

GCE

Design and Technology

H405/02: Problem solving in Fashion and Textiles

Advanced GCE

2021 Mark Scheme (DRAFT)

This is a DRAFT mark scheme. It has not been used for marking as this paper did not receive any entries in the series it was scheduled for. It is therefore possible that not all valid approaches to a question may be captured in this version. You should give credit to such responses when marking learner's work.

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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1. Annotations

Annotation	Meaning
	Blank Page – this annotation must be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response.
	Tick
	Cross
	Confused (replaces the question mark)
	Benefit of doubt
	AO1 – Knowledge and understanding
	AO2 – Apply knowledge and understanding
	AO3 - Analyse
	AO4 - Evaluation
	Omission
	Not answered question
	Noted but no credit given
	Too vague
	Own figure rule
	Repetition

2. Subject Specific Marking Instructions

INTRODUCTION

Your first task as an Examiner is to become thoroughly familiar with the material on which the examination depends. This material includes:

- the specification, especially the assessment objectives
- the question paper
- the mark scheme.

You should ensure that you have copies of these materials.

You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet Instructions for Examiners. If you are examining for the first time, please read carefully Appendix 5 Introduction to Script Marking: Notes for New Examiners.

Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

Question		Answer	Mark	Guidance	
				Content	Levels of Response
1		<p>Indicative content:</p> <p>Primary User:</p> <ul style="list-style-type: none"> • Protection against burns; this relate to the design of the jacket or in the fabric used. Long sleeves help protect arms and high neck protects. • Protection against hot spills; the jacket has to be easy to remove before hot spills absorb through the fabric onto the skin. • Fabric choice - Heavy weight cotton provides protection and insulates against the heat whilst being breathable. • The type of fabric blend is a crucial consideration; poly cotton is easy to care for and polyester dries fast, whilst cotton is breathable and cool. • Dedicated air ventilation or moisture wicking panels. These are essential for allowing your skin to breathe easily. • Protection can be provided by using fire resistant fabric. • Protection – provided in the chest area due to the double-breasted element in the design. • Keep cool; the jacket shouldn't be too tight; the fabric should be breathable or have breathable panels • The colour white is the most reflective colour and as such helps repel the heat keeping the chef's cooler than if they were wearing a dark colour. • Maintenance – the white fabric can be bleached to remove really stubborn stains that happen frequently in kitchens. • Presentation – the double-breasted feature on chefs' jackets allows the front panel to be swapped over to the one behind if it gets stained. • Presentation – the jacket gives the wearer an air of professionalism and they can be distinguished from other employees in the kitchen. • Comfort – this can be through the design, fit and fabric selection. • Ease of movement – the jacket should allow for ease of movement. • The jacket shouldn't have too many seams as many chefs wear nothing under the jacket and seams on the inside could cause irritation with the heat in the kitchen. • Quality – the chef will require more than one jacket usually but they are used for long periods and washed frequently so the primary user will want a high-quality fabric and finish to ensure longevity. 	8	<p>Chefs as the main primary user. Other stakeholders identified – manufacturers, designers, marketing, transportation – all of which can be linked to different stages in production and would link to the design requirements.</p> <p>Candidates may extract information from the Resource Booklet. Any such lifted information can be used in support of the critical evaluation but no marks should be awarded simply for duplicating text.</p> <p>There is no analysis or evaluation in Level 1.</p> <p>Only 1 Des. Req. but detailed – top of Level 2.</p> <p>Indirect ref to stakeholder group – Max mark in level 2.</p> <p>Candidates can draw on practical experience of iterative designing to support their response to this question.</p>	<p>Level 4 (7-8 marks) A comprehensive critical examination of design requirements in relation to both the user and stakeholder groups. Comprehensive understanding of a wide range (at least 3) of different design requirements that would have been considered when designing the chef jacket. Analysis of design requirements is consistently and appropriately aligned with needs of target group. Information in the RB is used effectively to fully exemplify the points being made. Well-constructed narrative in relation to question with clear and supported evaluative comments.</p> <p>Level 3 [5-6 marks] A good critical examination of design requirements in relation to both the stakeholder and user groups. Good understanding of a range (at least 2) of different design requirements that would have been considered when designing the chef jacket. Analysis of design requirements is appropriately aligned with needs of target group but one or two opportunities are missed to make connections. Information in the RB is used for the most part effectively to exemplify points being made although one or two opportunities are missed. Well-constructed narrative in relation to question although one or two opportunities missed to</p>

