the candidates were able to give a brief explanation of laser cutting but did not fully answer the question set and it was evident that a number do did not really know the qualities/functions of a CNC machine. This question posed problems for a significant number of candidates. A clear reading of the question asks for a comparison to be made between a CNC milling machine and a 3D printer. A significant number of candidates did not seem to have experience of a CNC machine and a large number thought that it was more expensive technique than 3D printing. The mark scheme makes this difficult to resolve. The process of casting in the second part was also very poorly understood. Candidates that had experienced casting as a demonstration or a practical activity achieved high marks, but they were in a minority.

- (b) Candidates in general understood the need for an extended answer but simple historical documentation of the achievements of James Dyson cannot obtain full marks. Some candidates either fail to read the essay question effectively, or simply write all they have learned about the chosen designer. Many answers just included factual information and failed to understand that we were after how his work has influenced the market i.e. the bagless vacuum cleaner is now a common feature of commercial many cleaners. To score high marks discussion of the effects on competitors and the market in general was essential.

**Q.5** It was evident that many candidates failed to score well in all parts of this question.

- (a) Not many were able to define the term equilibrium, which is disappointing. Also, a number of candidates drew poorly annotated diagrams which resulted in low marks being awarded. The detailed labelling of the drawing is essential.
- (b) Calculation of the force  $F$  proved to be demanding to a significant number of candidates. Centres need to ensure that candidates should clearly show how they carried out their calculations and not just put numbers on a page. Marks are easily lost this way.

**(c) & (d)**

This question was again based on the properties of the materials and it was clear that many did not really have in depth knowledge of the properties or characteristics of stainless steel and in particular its suitability for a range of reasons. The evaluation of hardwood as a handle and its benefits and recyclability was answered slightly better but there was no real depth to several answers relating to environmental impact.

**Q.6** Most candidates scored well on this question.

- (a) Most candidates were able to identify an input sensor and output component.
- (b) Most gained 3 marks for identifying an analogue device and it was clear that many understood the purpose of a pic microcontroller.
- (c) The calibration of the lamp was found to be too demanding for many which is disappointing as many will have built circuits requiring some form of calibration. The calibration could have been achieved in a number of suitable ways, but most answers were superficial and revealed a lack of understanding.
- (d) This seemed to be well answered by several candidates and was not an issue, the majority giving good explanations of why prototype 2 functions better. Many though were not able to complete the control system which is disappointing. Candidates could adapt the circuit from earlier in the question and still obtain full marks.
- (e) This question was fairly well answered although centres do need to get candidates to take more care when showing calculations and drawing diagrams. There were a range of accurate responses to changing the final RPM.

## Summary of key points

- It is evident that certain centres prepare candidates for this examination better than others. A systematic coverage of the teaching specification, together with some practical modules and making experiences appears to equip candidates with sufficiently broad knowledge and understanding to complete this paper. Completing non-examination assessment prior to this examination also reinforces and deepens the experiences that can be brought to bear in certain parts of the question paper.
- Overall, candidates appeared to find this paper accessible and the vast majority of scripts display very similar standards to scripts that were in the previous Systems and Control specification.

# FASHION AND TEXTILES

## GCSE (NEW)

Summer 2019

### UNIT 1

#### General Comments

The 2019 paper for the new fashion and textiles course followed a new format with questions drawn from a broad cross section of topics listed in the course specification. The style and demand of questions however were similar to previous textile technology papers and effectively tested candidates' ability to demonstrate knowledge, understanding and skills acquired over the two-year period of study at GCSE level.

The style and structure of the questions meant that the paper was accessible to most candidates who attempted all questions, with no obvious questions causing concerns. However, when compared to previous years there was a marked increase in the number of questions '*not attempted*' or only '*partially attempted*' with generally much weaker responses overall. From the evidence seen there appears to be a considerable number of papers with total marks of less than 30, very few above 75 with most candidates achieving around 50% of the available marks.

Many centres deliver a well-balanced course covering the full specification content which adequately prepares candidates for the non-exam assessment (NEA) and the theoretical aspect of the examination. This approach ensures candidates gain the greatest success. However, it is clear that in many centres too much time is still being devoted to the NEA leaving some candidates inadequately prepared for the examination. There continues to be a huge disparity between performance in the NEA and the written examination. Given this new course has a 50:50 weighting this is a concern.

