GCE A LEVEL MARKING SCHEME

SUMMER 2019

A LEVEL (NEW)
DESIGN AND TECHNOLOGY - FASHION & TEXTILES
A601U10-1

© WJEC CBAC Ltd.

INTRODUCTION

This marking scheme was used by WJEC for the 2019 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

© WJEC CBAC Ltd.

GCE A LEVEL DESIGN AND TECHNOLOGY

SUMMER 2019 MARK SCHEME

COMPONENT 1 - FASHION AND TEXTILES

Question 1

As part of the design process, fashion designers use a range of strategies to present their ideas.

(a) Explain why a designer might use a design story board like the one shown below.

(b) A manufacturing specification contains information relating to the manufacture of a product.

Describe how a product would be visually represented on a manufacturing specification and explain the purpose of two other pieces of information that would also appear in a manufacturing specification.

Q 1	Science	Maths		AO3		AO4					Total
				2a	2b	1a	1b	1c	2a	2b	
1 (a)						2					2

Candidates should demonstrate knowledge of technical principles and awarded up to 2 marks.

No response or an inappropriate response – 0 mark

Responses should be based on:

A storyboard conveys the background information/story relating to a new collection [1]; it usually consists of fabrics/textures, colour palette, overall concept for styling [1]; it is visual interpretation of the collection prior to actual design taking place [1]; would allow the customer to gain a better understanding of what the designer has in mind[1].

Credit any other appropriate response.

© WJEC CBAC Ltd.

1 (b)							4	2			6

Candidates should demonstrate understanding of technical principles and apply it to specific appropriate points and awarded up to 6 marks.

No response or an inappropriate response – 0 mark

Responses should be based on:

- *Visual representation of the product (up to 2 marks):*
  A detailed line drawing (or flats) showing all appropriate views [1
  All critical dimensions needed for manufacture [1]
- *Other information could include:*
  (award up to 2 marks for <u>each</u> other detailed piece of information)
  Specific named processes [1] alongside where these relate to the product [1]
  Specific named materials and components [1] where they relate to the products [1]
  Details of sizes, widths and quantities of each named material and component [1] to support ordering of stock prior to manufacture [1]
  Machinery and machine setting instructions [1] critical to manufacture consistently [1]
  Instructions for lay planning [1], one way/directional/ pile weave [1]

Credit any other appropriate descriptive response.

© WJEC CBAC Ltd.

Question 2

The thermal bottle carrier shown below is made from laminated neoprene. Neoprene is a synthetic rubber which forms part of the laminated material.

(a) Explain what is meant by the term 'laminating' and give a detailed reason for laminating the thermal bottle carrier.

(b) Using notes and sketches describe a test you could carry out to compare thermal properties when choosing materials for the thermal bottle carrier.

(c) The height of the bottle carrier is 24cm and the diameter of the base is 8 cm.

(i) Calculate the maximum volume of liquid in litres that a cylindrical bottle the same shape and dimensions as the carrier could hold.

Round your answer to the nearest whole number.

(ii) A template is needed before the manufacture of the bottle carrier can begin. Calculate the size of the rectangular template needed for the cylindrical part of the bottle carrier. *Note: Seam allowance does not need to be included.*

	Science	Maths		AO3		AO4					Total
				2a	2b	1a	1b	1c	2a	2b	
2 (a)	✓						2		2		4

Candidates should demonstrate understanding of technical principles and design and make principles and awarded up to 4 marks.

No response or an inappropriate response – 0 mark

Responses may include:

- *Laminating (up to 2):*
  Made from a few different fabric membranes (thin layers) [1] sandwiched and bonded together to form new fabrics with additional/different properties [1]
- *Reasons (up to 2):*
  Neoprene is a rubber and not suitable for use on its own [1] laminating with other fabrics makes it more versatile and useful in a variety of applications [1].
  Neoprene has good thermal qualities but is visually less attractive [1], a decorative outer layer will add appeal to the intended product [1].
  Laminating materials with different properties brings together the most favourable qualities of all the fabrics used [1].

Credit other appropriate responses.

© WJEC CBAC Ltd.

2 (b)	✓					2		2			4

Candidates should demonstrate knowledge and understanding and apply it to technical principles and awarded up to 4 marks.