		<ul style="list-style-type: none"> • Function and durability - retain its shape, colour and handle industrial laundering well. • Fit for specific working environments - Lightweight if working in extremely hot, humid conditions. For a colder working environment a thicker fabric is going to be more suitable. • Component choice - The fastening choice needs to be secure. This could include: <ol style="list-style-type: none"> 1. Waterproof plastic studs, 2. Hand-rolled cloth buttons, 3. Metal poppers are highly effective for quickly changing in and out of the jacket. • Design aesthetics – <ol style="list-style-type: none"> 1. A high-neck collar on a chef jacket is more traditional but a low neck collar is more comfortable. 2. Apron clasp stitched to the back of the collar. 3. Pocket detail for holding pens and thermometers. 4. Single breasted or double breasted; double for presentation and protection, single for a cooler jacket. 5. Sleeve length; long for more protection; short for a cooler feel. • Cost – this needs to be affordable for the user but as the jacket needs to have longevity a low cost jacket may reflect the quality and therefore not function as required. • Any other suitable response. <p>Wider Stakeholder Requirements:</p> <ul style="list-style-type: none"> • Fabric manufacturers - need to ensure fabric is high quality to satisfy buyers requirements, • Manufacturers – the jackets need to be high quality or they would lose sales and overall affect the business. • Designers – The design of the jacket needs to be a success which ultimately reflects on the designer. • Marketing and advertisers – Successful marketing strategies for the jacket will increase sales. • Transportation – the raw materials and final products need to be reliable and cost effective otherwise it could result in loss of sales. • Government as it receives taxes from the company; more sales means more tax dividends. • Any other suitable response. 			<p>develop response. Evaluative comments are clear but not always supported.</p> <p>Level 2 [3-4 marks] A sufficient critical examination of design requirements in relation to the main user group. There will be basic reference to other stakeholder requirements. Sufficient understanding of design requirements (at least 1) that would have been taken into account when designing the chef jacket. Analysis of design requirements is reasonably aligned with needs of target group but there are significant opportunities missed to make connections. Information in the RB is used to exemplify some points being made although much more could have been done to exploit the stimulus material available. Reasonable narrative in relation to the question although response at times lacks depth and cohesion. Evaluative comments lack clarity and are unsupported.</p> <p>Level 1 [1-2 marks] A limited examination of design requirements in relation to the user group. There will be no reference to stakeholder design requirements. Limited knowledge and next to no understanding of design requirements that would have been considered when designing the chef jacket. No analysis of design requirements resulting in only weak alignment with needs of target group. Use of information from the RB is</p>
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						<p>used in a simplistic way and adds limited value to the points being made. Limited narrative in relation to question. Response is basic and unstructured with no evaluative comments.</p> <p>0 marks = No response or no response worthy of credit.</p>
Question	Answer			Mark	Guidance	
					Content	Levels of Response