#### Comments on individual questions/sections

**Q.1** This question was quite well answered and was considered very accessible with most candidates achieving high marks.

- (a)** Some candidates misunderstood the question and took the meaning of 'environmental concerns' to be a negative point and consequently failed to answer the question. The candidates who considered the positive aspect regarding material choice for the hand-made toy scored well.
- (b)** Almost all candidates understood how recycling materials reduces the environmental impact of the toy. The question was generally answered well.
- (c)** Almost all candidates correctly identified the Fair-Trade mark.
- (d)** Most candidates demonstrated a good understanding of the work of the Fair-Trade Foundation in supporting workers and consequently scored high marks.

**Q.2** Responses to this question were generally good and was considered accessible. The candidates who had clearly been taught about renewable energy alongside the technological developments within the textile industry generally gained full marks.

- (a)**
  - (i)** Most candidates gave a suitable meaning for the term 'renewable energy.'
  - (ii)** The majority of candidates gave reasonable if rather simplistic explanations on how the solar panel on the beach bag worked. Few answers showed detailed understanding.
  - (iii)** Most candidates correctly identified a disadvantage of relying on solar energy, some responses lacked detail and missed out on full marks.
- (b)** Few candidates understood the meaning of the term technology-push. Very few candidates understood how developments in textile technology specifically influenced the development of the solar powered bag. Answers were generally superficial relating to how we all rely on technology these days with most candidates not appearing to know much about recent developments in integrated textiles or how a solar panel could even be integrated into fabric!

**Q.3** Generally, the responses to this question were good with the exception of part (b), nevertheless this question was quite accessible to most candidates.

- (a)** Some candidates gained full marks for this question clearly describing the difference between a print lying on top of the fabric whilst dye colours through the fibre. Some gained full marks particularly where the differences were more clearly explained.
- (b)** This question required candidates to consider the designer Orla Kiely's '*particular style*' of work in order to gain high marks in this question. Very few candidates recognised that. Most candidates did not acknowledge how her repetitive bold style with stylised shapes in block colours lends itself to cutting, pasting, rotating and repeating patterns, ideally suited to CAD. Most considered it was easier quicker and faster to develop ideas and consequently only achieved one or two marks. The question was not about communication and sending designs via email which many candidates suggested. Questions need to be read and considered more carefully!
- (c)**
  - (i)** Most candidates correctly identified which statements were true or false.
  - (ii)** Candidates overall had a good idea of consumer rights relating to faulty products. Most suggested the customer should be offered a full refund or a replacement. A few candidates gave detailed explanations of the Consumer Rights Act and gained full marks.

**Q.4** This question proved quite challenging for a large percentage of the cohort and many did not attempt the latter part of the question. Many candidates still do not have good knowledge of fabrics and very few understood the use of anthropometrics in developing fashion and textile products. Few good answers were seen, consequently this question was deemed too challenging for many.

- (a) (i) Pictures are included with questions to support candidates. They need to consider what the product is, who is the intended user, then what specific properties the fabric should have for the product to function and meet the needs and wants of the user. It is advisable that candidates consider this more carefully when answering questions in future. Responses to these questions were superficial and weak. For the cotton sleepsuit it needs to be washable and easy to care for. Most did not consider the shopping bag was a re-useable product that is widely seen these days and jute is a sustainable, bio degradable and an eco-friendly fibre. Most suggested it was strong and although correct only gained one mark.
- (ii) A few candidates gave comprehensive explanations for using a knitted fabric for the sleepsuit, however the majority of candidates gave simple responses such as soft or stretchy but then failed to explain further. The majority of candidates suggested woven fabric is a strong weave however they failed to give further explanation for example it would support the shape and structure of the bag.
- (b) The majority of candidates did not acknowledge primary research gives more accurate results rather than less reliable secondary information. A straight forward question which was quite simply, poorly answered.
- (c) The responses to this question were disappointing and clearly demonstrated weakness in candidates' knowledge. Given anthropometrics affects all the products we use on a daily basis, sizing being critical in the clothing we wear, the majority of candidates could not answer this question with several '*not attempted*'. Where marks were awarded it was for the sleepsuit where some understanding was evident. Many suggested a one size shopping bag did not need to consider anthropometrics! Quality of written communication varied.