No response or an inappropriate response – 0 mark

Responses should be based on:
A selection of materials to be tested (usually formed into a 'sock') which will be placed over a number of test tubes [1]; each test tube has a stopper with a thermometer through it to record the temperature [1]; boiling water (same in all) poured into each test tube and sealed with stopper [1]; time recorded is critical as the longest time taken for water temperature to decrease is most thermally efficient material [1]

Credit any other appropriate response. Candidates may draw more than one diagram. Assess the work as a best fit and award marks accordingly.

2 (c) (i)		4					1	3			4

Candidates should demonstrate knowledge and understanding and its application in this context to be awarded up to 4 marks based on:

Responses should be based on:

- Formula for volume is: $\pi r^2 \times h$ [1]

Numeric value for formula
- (including radius of base): 3.142 x (4 x 4cm) x 24cm [1]
- Correct answer: 1,206.528cm³ [1]

Conversion to litres: divide by 1000
- Correct answer: (1.206) 1.2L or 1200ml [1]

Accept other methods of calculation.

All calculations need to be shown for full marks.

2 (c) (ii)		2					1	1			2

Candidates should demonstrate knowledge and understanding and its application in this context to be awarded up to 2 marks based on:

Responses should be based on:
- Circumference of the base/correct formula: $(2\pi r)$ 2 x 3.142 x 4 [1]
  (Accept calculations based on πd)
- Circumference of circular base: 25.14cm
- Template dimensions: 25.14cm x 24cm (height is stated) [1]

Accept other methods of calculation.

All calculations need to be shown for full marks.

© WJEC CBAC Ltd.

Question 3

Aramid is the generic term for a specific group of fibres derived from petrochemicals. Kevlar and Nomex are both examples of aramid fibres.

(a) Describe the specific properties of aramid fibres that differentiate them from other fibres also derived from petrochemicals.

(b) The products in the picture below have all been made from Kevlar or a composite containing Kevlar.

Explain why Kevlar has been used for the safety gloves, vest or helmet.

Q 3	Science	Maths		AO3		AO4					Total
				2a	2b	1a	1b	1c	2a	2b	
3 (a)	✓					4					4

Candidates should demonstrate knowledge of technical principles and awarded up to 4 marks.

No response or an inappropriate response – 0 mark

Responses should be based on:
Aramid fibres are high tech fibres that can be engineered to specific requirements in the form of woven, knitted or non-woven textiles [1]
Aramids are 5 times stronger than nylon (also derived from petrochemicals) [1]
General characteristics of aramid fibres include:
Very high strength/engineered to exact specification [1] far exceeding steel and even specialist metal alloys, such as magnesium alloys, used in aerospace engineering.
Low flammability with no melting point - other synthetic fibres will melt [1]
Excellent heat, and cut resistance [1] unlike standard synthetics that can tear and will not withstand heat [1]
Aramids are often used in combination with other materials, forming composites [1]
Engineered yarns provide greater levels of cut, heat and durability protection than ever before.[1]

Credit other appropriate responses.

For full marks, responses must include a comparison to other fibres derived from petrochemicals (standard manmade synthetics).

© WJEC CBAC Ltd.

3 (b)	✓								4		4

Candidates should demonstrate knowledge of design and make principles and awarded up to 4 marks.

No response or an inappropriate response – 0 mark

Responses should be based on:
Kevlar is lightweight and has a high tensile strength to weight ratio [1] as it is lightweight and extremely strong it would suit products that can be worn [1] but also protect [1]
Safety is something you can't take for granted; Kevlar is engineered for superior cut protection for your safety [1].
Unlike nylon, leather and high-performance polyethylene, gloves made of Kevlar fibre are not only incredibly cut-resistant [1] but are inherently flame-resistant so they won't burn, support combustion, or melt [1] making them a good choice for those who encounter both cut and heat on the job [1]
Kevlar Fabric is used for protective applications in rigid and soft body applications - in Ballistic Protection Products ie the vest and helmet [1] it is also chemical and flame resistant [1]
Kevlar is flexible making it comfortable to wear.[1]
Kevlar is 5 times stronger than steel of equivalent weight. [1]

Credit other appropriate responses.