2*		<p>Indicative content:</p> <p>Extreme Working Temperatures:</p> <ul style="list-style-type: none"> Both coats are made from 100% cotton which is natural and absorbs moisture which allows the skin to 'breathe' in hot temperatures. However, it is slow drying and therefore sweat patches would look unsightly on the jackets. Ladies chef coat is cotton denim chambray which is a lightweight plain weave fabric which will be more breathable due to the structure of the fabric than the twill weave on the unisex jacket. Twill weave fabric has a tighter structure and overall denser finish. This will make it more suitable for very high working temperatures. The stretch back and side panels on the ladies' jacket have holes in the structure which will make the jacket more breathable in hot temperatures. Whereas the unisex jacket is constructed with the same twill fabric throughout. The double-breasted design of the unisex jacket will be hotter due to the 4 layers of fabric whereas the ladies single breasted design will only have 1 layer of fabric. The short sleeve style of the ladies' jacket will be cooler than the long sleeve version. The zips on the unisex jacket could be made from aluminium and as such have high thermal conductivity which means the zipper teeth could get extremely hot when cooking near a flame. But the zippers are protected by the fabric and slightly set back from the front edge. The poppers on the ladies' jacket are usually made from nickel which is also conducts heat. The side seam splits on the ladies jacket with allow for greater ventilation in hot temperatures. Any other suitable response. <p>Movement and Comfort:</p> <ul style="list-style-type: none"> 100% cotton used for both jackets will make the jacket more breathable and therefore keep the user cooler during work. Cotton fibres resist static and as such will mean both jackets won't 'cling' to the body. The plain chambray weave will be softer to the skin as it is a 'flatter' weave than the twill and therefore will be more comfortable. The ladies jacket will be lighter in weight and therefore more comfortable in very hot temperatures. The stretch side and back panels on the ladies' jacket will make it more comfortable to move in which is crucial for a chef. 	12	<p>All responses should be in relation to the existing product information provided on pages 3 and 4 in the RB.</p> <p>Candidates may extract information from the Resource Booklet. Any such lifted information can be used in support of the critical evaluation but no marks should be awarded simply for duplicating text.</p> <p>There is no analysis or evaluation in Level 1.</p>	<p>Level 4 [10-12 marks] A comprehensive examination of the suitability of the chef jackets in meeting the primary user feedback. Comprehensive understanding of the suitability of the existing products in relation to feedback received. Product analysis is consistently and appropriately aligned with feedback. Information in RB is used effectively to fully exemplify the points being made. Well-constructed response in relation to question with a clear and developed narrative.</p> <p><i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i></p> <p>Level 3 [7-9 marks] A good examination of the suitability of the chef's jackets in meeting the primary user feedback. Good level of understanding of the suitability of the existing products in relation to feedback received. Product analysis is appropriately aligned with feedback but one or two opportunities are missed to make connections. Information in RB is used for the most part effectively to exemplify points being made although one or two opportunities are missed. Well-constructed response in relation to question although one or two opportunities missed to develop narrative.</p> <p><i>There is a line of reasoning presented with some structure.</i></p>
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		<ul style="list-style-type: none"> • The short sleeve will offer more comfort due to being cooler for the user and also allowing more movement, but the sleeves on the unisex jacket are loose so will still be comfortable. • The turn back cuffs on the unisex jacket could be an irritation when working as they could keep rolling down and getting in the way. • The double-breasted jacket has a looser fit and will be more comfortable to move in as the ladies jacket specifies it is a slim fit. • The poppers may be uncomfortable on the skin on the reverse but the zips are ‘sandwiched’ between layers of fabric so won’t irritate. • The side splits on the ladies jacket will allow for more movement and stretching when working and not as constrictive as the straight hem on the unisex jacket. • The ladies jacket gives the option of securely attaching the apron neck tie to the back of the neck which prevent it rubbing on the back of the neck. Whereas the unisex jacket user would have to wear an apron over the top and it could move on the neck and cause friction. • The ladies jacket has more pocket options allowing for a range of items to be carried and the pockets are a patch style which means items would be held securely. The pockets on the unisex jacket are angled in the front seams and are more suitable for putting hands in than securing items. • Any other suitable response. <p>Hazards:</p> <ul style="list-style-type: none"> • The twill weave is thicker than the plain weave and as such will give more protection against liquids and spills. • Cotton fabrics tend to ignite easily and burn more rapidly than synthetic fabrics which could be dangerous working near flames. • The stretch mesh side and back panels will not provide protection against hot spills as to allow for breathability the fabric will only be one layer. • The short sleeve does not offer any protection to the arms when cooking near naked flames and hot liquids/food. The long sleeve offers greater protection to the arms but the turn back cuff could catch fire if it rolled down. • The double-breasted feature will offer more protection at the front of the body than the single breasted due to more layers of fabric and therefore insulation. • Any other suitable response. 			<p><i>The information presented is in the most part relevant and supported by some evidence.</i></p> <p>Level 2 [4-6 marks] A sufficient examination of the suitability of the chef’s jackets in meeting the primary user feedback. Sufficient understanding of the suitability of the existing products in relation to feedback received. Product analysis is reasonably aligned with feedback but there are significant opportunities missed to make connections. Information in RB is used to exemplify some points being made although much more could have been done to exploit the stimulus material available. Reasonable response in relation to the question although narrative at times lacks depth and cohesion.</p> <p><i>The information has some relevance and is presented with limited structure. The information is supported by limited evidence.</i></p> <p>Level 1 [1-3 marks] A limited examination of the suitability of the chef’s jackets in meeting the primary user feedback. Limited knowledge and next to no understanding of the suitability of the existing products in relation to feedback received. Isolated statements made in relation to existing products resulting in only weak alignment with feedback. Use of information from the RB is used</p>
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		<p>Presentation:</p> <ul style="list-style-type: none"> • Cotton fabrics have little crease resistance and therefore the jacket could look creased and untidy during use. However, the twill weave is slightly more crease resistant than the chambray due to the thickness of the fabric. • Twill weave fabric has slightly raised diagonal lines and will 'hide' stains more than the smooth plain weave of the chambray. • The cotton twill weave of the unisex jacket will give a 'crisper' finish than the chambray fabric in the ladies' jacket. The fabric will be firmer due to the weight and weave. • Pilling of fabrics tends to occur with all fabrics but cotton 'pills' fall off in the wash which means the fabric maintains its smooth surface. • The side and back panels on the ladies' jacket will not crease as it is designed to return to shape. • The longer sleeve gives a smarter more professional appearance than the short sleeve. The short sleeve looks more casual. • Both jackets look smart but the double-breasted version is likely to show cooking stains more. • The unisex double-breasted front is synonymous with the traditional chef jacket and as such gives a professional look in comparison to the more modern single breasted version. • Any other suitable response. <p>Maintenance:</p> <ul style="list-style-type: none"> • Both fabrics are made from 100% cotton which has a moderate tensile strength and therefore will be durable. However, the strength is also effected by moisture. Wet cotton is much stronger than dry and in a hot working environment this is beneficial for both jackets as the wearer will sweat a lot. • Cotton has no elasticity and therefore both jackets will keep their shape after use and frequent washing. However, due to the unisex jacket being a twill weave and therefore stronger it is likely to maintain its shape longer. • The twill weave will be more durable than the plain weave and as such will be less likely to tear or have weak areas. • Cotton can withstand high temperatures in the wash which is important to maintain the look of the jacket. The ladies jacket however, is black and in high temperatures or frequent washes the colour could fade. The unisex jacket has to be washed in cold water. This could compromise the look of the jacket due to not being able to remove stubborn stains. Cotton can withstand bleach to remove stubborn stains but it could go yellow with frequent use. 			<p>in a simplistic way and adds limited value to the points being made. Limited response in relation to question. Narrative is basic and unstructured.</p> <p><i>The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.</i></p> <p>0 marks = No response or no response worthy of credit.</p>
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		<ul style="list-style-type: none"> • The side mesh panels on the ladies' jacket are likely to be made from polyester. The fabric will not withstand the high iron temperatures that the twill fabric of the unisex jacket which will make it more complex to maintain. • The double breasted feature will be more difficult to iron and keep presentable than the single breasted option. • The double breasted jacket has a double zipper fastening which means the stress is distributed between both zips when fastened in comparison to the poppers that can weaken with repeated use or weaken the fabric with frequent pulling the poppers apart. • The splits on the ladies jacket could be a weak point with continual use and may require stitching to reinforce. • The back neck grommet on the unisex jacket allows for the jacket to be hung up without putting strain on the fabric whereas the ladies jacket may just be hung on the collar which could cause a weak point in the fabric. • The cost of the unisex jacket is considerably more than the ladies which could be due to higher quality fabrics, components and construction techniques. This means the jacket is likely to have greater longevity and be more durable. • Any other suitable response. 				
					Content	Levels of Response
3		Indicative content:	16	Candidates can draw on practical experience of iterative	Level 4 [13-16 marks]	