**Q.5** Responses to this question were mixed but overall fairly accessible for most candidates.

- (a) (i) Almost all candidates identified batch production for the Bardot style top, it being a fashionable summer product.
- (ii) Most candidates offered appropriate advantages and disadvantages of buying popular ready to wear clothing like the Bardot top however a large number of responses were superficial and lacked 'real' understanding.
- (b) (i) A large number of candidates did not know pattern marking and consequently could not answer parts (ii) or (iii) either. A double ended arrow represents the straight of grain; some candidates drew a single headed arrow which although technically incorrect were awarded a mark.
- (ii) Where candidates knew the straight of grain pattern mark, they also understood how to follow the instruction and gained full marks.
- (iii) A few candidates demonstrated good knowledge and understanding relating to one-way directional prints and its impact as in, all templates have to be laid the same way so that the print on the products match and run the same way.

Several responses were simply, poorly explained but were given credit for demonstrating some understanding.

- (c) Few candidates gained full marks in this question and overall subject knowledge was considered quite weak. Where marks were awarded it was for stating combining the fibres gives you the benefits of each fibre. Most answers were descriptive in content and failed to evaluate on the benefits to the wearer. This question typified failure of candidates to read questions but also lack of practice in answering an 'evaluate' question.
- (d) Responses to this question varied, with many simply repeating the stem of the question. Shirring elastic is currently a fashionable feature on many products, it is therefore surprising that this question proved challenging for many. Where answers were more detailed they tended to be descriptive rather than an evaluation of the benefits to the wearer. Again, further practice in answering these types of question will benefit candidates in future.

**Q.6** This question was answered quite well with many candidates gaining close to full marks therefore it was considered accessible for most. It was however too much for some candidates with several 'not attempted' or 'partially attempted' responses. End of a two-hour paper perhaps.

- (a)
  - (i) Most candidates identified the satin/zig zag stitch and bead (or pearl).
  - (ii) Most candidates gave suitable reasons for using a laser cutter to cut the flowers shapes, but candidates need to be mindful of repetition in their answers.
  - (iii) Responses for creating a block then using it to apply the flower shape varied although most candidates gained a few marks here. Full and detailed descriptions were however rarely seen.
  - (iv) The majority of candidates could not answer this question consequently full marks were rarely awarded. It was clear from the evidence seen that where the technique of piping appears to have been taught the responses were significantly better.
  - (v) A considerable number of candidates did not know the standard seam allowance used in textiles is 1.5cm (15mm). This is a basic but essential requirement in the manufacture of textile products. Given all candidates make products, this is surprising! Reasons for using a consistent seam allowance varied but given that many did not know what the standard measurement is, it is hardly surprising they could not answer this question either.
- (b) Most candidates gave at least one valid reason for using an invisible zip for example hardly visible/aesthetically better or less likely to cause discomfort.
- (c)
  - (i) Most candidates stated the name of a suitable finish for preventing marks permanently spoiling the cushions. Acceptable answers included: stain resistant finish, Teflon/Scotchguard.

- (ii) Responses to this question varied but most candidates demonstrated some understanding of washing a selection fabric, all the same size in different cycles then drawing comparisons for rates of shrinkage at the end. Although the answers were generally weak, most demonstrated some knowledge and were given credit.

### Summary of key points

General issues in candidate performance include:

- Failure to read the questions properly.
- Repeating the stem of the question but failing to demonstrate a specific body of knowledge.
- Failure to 'explain.' An 'explanation' requires a fact and an elaboration of that fact.
- Writing with clarity and clear meaning.
- Rushing through the paper and failing to take advantage of the **full two hours** of examination time to consider and respond to the questions more thoughtfully.