© WJEC CBAC Ltd.

Question 4

Coloured fabric bunting, like the example shown below, is needed for a local village fete.

- Each triangular pennant is made from two pieces of fabric with no visible raw edges.
- A binding runs along the top and holds all the pennants together with a 2cm gap between each pennant.

(*Do not include seam allowances)*

(a) Using notes and sketches, explain how you would construct each pennant so that no raw edges are visible.

(b) Calculate the maximum number of pennants that can be made from a one metre length of fabric that is 150cm wide.

(*Show all calculations including sketches if appropriate*)

(c) A length of bunting containing 3500 pennants is needed for the village fete. If the binding is 75p per metre, calculate the cost of the binding for the length of bunting.

(*Show all calculations*)

Q 4	Science	Maths		**AO3**		**AO4**					**Total**
				2a	2b	1a	1b	1c	2a	2b	
4 (a)						2	2				4

Candidates should demonstrate knowledge and understanding of technical principles and awarded up to 4 marks.

No response or an inappropriate response – 0 mark

Responses should be based on:

- Lay two pennant pieces together right sides facing inside [1]
- Stitch around the longest sides of the triangle shape with consistent seam allowance [1]
- Cut off the point of the triangle (not cutting stitch line) to ensure a sharp point to the pennant [1]
- Turn it through, press it flat [1]
  (Answers may refer to stitching along the outer edge with a consistent seam allowance – credit this as it would allow pennant to lie flatter)
  (Candidates responses may make reference to adding the binding at the top – this is not required in the answer)

Credit any other appropriate response. Candidates may draw more than one diagram. Assess the work as a best fit and award marks accordingly.

© WJEC CBAC Ltd.

4 (b)		5						5			5

Candidates should demonstrate knowledge and understanding of technical principles and its application in this context to be awarded up to 5 marks.

No response or an inappropriate response – 0 mark

Responses should be based on:

- Calculating 7 pennants fit across the 150cm width [1]
  (*Information states straight grain lies with height of pennant, calculation based on this information*)
- Inverting/tessellating pennants maximising fabric utilisation (*laid out across the width, height of pennant follows selvedge edge of fabric*) [1]
- 14 sides of the pennants can be cut from 30cms depth [1]
- 14 x 3 (30+30+30) = number of pennant pieces in 90cm fabric = 42 pieces [1]
- Each pennant has 2 pieces (bagged out) = 21 pennants [1]

Credit other appropriate responses. Candidates may draw sketches to support their calculations, look to credit within method)

4 (c)		4						4			4

Candidates should demonstrate knowledge and understanding and its application in this context to be awarded up to 4 marks.

No response or an incorrect response – 0 mark

Responses should be based on:

- Top of each pennant plus a 2cm gap = 22cm [1]
- 3500 pennants x 0.22m = (Length of binding) 770m [1]
- 770 x 0.75 (cost per metre of binding) [1]
- Correct answer = £577.50 [1]

Accept other methods of calculation.

All calculations need to be shown for full marks.

© WJEC CBAC Ltd.

Question 5

The tweed jacket shown below was designed by Coco Chanel in the 1950s and at that time was considered one of fashion's chicest and most revolutionary pieces. Today it is considered an iconic design.

(a) Define the term 'iconic' and explain why contemporary designers are influenced by such historic designs.

(b) Jackets, like the one pictured, are usually fully lined. Explain in detail why a lining is essential in the manufacture of similar jackets.

Q 5	Science	Maths		**AO3**		**AO4**					**Total**
				2a	2b	1a	1b	1c			
5 (a)						2	3				5

Candidates should demonstrate knowledge and understanding of technical principles and awarded up to 5 marks.

No response or an inappropriate response – 0 mark

Responses should be based on:

Stylish piece that remain timeless [1] and a steadfast/staple piece of clothing whatever a person's age or general approach to fashion [1]; timelessly elegant meaning that it has simply never fallen out of style[1]; timeless pieces that are reinvented [1]
This type of jacket was intended to ease women from the constraints of the wasp-waisted silhouette of the Fifties but still maintain popularity today as they are easy to wear by anyone [1] can be adapted to each women's personal flair [1]
Reinterpreted and reinvented by designers who are aware that their product is likely to be successful provided they remain true to the original style concept [1] historical influence is used as a source of inspiration but with the inclusion of a modern twist eg new fabrics [1]
Credit other appropriate responses.

