GCSE EXAMINERS' REPORTS

DESIGN AND TECHNOLOGY

Design and Technology in the 21st Century

GCSE

AUTUMN 2020

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General Comments

Just 23 candidates selected to take this GCSE exam at this time and therefore it is difficult to conclude how accessible this paper truly was. Candidates did attempt all questions and it was pleasing to see all candidates selected and answered just one Question 6. The Maths questions continue to be accessed well by the candidates though we do encourage centres to ensure candidates show all their calculation workings.

The in-depth sections were variable in the knowledge shown. Over a third of the candidates chose the Fashion & Textiles Question 6 and all showed a good understanding of this material area. No candidates selected the Electronic Systems and Mechanical Devices section. Very few candidates showed a clear understanding of the designer linked to their material area (Q6(d)). It is important that centres understand any element of the Specification, including the NEA, can be tested in the examination.

Although questions often follow a theme, candidates must read the stem of each question carefully, as they continue to duplicate or reference the same points throughout the paper, this year answers tended to reflect sustainable issues even though the question itself did not reflect sustainability. Answers on material-based questions were sometimes vague, lacking real knowledge of the materials properties. Examples of “it’s strong”, “it’s cheap”, are not encouraged unless supported by a fact that can elaborate or explain why. Examples of supported answers are given in the mark scheme, so centres are encouraged to use this as a teaching tool.

Comments on individual questions/sections

1. Smart Materials

A positive start to the paper whereby the majority of candidates performed well.

(a) All candidates defined a smart material and referenced that smart materials react to changes in their environment or through environmental stimuli. There was some confusion how to calculate a percentage and so it would be worthwhile practicing with candidates when to divide and when to multiply.

(b) Very few candidates understood what an electroluminescent film was, but all candidates attempted the answer applying the knowledge they had of calculator screens – sometimes giving the question a go and applying knowledge they do have pays dividends with the marks awarded. No named biomimicry fabrics were provided but their understanding of the principles of biomimicry was excellent.

2. New Technologies in our Society

Candidates have a sound understanding of environmental factors associated with new technologies.

(a) All candidates recognised correctly the energy source(s) shown in the picture provided and all could give a disadvantage to using energy sources in providing heat to households.

(b) Knowledge of the benefits of buying an electric car were clear and suitable, though all did relate to the environmental impact when there are many other benefits, such as governmental incentives, safety features, low maintenance and the like.

(c) The question on wind-up energy products was answered well, it was clear these products were familiar to the candidates.

(d) The question on the negative impacts of technological advances was answered well.

Most answers provided were related to unemployment and the lack of social face-to-face interactions.

3. Electronic Systems, Programmable Components and Mechanical Devices

Candidates were more prepared for this section of questions and had a sound knowledge of both electronic systems and mechanical devices.

(a) Both rotary and reciprocating/linear motions were identified correctly. All candidates attempted to explain, with some success, how their chosen mechanical motion functioned.

(b) Candidates had no problems with calculating the speed of the pedal crank nor with calculating the ratio of the gears used on the bicycle.

(c) Some candidates struggled to identify and draw the feedback route for the iron, but most could identify at least one function of the thermistor. All candidates knew about the advantages of LEDs and could relate their answers to an iron. It was felt their understanding of how an iron operates in everyday life aided the answers provided.

4. Materials

(a) This starter question was surprisingly challenging for many candidates. Ensuring students can identify the examples of thermoforming plastics used for a range of different products needs a little more focus. The forms in which plastics are sold – film, bar, rod, tube – were not familiar to many candidates. Acrylic is one material all students were confident writing about and referenced the properties well in the answers provided.

(b) Not many candidates were confident in their understanding of a non-ferrous metals, though many could reflect on the tablet stand and identify the properties the material should have.

(c) Not all candidates knew denim fabric is made from cotton, or that it is frequently blended with an elastane fibre. However, candidates recognised the products made from denim so could discuss well the versatility of this material and referred to a range of properties in the answers provided.

(d) Few candidates could name an appropriate type of paper to manufacture the pop-up book, but they all had a sound understanding why laminating paper benefits the long term use of the child's book.

5. Generic Questions

Candidates accessed this question well. The most popular products selected were the fabric dinosaur and mechanical toy.

(a) All candidates could identify a decorative technique that could be used to improve the aesthetic of their selected product. Candidates had a good knowledge of the advantages of using the laser cutter, but some did not refer to or reflect upon their chosen product, answers were therefore too broad or generic.

(b) Candidates read this question well, stated a suitable safety factor and went on to describe other factors considered by the designer. Some did refer to safety as a factor again, emphasising the importance of reading the question fully and underlining the key words prior to answering the question.

(c) Although few candidates could not identify The Consumer Rights Act 2015, their knowledge of how legislation protects the buyer or user was excellent, a number of candidates accessed full marks.