This report should be read alongside the paper and mark scheme. Centres are reminded of the item level data available on the WJEC secure website when they reflect on their candidates' performance. Item level data sets out the candidates' performance in this year's paper at a national level as well centre performance. Feedback on candidate performance for the 2019 paper will also be discussed in the CPD sessions planned for January 2020.

I hope that the feedback I have provided in this report will enable centres to reflect on the strategies and advice given to their candidates as they prepare for the 2020 examination.

## PRODUCT DESIGN

### GCSE (NEW)

#### Summer 2019

#### UNIT 1

### General Comments

The 2019 summer series examination represents the first award of the new specification examination paper. There were close to 4500 candidates within this cohort, providing very high attempt rates for all six questions within the examination paper. This new paper challenges candidates to 'think' more based on the question being placed within a specific context. This encourages each candidate to analyse and evaluate rather than present recalled information which can sometimes be considered as knowledge in isolation. The accessibility of this examination paper appears to be fairly high, although some candidates seem to 'run out of steam' as the paper progresses, with question 6 being statistically the lowest attempted, and with the widest range of performance.

Overall, there were very few scripts with spoiled questions or blank spaces, suggesting that the content of the questions was both familiar to candidates, and that they had some knowledge and understanding about the context of each part question. Encouragingly, there were some excellent responses within examination scripts, with some in the high nineties, demonstrating detailed and high-level knowledge across a wide variety of specification content. There were also, conversely, some weaker scripts with much lower totals, although sometimes candidates appeared to be able to respond to some degree, but often simply offered a one-word response or insufficient information to gain credit.

### Comments on individual questions/sections

- Q.1** This question was attempted by virtually every candidate and was the most accessible of all six questions. The context of a new smart watch replacing a more traditional product provided all candidates with an opportunity to settle quickly into the paper and respond with some detail.
- (a)** A number of candidates misunderstood the term 'aesthetics' and offered functional changes which scored no marks.
  - (b)** This was answered very well, where most candidates included sustainably disposing of the traditional watch by separating and recycling or reusing useful parts. Some candidates made reference to selling on or using forums such as Ebay to allow other users to purchase used products, generate cash and avoid disposing in landfill. Some responses here lacked the full depth to gain the full 2 marks, and some responses tended to be repetitive or cover similar content in both responses.
  - (c)** Virtually all candidates scored marks here, even if it was not the full 4 marks. Candidates need to be reminded that large mark tariffs require broader and deeper responses. Extended answers should be practised in order to establish a standard for the mark available.

All candidates understand and have experience of CAD, especially having just completed NEA tasks, so applying this to the design of the smart watch was quite accessible.

**Q.2** This was another accessible question where candidates picked up marks throughout. Smart materials are generally well known and 3D printing is popular in lots of centres, where candidates are utilising this when completing NEA activities.

- (a)** The vast majority of candidates named thermo-chromic pigments or inks and could describe the colour changing due to temperature changes within the mug. This proved very accessible for virtually all candidates.
- (b)** The term 'explain' demands more depth of response and candidates need to provide sufficient detail to gain 2 marks for different advantages. There were some repetitive responses here, with candidates almost repeating the same advantage, limiting the marks awarded.
- (c)** Most candidates selected PLA or ABS for the 3D printing material, probably because this is what would be used at their centre. There were other acceptable responses which gained the 1 mark available here. The 3 marks for advantages to the designer proved slightly more challenging. Lots of candidates accessed one or two marks, but only the higher achieving appeared to gain all three. Common issues included short responses such as '3D printing produces products quickly' but this fails to identify why this is an advantage to the designer. Again, candidates need to be reminded to provide a response proportionate to the mark available.

**Q.3** This question was not as accessible as the previous two. Candidates appeared to struggle with energy sources and the issues surrounding sustainable sources. Energy labels was not well understood and there were few full marks responses for bii.