© WJEC CBAC Ltd.

5 (b)							5				5

Candidates should demonstrate knowledge and understanding of technical principles and awarded up to 5 marks.
No response or an inappropriate response – 0 mark

Responses should be based on:
Linings conceal all the inner seams and construction details related to the product [1]
Linings support the wear and tear/durability of a product [1]
Add a layer of insulation [1]
Adds to the comfort factor as some outer materials do not feel comfortable next to the skin [1] easier to put on and take off as linings tend to be silkier and smooth [1]
Gives a better finish to edges such as hems [1] no visible stitches seen externally [1]; some fabrics are too bulky for a stitched hem/edge [1]
The drape/fit of a garment can be improved with the inclusion of a lining [1] as it adds structure to the product [1]
Linings can make a garment look more expensive/ adds a luxurious look thus increasing appeal [1]
A lining in a contrast material can add to the aesthetic appeal of the jacket [1]

Credit other appropriate responses.

© WJEC CBAC Ltd.

Question 6

Textile fabrics have traditionally been embellished using different types of embroidery, appliqué and cutwork like the example shown below.

Explain why the use of laser cutters is increasingly becoming the preferred method of embellishment for many designers.

Q 6	Science	Maths		AO3		AO4					Total
								2a	2b	2c	
									5		5

Candidates should demonstrate understanding of design and make principles and awarded up to 5 marks.

No response or an inappropriate response – 0 mark

Responses should be based on:
Laser cutters can be programmed to cut far more intricate designs [1]
Laser cutters can also engrave fabrics – cannot do this by any other means [1]
It is less time consuming to cut on a laser cutter than by hand [1]
Cut with a scissors edges can fray, edges are sealed on the laser cutter [1] edges on hand cut work have to be finished by stitching [1] more in cost and time [1]
Repetition of identical designs [1] with consistent quality unlike hand work [1]

Credit any other appropriate response.

© WJEC CBAC Ltd.

Question 7

Consumers have a right to expect that the fashion and textile products they purchase fully function, are fit for purpose and meet legal requirements.

(a) Analyse the purpose of quality assurance in the manufacture of fashion and textile products in order to meet consumer needs and expectations.

(b) With reference to specific examples, evaluate the importance of quality control in the manufacture of a school shirt like the one shown below.

Q 7	Science	Maths		**AO3**		**AO4**					**Total**
				2a	2b	1b	1c	2a	2b	2c	
7 (a)				4						2	6

Candidates should provide evidence of either deconstructing information, find connections and/or logical chains of reasoning and **apply** it appropriately to design and make principles to be awarded up to 6 marks.
Responses should be based on:

- Quality assurance (QA) is a system of checks designed to ensure that products are free of faults – a continuous set of processes monitoring the process of production.
- The final product quality is assured in terms of fibres, yarns, fabric construction, colour fastness, durability surface design, garment construction, and final finished item.
- QA is the way the production is managed to make sure the required specification is met.
- QA focuses on preventing production defects before production starts.
- QA controls the required quantity – a means of managing the quality, the responsibility of all concerned.
- A quality assurance system involves regular quality control inspections that test and monitor the quality, accuracy and fitness for purpose of the product, from the design stage through to manufacture. This includes testing machinery, processes etc prior to production. Strict procedures are laid down and in place for each stage and must be adhered to.
- QA is a question of customer satisfaction. Superior quality increases the value of a product or service, builds up good reputation for the textile exporter and establishes brand name, which in turn results into high sales, foreign exchange for the country and customer satisfaction.
- The perceived quality of a garment is the result of a number of aspects which together help achieve the desired level of satisfaction for the customer.
- Includes paperwork monitoring standards, tests on fabric etc and labour force.

Credit any other appropriate response

© WJEC CBAC Ltd.