(d) A pleasing set of correct maths calculations. All bar charts were well labelled and correctly displayed.

6. In-depth Knowledge

All candidates were able to follow the instructions about selecting and answering just one material area. Success with these questions was variable but difficult to evaluate when such low numbers of candidates were entered for this paper.

6. Electronic Systems, Programmable Components and Mechanical Devices

No attempt was made by any candidate to answer this in-depth section of the paper.

6. Papers and Boards

(a) Candidates could not identify the process to bond the plastic to the card was lamination, nor could they give a reason. The process of die cutting could not be described. Candidates could not identify quality control markings though they did attempt to describe the importance of these markings within the table provided.

(b) Candidates could not identify the size of an A3 sheet of paper and struggled to calculate the number of business cards that could be printed on to one A2 sheet.

(c) Very little reference was made to manufacturing or transportation pollution. Answers provided tended to be brief and just reflected on natural card being able to be recycled.

(d) Candidates found this question challenging, attempts made were brief and didn't reflect the disadvantages of the shift in manufacturing practice from plastics to recycled papers and boards.

6. Timber and Manufactured Boards

(a) Candidates could identify a surface finish suitable for the oak parts of the desk and they could give an advantage to using a veneer by referencing it is lighter in weight than solid planks. Candidates struggled to explain the process of spray painting forgetting that surfaces need to be sanded and cleaned and primed before being prayed. The cam fitting was not recognised but most candidates could draw and label a mortise and tenon joint.

(b) Calculating how many handles would need to be manufactured for an order of 20 desks was easily answered. However, candidates did get confused as to how to calculate the area of a circle, often using the formulae for the circumference of a circle.

(c) Candidates could access this question and were able to compare the benefits of using man-made boards instead of solid wood. Most answers reflected size and cost rather than making reference to the properties and characteristics of man-made boards.

(d) Candidates could not evaluate the impact Philippe Starck has had on the product design industry. They all attempted the question but could not identify any of the products he is most famous for designing.

6. Metals: Ferrous and Non-Ferrous Metals

(a) All candidates could state why a chrome plated finish was applied to the clamp bracket though few could state that the manufacturing process used to create it. Candidates could describe well the term 'alloy'.

Few could identify the drawing presented was a First Angle Orthographic Drawing and did struggle to identify and describe the function of two drawing details.

Candidates did have a go and did pick up some marks.

(b) The maths questions were answered well with many gaining full marks for each section.

(c) Understanding what a non-ferrous metal is and giving examples really helped candidates answer this question with good reference made to bathroom fittings throughout.

(d) Although candidates could name products developed by James Dyson they struggled to evaluate the impact he has had on the design industry. Mark schemes should help centres prepare lessons on all designers listed in the specifications.

6. Thermoforming and Thermosetting Polymers

(a) Candidates could not relate HDPE to the group of plastics known as thermoplastics.

Some stated injection moulding is a manufacturing process suited to produce the body of the game controller. Candidates are able to suggest properties appropriate for the material discussing but still find it difficult to justify or relate the property suggested to the product they are describing. No candidate could state and describe that dip coating was the process used to create the rubberised finish on the joystick correctly.

(b) As with other materials, the maths questions are answered well with just some using the formulae for the circumference of a circle rather than the area.

(c) Most answers provided related to recycling, few referenced manufacturing energy requirements, composability or biodegradability.

(d) Although candidates could name products developed by Apple and reference how packaging has changed so it is now more sustainable, they struggled to evaluate how Apple has changed the way they use plastics in the manufacture of their products.

6. Fibres and Textiles

(a) Few candidates recognised a detailed pattern print would be digitally printed. However, all candidates recognised the characteristics of silk. Calendering is a common finishing process used in the industry to add lustre to fabric, it was not a process candidates were familiar with so this questions was not accessed well. All candidates recognised the back-pattern piece and could describe the function of pattern markings.

(b) The maths questions were answered really well with many gaining full marks for each section.

(c) There was a good understanding shown of the differences between the properties of natural and synthetic materials and candidates did analyse the benefits of natural materials well.

(d) Few candidates new about the impact Matthew Williamson has had on the fashion industry but all attempted this question and made some correct assumptions based on the dress image provided.

Summary of key points

- The main areas candidates could improve attainment are by:
- Ensuring they have an understanding of all aspects of the specification content, not
- just those materials that they are choosing to study.
- Ensure they know the difference between calculating the area of a circle and the
- circumference of a circle.
- Ensure they have a good understanding of key construction processes, know how to
- draw them, label then and write about them.
- The properties and characteristics of materials – knowledge needs to be more defined, specific and relate to the material being discussed. Using general terms like strong, cheap, 'can be recycled' are not suitable answers as they are too generic unless supported by a justification.
- Ensuring they are familiar with electronic systems as their understanding of mechanical devices is much improved.
- Be aware that NEA content, along with designers can be tested within the exam.

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