- (a)** Lots of candidates mistook Energy Source A as a wind turbine. The majority identified geo-thermal, but some could not use the correct term. The description of cold water circulating and being heated naturally was quite common and allowed credit to be awarded. Candidates sometimes struggled to explain disadvantages, probably due to the negative perspective where they are more comfortable identifying advantages. Those identifying A correctly as a tidal system understood the expensive set up costs involved, and the possible danger to marine life which were the most common responses here. The most popular response for (iv) was that using renewable energy sources reduced costs for the manufacturer, but sometimes candidates failed to provide sufficient depth for the full 2 marks available.
- (b)**
  - (i)** Again, some candidates produced some repetition here, with answers relating to energy consumption. Part (i) requires candidates to identify that the energy label is a legislative requirement to inform customers of information regarding the product. Lots missed this and just described the information on the label which restricted access to the full 2 marks.
  - (ii)** The 5 marks available for (ii) requires a detailed and varied response from candidates about the benefits of labels for consumers choosing products. Most candidates scored some marks for identifying benefits when comparing energy efficiency ratings in products.

Only very full responses that contained the breadth of benefits in their explanations scored the full 5 marks.

- Q.4** This appeared to be the least accessible question within the paper, which was quite surprising considering the topics examined. One reasons for lower mark accumulation in candidate's performance was the high mark tariffs, and the 'analyse' and 'evaluate' nature of the questions. Many candidates scored around half marks because responses did not contain enough depth or detail or were more descriptive rather than analytical. This is an area for improvement for future examinations. Question 4 is also where QWC is assessed.
- (a)** This question produced some very disappointing responses from a larger percentage of the cohort. Despite recently completing their NEA, candidates failed to provide any methods of researching the target market to find important information. Some candidates mentioned anthropometric data but did not fully analyse how this could be conducted. Candidates probably knew more than they offered due to a lack of reading the question carefully and considering the response accordingly. It was expected that with this very 'user centred' specification, candidates would have accessed this with greater ease.
  - (b)** The 6 marks available here were rarely awarded in full. This was due to responses not fully evaluating the environmental impact of the products. Most knew that the injection moulding process was very energy reliant, and some also mentioned that the use of polythene with a rubberised handle would need a bonding agent or adhesive which would make separation, reusing or recycling more complex. Very few candidates focussed on the robust and durable nature of the products, or that the long-life expectancy would be beneficial. Again, 6 marks is a large percentage and requires both the breadth and depth of response to gain the full tariff.
  - (c)** Most candidates would have undertaken modelling using foam to test and analyse ideas and concepts for products during the course. This question (i) clearly requires candidates to evaluate how the use of blue foam helps when modelling in school. This was not fully understood by some who simply provided a list of reasons why blue foam was a good modelling material. This restricted the marks accessed. This was not well answered again due to a lack of understanding the question. Similarly, in (ii), candidates missed the 'analyse the benefits' aspect and lots of responses were restricted to testing the torch to see if it was the right shape. Some stronger responses delved deeper and discussed the designer testing the torch on the target market and the avoidance of any issues before embarking of full-scale production. Responses to this were patchy.
- Q.5** This question proved fairly accessible with most candidates. Sustainable design and the use of materials such as corrugated cardboard is clearly studied during the course and typical product such as flat-packed chairs are familiar subjects to analyse.
- (a)**
    - (i)** Virtually all candidates attempted (i) and gained marks for identifying one reasons for flat-packed products. Most offered reduced cost, and some better responses discussed the protection of the main shape of the product in a fragile / easily damaged material.

- (ii) As expected in (ii) lots of responses were basic and mentioned 'strong' or 'sturdy' without any additional explanation. For 2 marks, the reinforced structure of corrugated card needs to be understood, and how this offers a rigid and strong sheet material when placed vertically in the products shown.
  - (iii) The pattern of repeating responses was again evident in (iii) where two different advantages are required. Common responses included quicker assembly due to less parts, and product is able to be used instantly without any specialist tools, equipment or waiting time for glue to dry. Most candidates scored 2 or 3 marks, with only the more detailed and different responses gaining the full 4 marks.
  - (iv) Part (iv) was trickier because candidates needed to be perceptive and study the images to identify that the outer packaging of the light becomes the light shade. Not many candidates gained the full 2 marks here.
- (b) This part question was variable from some very good responses to some which were very basic only. Some candidates identified mild steel as appropriate due to its strength and rigidity once shaped to support multiple bicycles. This gained the 2 marks available. Again, the weakest candidates would offer one word or very short responses relating to strength or sturdiness, but with no real justification for its use in the bike rack product context. These gained no or just 1 mark depending on the depth. The 6 marks available for (iii) was only awarded to the higher quality candidate who could comprehend that by offering multiple varying bike racks, the manufacturer could provide more flexible solutions and customers could apply a modular approach when purchasing numbers of racks to meet needs. Lots score low marks here, again this is disappointing when candidates struggle to understand the user or target market perspective, which is such a core element of their studies.