Band	Marks	AO3 2a	Marks	AO4 2c
2	**3-4**	Good analysis of the purpose of QA in manufacture. A sound discussion, which deconstructs information and provides adequate connections and reasoning. Generally well-considered and relevant factors used as a context for the discussion	**2**	Applies a sound knowledge and understanding of design and make principles in the context of QA in manufacturing.
		There is a line of reasoning which is generally coherent, mainly relevant and with some evidence and structure.		
1	**1-2**	Limited analysis of the purpose of QA in manufacture. Little evidence of deconstructing information and limited connections are made. Few factors are identified.	**1**	Applies a basic knowledge and understanding of design and make principles in the context of QA in manufacturing.
		There is limited evidence of relevant examples or structure.		
	0	No response or work that is worthy of a mark.		

© WJEC CBAC Ltd.

Q 7	Science	Maths		AO3		AO4					Total
				2a	2b	1b	1c	2a	2b	2c	
7 (b)	✓				4		2				6

Candidates should show knowledge and understanding, clear evidence of appraisal and/or making judgements and **apply** this to technical principles to be awarded up to 6 marks.

Responses should be based on:

- Quality control checks take place at critical control points (CCPs) in a product's manufacture and is a technical process confirming product quality and standard.
- QC is practiced right from the initial stage of sourcing raw material to the final stage of finished garment for the shirt this would start with sourcing raw materials; incoming raw materials/components checked/tested (various tests) and rejected or passed.
- Processes/machinery would be set up and checked prior to production.
- Detailed checks on all aspects of the product during physical manufacturing: manufacturing process throughout / work in process for example: seam tolerances, stitch tension, colour matches, placement/accuracy of buttons/button holes, pocket placement; collar and cuffs meet product specification; fabric and component quality
- Final visual check of products: finished products must meet product specification both technically and visually.
- QC means of eliminating product defects – products matches product specification; rework parts where possible; reject inferior products where they do not meet required standard.
- The prototype is a mock-up of the product used to trial a design or pattern, see how materials and components behave, try out an assembly process, work out costs and test fitness for purpose in everyday use – part of QC.

Credit any other appropriate response.

© WJEC CBAC Ltd.

Band	Marks	AO3 2b	Marks	AO4 1c
2	**3-4**	Good evaluation of the importance of QC in the manufacture of a school shirt. A sound discussion which appraises and/or makes judgements about QC in manufacturing. Generally well-considered, relevant issues used as a context for the discussion.	**2**	Applies a sound knowledge and understanding of technical principles relating to QC in shirt manufacture.
		There is a line of reasoning which is generally coherent, mainly relevant and with some evidence and structure.		
1	**1-2**	Limited evaluation of the importance of QC in the manufacture of a school shirt. Little evidence of appraising or making judgements about QC in manufacturing.	**1**	Applies a basic knowledge and understanding of technical principles relating to QC in shirt manufacture.
		There is limited evidence of relevant examples or structure.		
	0	No response or work that is worthy of a mark.		

© WJEC CBAC Ltd.

Question 8

Fashion designers such as Stella McCartney have strong moral, social and ethical beliefs that influence their design thinking. They believe high end glamourous fashion is both realistic and achievable without compromising their personal beliefs.

Analyse how fashion designers can remain true to their personal beliefs but still produce high end glamorous fashion.

Q 8	Science	Maths		AO3		AO4					Total
				2a	2b	1b	1c	2a	2b	2c	
	✓			6						3	9

Candidates should provide evidence of either deconstructing information, find connections and/or logical chains of reasoning and **apply** it appropriately to design and make principles to be awarded up to 9 marks.

Responses should be based on the following points:

- The importance of designing and making products that last – better quality and are easily repaired – reduces final impact on disposal.
- Use of sustainable materials – or use recycled materials.
- Durability of materials and finished products.
- Using materials that are easily recycled and reprocessed.
- Use Fair trade suppliers/manufacturers.
- Advertising more effectively about the product's green credentials.
- Products that could be adapted or up-cycled into new.
- Source materials and components, finite resources, locally sourced, closer to location of factory and market place – reduction of carbon footprint.
- Use greener/renewable energy to power factories.
- Use of organically produced materials for example: cotton – no pesticides in production, organic dyes, no bleaching – moral and ethical
- Natural v manmade materials – ethical issues.
- Highly toxic processes in the manufacture of some synthetic materials – avoid the use of such materials.
- No fur or leather – ethical/moral issues.
- Simplify designs, less processes in manufacture – innovative styling ideas.