	<p>Pattern templates and markings:</p> <ul style="list-style-type: none"> The pattern templates would be digitised using computer software and then the most economical pattern lay would be produced. The fabric would be prepared for cutting using a fabric spreader to evenly lay layers of the fabric. The fabric would be cut out using a computer controlled knife cutting machine or manually cut out using a band knife, laser cutting or ultrasonic fabric cutter. The notches would be transferred using a cold or hot notcher. The position of the popper fasteners would be marked using a drill marker. Any other suitable response. <p>Construction techniques:</p> <ul style="list-style-type: none"> The pocket sections are sewn along the top edge and turned through to the right side; pressed in to place, The right side top edge of the pocket is topstitched. The 2 main 'apron' section would be stitched around the edges wrong sides together to keep them secure before attaching the pocket sections. The poppers would be attached to the pocket sections before attaching pockets to the apron section. This would be done using snap fastener press and follow the pattern markings for the correct position. The pockets would be placed on the top back and bottom front of the main apron piece and then machine stitched on a flat bed machine around all the edges, (see diagram). The edges would be finished with bias binding using a bias binding foot attachment. This allows for the binding to be attached in one operation. The final end would be tucked under before sewing over. The long edge with the indent would need to be snipped to allow the binding to sit flat. Any other suitable response. <p>Tools and Equipment: Many of the tools and equipment have been included in the content above. This highlights that the examiner must identify these sources within the text presented. Types of relevant tools and equipment include:</p> <ul style="list-style-type: none"> Computer software to digitise the pattern templates Fabric spreader to evenly lay out the fabric prior to cutting 	<p>designing and product analysis to support response.</p> <p>The question assesses applied knowledge and technical principles to the existing design. Redesigning the existing solution will not be rewarded.</p> <p>Candidates are expected to demonstrate understanding of the processes through annotated sketches and/or notes. There may be variations to the process as indicated but to get into L3 candidates must show a clear understanding of the end to end process.</p>	<p>A comprehensive demonstration of the manufacturing and assembly process for the reversible bib. Comprehensive understanding of the four elements specified in question. Information in RB is used effectively to fully exemplify the points being made. Sketches will be clear and supported with relevant notes. The process will be end to end and clear in the way it is explained.</p> <p>Level 3 [9-12 marks] A good demonstration of the manufacturing and assembly process for the reversible bib. Good understanding of the four elements specified in question. Information in RB is used for the most part effectively to exemplify points being made although one or two opportunities are missed. Sketches will for the most part be clear and supported with relevant notes. The process will be end to end and for the most part be clear in the way it is explained.</p> <p>Level 2 [5-8 marks] A sufficient demonstration of the manufacturing and assembly process for the reversible bib. Sufficient understanding of the four elements specified in question. Information in RB is used to exemplify some points being made although much more could have been done to exploit the stimulus material available. Sketches will be adequate and supported with notes. The process may not</p>
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		<ul style="list-style-type: none"> • Computer controlled knife cutting machine/band knife/laser cutting machine or ultrasonic fabric cutter for cutting out the fabric (also helps to prevent fraying of fabric) • A hot notcher to mark and temporarily fuse together loosely woven fabrics so that they can have a precise alignment to ensure the accuracy of the sewing. • A cloth drill marker to mark the position of the poppers. • A computer controlled sewing machine to sew the apron together and stitch the poppers on the apron bib and the jacket • An overlocker to overstretch the edges of joined fabrics to prevent fraying • An iron/press to press the fabric during and after completion. <p>Finishing:</p> <ul style="list-style-type: none"> • The final product would be quality checked to ensure the finished product meets the technical specification. • These checks could include\): <ul style="list-style-type: none"> • Ensuring the product size is within the set tolerance measurements, • Checking that the stitching is even and correct tension on both sides, • Making sure there are no loose threads, • Checking the popper fasteners are in the correct position. • Ensuring the width of the binding is even all the way around the edges. • The final product would be pressed using a steam press table. • Any other suitable response. 			<p>necessarily be end to end with some knowledge gaps evident.</p> <p>Level 1 [1-4 marks] A limited demonstration of the manufacturing and assembly process for the reversible bib. Limited knowledge and next to no understanding of the four elements specified in question. Use of information from the RB is used in a simplistic way and adds limited value to the points being made. Sketches if used will be unclear with only basic notes to accompany them. The end to end process may not exist and if anything is basic in nature.</p> <p>0 marks = No response or no response worthy of credit.</p>
				Content	Levels of Response