**Q.6** This last question proved to be less accessible than most of the others and provided more blank spaces than any of the other questions. Candidates possibly ran out of time or had to rush to complete the paper with little time remaining. Again, the context is a product that most would be familiar with if not have used.

- (a) (i) This section requires a product analysis style interpretation which candidates should be comfortable with and have undertaken during their NEA. Most candidates understood that in (i) PVC is rigid and lightweight, but only sharper pupils added that this made the shaft of the tennis game suitable for outdoor use and more portable. This was another case for candidates gaining 'easy' additional marks for going 'a step further' in their response.
- (ii) For (ii), the images of the product are critical in helping candidates analyse the product neatly packed into the carry case which becomes the base once assembled. Not all candidates gained the 2 marks here, but most gained 1 mark for a response worth some credit.
- (iii) Candidates generally understood that injection moulding was suitable for creating hollow cases in two parts, identical multiple products, and high-quality repeatability with little waste.

Some candidates offered the ability to change colour and that the base would be water resistant and non-corrosive when used outdoors, and even easy to rinse or wipe clean if used in sand or muddy conditions.

- (iv) In (iv), the physical properties of nylon were generally understood by candidates, but typically some responses were limited to recall of nylon i.e. strong, dense and durable rather than analysing why nylon would be suitable in this context. Candidates need to consider the material and the product.
  - (v) Global manufacture is quite well understood, and in (v) the vast majority could offer some response to gain at least 2 of the 4 marks available. As previous, only the higher ability seemed to gain access to the full 4.
  - (vi) Responses for (vi) generally scored some marks, but lots of candidates failed to grasp that testing the market initially would be a reason for launching a smaller batch of products. Higher achieving candidates produced excellent responses including meeting demand and low risk production in order to prevent high investment and low sales.
- (b) The explanations offered here were very varied. Most candidates understood that cutting 3.1m bought in lengths would be more economical, and some added that this would reduce lead in time with less parts to manufacture in house. There were lots of low-level responses here gaining 1 or no marks.
- (c) Being the last part of the examination paper, a number of no attempts featured here. Some candidates did not understand the term 'semi-automated' and as a result could not respond with any knowledge. In addition, using manual workers was also inconsistently answered, although some candidates fully understood how commercial production would take place in order to manufacture the tennis game.

### Summary of key points

General issues in candidate performance include:

- Failure to read the questions properly.
- Failure to 'explain.' An 'explanation' requires a fact and an elaboration of that fact.
- Rushing through the paper and failing to take advantage of the full two hours of examination time to consider and respond to the questions more thoughtfully.

**DESIGN AND TECHNOLOGY:  
ENGINEERING DESIGN, FASHION AND TEXTILES AND PRODUCT DESIGN**

**GCSE (NEW)**

**Summer 2019**

**UNIT 2: NON-EXAMINED ASSESSMENT.**

**General Comments**

This is the first year of the award of this new specification for GCSE Design and Technology. This specification provides centres in Wales with 3 different GCSE Design and Technology titles: Product Design, Engineering Design and Fashion & Textiles, examined through WJEC.

This year, the qualification weighting has shifted to a 50-50 split in weighting of examination and Non-Examined Assessment (NEA) where the legacy specification awarded controlled assessment project work at 60% of the qualification at. The NEA is worth 100 raw marks. The new specification clearly requires candidates to present a 'design journey' showing the iterative development of a fully functioning prototype that fully meets the identified needs, wants and values of the users. There is now far more emphasis on a 'think, test, evaluate, rethink' cyclic process where possible design ideas are tested, developed and refined against a clearly defined design specification. The format and layout of the NEA submission is completely flexible, and candidates may present their NEA in a way which best reflects their skills, abilities and expertise. This is a 35-hour design and make task which commences on June 1<sup>st</sup> annually with the publication of three different contextual challenges.