Candidates need to fully elaborate on and justify all the points they put forward that a designer might consider in order to stay true to their moral, ethical and social beliefs when designing high end fashion.

Accept other examples where candidates put forward links and explain the impact.

© WJEC CBAC Ltd.

Band	Marks	AO3 2a	Marks	AO4 2c
3	5-6	Excellent analysis of the moral, social and ethical beliefs that influence high end designers. A thorough discussion which deconstructs information and demonstrates logical reasoning throughout. Well-considered, relevant wider issues used as a context for the discussion	3	Applies a thorough knowledge and understanding of design and make principles in the context of high end sustainable design. Well-considered, relevant wider issues identified.
		There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.		
2	3-4	Good evaluation of the moral, social and ethical beliefs that influence high end designers. A generally sound discussion which deconstructs information and demonstrates logical reasoning throughout. Generally well-considered, relevant issues used as a context for the discussion.	2	Applies a generally sound knowledge and understanding of design and make principles in the context of high end sustainable design. Generally well-considered, relevant issues identified.
		There is a line of reasoning which is generally coherent, mainly relevant and with some evidence and structure.		
1	1-2	Limited evaluation of the moral, social and ethical beliefs that influence high end designers. Little evidence of logical reasoning about the moral, social and ethical issues.	1	Applies a basic knowledge and understanding of design and make principles in the context of high end sustainable design.
		There is limited evidence of relevant examples or structure.		
	0	No response or work that is worthy of a mark		

© WJEC CBAC Ltd.

Question 9

Fashion and textile products are manufactured using different types of production systems.

Explain what is meant by cell production and describe how it benefits both manufacturer and cell production worker.

Q 9	Science	Maths		AO3		AO4					Total
				2a	2b	1a	1b	1c	2b	2c	
							5		4		9

Candidates should demonstrate knowledge, and apply knowledge and understanding to technical principles, understanding and application of design and make principles to be awarded up to 9 marks based on:
Explanation of cell production and its benefits to both manufacturer and production line worker should be based on the following points:

- Cell production facilitates 'flow' within a production line.
- Cell production is a lean manufacturing method – small teams or groups work in specialised areas away from the main production run.
- Cells might be designed for a specific process, part, or a complete product – once complete these 'parts' feed into the main production run. Examples could be collars, cuffs, pocket details, embroidery, complex electronic/technological parts etc.
- Cells are often used for highly specialised processes which require specialist machinery (see previous point) these processes could be more time consuming which could delay the flow of the main line. A benefit to the manufacturer to keep costs down.
- Because of increased speed in the skill of cell workers, minimal handling of materials, cells can result in great cost and time savings.
- Cells tend to be smaller so the equipment in the cell are placed very near one another to save space and time. The handling of materials can be by hand, conveyor, or robot.
- The main benefits to the manufacturer would be an efficient production line which is cost effective: faults can be identified more easily and rectified without impacting on further production; a skilled workforce improved quality; happier workforce job satisfaction.
- The small cell structure improves group cohesiveness and scales the manufacturing process down to a more manageable level for the workers.
- Workers can more easily see problems or possible improvements within their own cells and tend to be more self-motivated to propose changes.
- Improvements that are instigated by the workers themselves cause less need for management, so over time overhead costs can be reduced.
- The workers often are able to rotate between tasks within their cell, which offers variety in their work which can further increase efficiency because work monotony has been linked to absenteeism and reduced production quality.

Credit any other appropriate response.

© WJEC CBAC Ltd.