**Comments on individual questions/sections**

**Assessment Criteria**

• **Identifying design possibilities – 10 marks**

Candidates are required to study the 3 contextual challenges, and investigate, analyse and research these areas in order to be able to identify a range of possible design problems. It is important that this is not done in a linear fashion, and that candidates take ownership over their NEA from the start. There is no single starting point where candidates must begin this, and so candidates should be encouraged to understand problems from the user's perspective.

These 'design problems' can then be further examined, and candidates should develop possible design briefs. It is critical to consider the marking criteria early on during the NEA for candidates to be clear about the expectations of the mark descriptors.

All candidates need to establish a clear understanding of the end user's needs, wants and values in order to fully appreciate the design problem. The 'user centred' design approach cannot be achieved without constant reference to the end user during the whole design journey.

This area was generally assessed fairly and consistently in centres, although sometimes candidates were awarded high marks when they had been quite narrow and focussed on one problem, which fits better with the lower mark ranges.

- **Developing a design brief and specification – 10 marks**

Candidates are required to consider a broad range of possible problems before narrowing down and focussing on one chosen brief. Sometimes lower achieving candidates fail to demonstrate various possible problems, and the design journey they present is rather narrow. The final design brief that candidates choose to tackle should be developed as a result of realistic research and their understanding of the problem is critical to the eventual success of the product, and in the production of an innovative and creative outcome that fully meets the needs, wants and values of the end user.

Design Specification criteria needs to be developed appropriately by candidates so that they can use these as design tools, to ensure critical features are included in design ideas. Sometimes, candidates produce a generic list of basic criteria which do not contain any measurable criteria. These are no useful to candidates, they do not help focus designing, and they make analysis of ideas more difficult because there is nothing to measure success against.

There are several successful strategies which candidates can employ to help structure specifications. One is to separate the specification into areas such as size, cost, function, aesthetics etc., and itemise important factors under these headings. Including specific dimensions is useful within the 'size' specification list, so candidates are establishing clear parameters to help generate initial ideas.

Some candidates used dedicated headings such as 'User Needs' and 'User Wants' when developing the specification. This helps to ensure that the target market requirements are an integral part of the design process. Similarly, establishing 'essential' and 'desirable' criteria also helps candidates to include features which are vital, and consider others which are not so critical.

Specifications should be used as a design tool to help evaluate ideas as they develop. Not all candidates demonstrate this reflection of the specification criteria, and as a result do not access the higher mark range.

This area is generally fairly assessed in centres, although sometimes specifications that are not fully developed are awarded high marks.

- **Generating and developing design ideas – 30 marks**

In order for candidates to be able to generate possible initial ideas, they need to have a firm grasp of the problem, and a clear appreciation from the user's perspective. This proves problematic for some, because they do not really know enough about the problem, and therefore cannot take thinking to the next level. Initial ideas are meant to be broad and wide ranging, and candidates should be encouraged to produce ideas directly related to specification criteria. If specifications are detailed enough, issues such as size, function, cost, etc. can simple help to construct ideas. Candidates should be able to utilise a range of design strategies early on to see whether their initial ideas have any potential. Low fidelity modelling (card / foam / mock ups) will serve well as quick and simple ways to test ideas. As ideas develop, candidates should be recording their 'design journey' as they travel through the iterative process of 'think, test, evaluate, re-think'. There should be testing, experimenting and modelling at every level of designing, with analysis and evaluation of this to identify factors for elimination as well as areas for further development, refinement or 'tweaking'. Candidates can photograph testing and modelling, and use this to 'overlay' further ideas, and present practical modelling outcomes as evidence during moderation. It is critical that candidates demonstrate their 'design journey' and illustrate how they arrive at a final prototype stage.

This area is commonly over rewarded by centres, and candidates' marks are often found to be generous during moderation. Candidates do not need to produce high volume evidence here; it is not the amount of work that allows access to high marks. Candidates need to document what they are testing, the results of the test, and how the results impact on their thinking moving forward. Lean design is encouraged, but it must be focussed, relevant and well-documented.