Band	Marks	AO4 1b and 1c	Marks	AO4 2b and 2c
3	**4-5**	Demonstrates and applies thorough knowledge and understanding of technical principles in the context of cell production and associated benefits to both worker and manufacturer. Well-considered, relevant issues identified and used to support the discussion.	**3-4**	Demonstrates and applies a thorough knowledge and understanding of design and making principles to illustrate, with well-considered, relevant examples of how cell production is beneficial within manufacturing systems.
		There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.		
2	**2-3**	Demonstrates and applies a generally sound knowledge and understanding of technical principles in the context of cell production and associated benefits to both worker and manufacturer. Generally well-considered, relevant issues identified.	**2**	Demonstrates and applies a generally sound knowledge and understanding of designing and making principles to illustrate the benefits of cell production, with generally well considered examples provided.
		There is a line of reasoning which is generally coherent, mainly relevant and with some evidence and structure.		
1	**1**	Demonstrates and applies a basic understanding of technical principles in the context of cell production and associated benefits to both worker and manufacturer. Well-considered, relevant issues identified and used to support the discussion.	**1**	Demonstrates and applies a basic knowledge and understanding of designing and making principles in the context of cell production. Few examples are provided.
		There is limited evidence of relevant examples or structure.		
	0	No response or work that is worthy of a mark.		

© WJEC CBAC Ltd.

Question 10

Micro and Nano Technology has had a major impact on the fashion and textile industry with the introduction of innovative new products that include wearable electronics.

With reference to named examples, evaluate how technology-push and market-pull have influenced the development of products that include wearable electronics.

Q 10	Science	Maths		AO3		AO4					Total
				2a	2b	1a	1b	1c	2b	2c	
	✓				6			6			12

Candidates should show knowledge and understanding of wider issues, with clear evidence of appraisal and/or making judgements **and** apply this to technical principles to be awarded up to 12 marks based on:

- Knowledge of wearable technology – For example: heart rate monitors; GPS tracking systems; iPods; mobile phones; computer keyboards; health monitors; blood pressure monitors; physical activity (sports); heating elements.
- For each named example, responses must demonstrate knowledge of how the named device interacts with the user. For example: shirts of rugby professionals include a heart rate monitor that sends information back to the coaches whilst the player is on the field of play; depending on information relayed back, the coach can either replace the player or keep him in play.
- Market pull refers to the requirements of the market place 'pulling' companies to produce what the customer wants - consumer demand.
- Market pull – demand for newer interactive gadgets, ease of use, wearable; products with improved function, performance and appeal.
- Market pull – lifestyle choices, healthy living – sports/health and well-being related products.
- The development and emergence of new technologies leads to new products being 'pushed' into the market place.
- New technology opens up endless opportunities for innovative new products.
- Micro or Nano technology makes wearable electronics possible.
- Technology – linking of several devices wirelessly/ ease of use.
- Technology push - improving the functionality of a garment by embedding technologies such as electronics and computing into the clothing.
- Innovation approaches such as technology push and market pull help address the user needs leading to innovative products of wearable technology that try to analyse and transform information from the environment to assist the user. For example, smart clothing can create renewable and wearable energy sources from solar power or kinetic energy of the wearer.
- Another example: Ralph Lauren Tech Polo has focused on technology push to give a high fashion makeover to the sportswear industry, the Polo Tech shirt, aimed at athletes is designed to help improve general wellness and increase personal fitness of the user.

Accept other viable appropriate suggestions.

© WJEC CBAC Ltd.

Band	Marks	AO3 2b	Marks	AO4 1c
3	5-6	Excellent evaluation of the wider issues relating to wearable technology. A thorough discussion, which appraises and/or makes judgements about market pull and technology push. Well considered, relevant wider issues used as a context for the discussion.	5-6	Applies a thorough knowledge and understanding of technical principles to the context of wearable technology. Well considered, relevant wider issues identified.
		There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.		
2	3-4	Good evaluation of the wider issues relating to wearable technology. A generally sound discussion, which appraises and/or makes judgements about market pull and technology push. Generally well-considered, relevant issues used as a context for the discussion.	3-4	Applies a generally sound knowledge and understanding of technical principles in the context of wearable technology. Generally well considered, relevant issues identified.
		There is a line of reasoning which is generally coherent, mainly relevant and with some evidence and structure.		
1	1-2	Limited evaluation of the wider issues relating to wearable technology. Little evidence of appraising or making judgements about market pull technology push. Few issues are identified.	1-2	Applies a basic knowledge and understanding of technical principles in the context of wearable technology.
		There is limited evidence of relevant examples or structure.		
	0	No response or work that is worthy of a mark		

© WJEC CBAC Ltd.