- **Making a prototype – 30 marks**

Similarly, the quality and eventual success of the prototype is directly dictated by the detail of the final design and the overall understanding of the design problem. Most candidates produced a timeline for production to demonstrate how they would tackle the manufacture of the final, fully functioning prototype. Most candidates thoroughly enjoy this aspect of the GCSE course, and this is highly evident during the moderation process. The vast majority of candidates have very good skills when using tools, equipment and machinery. They also have good knowledge and understanding of materials and processes and complete their outcomes well. In some cases, inappropriate materials or methods of manufacture can occur, and obviously this limits the marks awarded.

Lots of candidates use modern techniques very effectively, and the use of processes such as laser cutting, and 3D printing is increasing, and more importantly, used effectively to create innovative and creative aspects within products.

The overall quality of construction of prototypes is generally good, but again this can vary from centre to centre. A small number of outcomes were submitted in a partially or incomplete state this year, and in some instances, candidates had been supported by non-specialist staff within centres which is very worrying, and also extremely limiting for candidates.

The assessment of this area is often generous where centres award high marks when the assessment descriptors in the band below appear more appropriate. Centres are again reminded to cross moderate internally, and especially where candidates produce multi material outcomes. The standardised approach prevents inconsistent application of the marking criteria.

- **Evaluating a prototype's fitness for purpose – 20 marks**

To obtain a high mark here, candidates need to be able to test a high-quality final prototype on the identified target market and analyse the results. This needs to be supported by on-going evaluation and analysis during the design and development 'journey' where it is intended that the users are closely involved in steering design decisions.

Feedback from users after trialling the final prototype should be analysed and used to help shape any modifications that need to be included to improve the outcome further. There can be further designing opportunities and making activities here.

Many candidates failed to demonstrate the on-going analysis required to access the very highest marks this year. This is an area for development and this new NEA approach progresses. Iterative user centred design must involve the target market and candidate must document analysis, evaluating and decision making more clearly.

## **Centre Adjustments**

Following moderation, over 95% of centres marks were accepted as accurate and no adjustments were made.

This is remarkably high considering that this is a new specification, with different assessment objectives, descriptors and mark bands. Centres should be congratulated on the delivery, completion and assessment of GCSE outcomes.

Some centres will have had an adjustment applied to their marks. This is to bring the candidates into line with the national standard. A small number of centres had positive adjustments applied to their original marks as a result of candidates not being fully rewarded for the work produced. Alternatively, centres which are consistently generous across the sample will have a negative adjustment applied which will reduce the marks of candidates accordingly. Centre reports will indicate whether the assessment of candidates' work was fair and consistent, and also provide feedback based on the sample presented for moderation.

The vast majority of centres deliver the NEA effectively, and assess outcomes fairly and consistently. There were large numbers of entries for the annual Innovation Awards again this year, which was extremely pleasing and encouraging, particularly considering specification changes and curriculum reform. It would be extremely advantageous for staff and candidates at centres to visit the Innovation Awards exhibitions in Cardiff and Bangor this autumn where the very best GCSE, AS and A Level work will be on display.

### **Summary of key points**

- Some centres provided candidates with a structured format or folio template by which to complete the NEA task. This should be avoided where possible as this guidance will limit the mark awarded to the candidate.
- Some centres prevented candidates from attempting all 3 contextual challenges. This restricts the opportunities for candidates to analyse and evaluate broadly and develop the wide range of possible problems required to access the highest mark range.
- There is evidence of a lack of standardisation within centres. Teachers should discuss the marking criteria and apply an agreed standard to all candidates within their centre.
- Proportionate time needs to be spent on all aspects of the NEA. Some candidates clearly struggled to complete NEA tasks and as a result, final evaluations were sometimes found to be incomplete, superficial or rushed. Some candidates spent too much time on research and investigation activities which were not particularly relevant or focused, and as a result did not help candidates understand the design problem more clearly.
- Awarding accurate marks is critical to ensure that candidates receive fair and consistent reward for the work produced. Banded mark descriptors help to determine the correct band where a candidate's work fits, and then within the band, the exact mark that the work deserves.



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