4*		<p>Indicative content:</p> <p>Materials and components:</p> <ul style="list-style-type: none"> • The apron and jacket could be made from organic cotton – plants are grown without the use of toxic pesticides and fertilisers. • Regular cotton growing is a very water intensive process. Organic cotton growing relies largely on rain instead of being irrigated. • Organic cotton production sustains the health of soils, ecosystems and people by using natural processes rather than artificial inputs. • Recycled or upcycled cotton is using post-industrial and post-consumer cotton waste. Recycled cotton can be a more sustainable alternative to both conventional and organic cotton. It has the potential to help reduce water and energy consumption, as well as help keep cotton clothes out of landfill. • Organic hemp could be used. Hemp is grown all around the world and requires very little water, no pesticides, and naturally fertilises the soil it grows in. Hemp also keeps you cool so would be particularly suitable for the jacket. • Heavy weight linen could be used for the apron but really not suitable for the jacket as it creases. Linen is derived from the flax plant. Linen requires minimal water and pesticides, and grows in poor quality soil. Also, every part of the plant is used, so nothing is wasted. Linen is strong and when untreated or not dyed, is fully biodegradable. It is also light and can withstand high temperatures, absorbing moisture without holding bacteria. • Viscose could be used as long as it was sourced from sustainable managed forests. • Recycled polyester could be used as a mix with sustainable cotton. This could be from recycled plastic bottles. • Encouraging circular economy to eliminate waste and products in landfill. • Fabric source – to eliminate carbon footprint fabrics should be manufactured as close to clothing production to reduce CO² emissions. • Vegetarian leather could be used for the shoes. In regular leather production land use and greenhouse gas emissions associated with animal rearing have a big impact on the environment. Other important impacts are energy use and water requirements of tanneries as well as water pollution resulting from chemicals used in the tanning process. Recycled polyester can be manufactured to resemble leather. 	12	<p>All responses should be in relation to the concept ideas provided on page 6 of the Resource Booklet.</p> <p>Candidates may extract information from the Resource Booklet. Any such lifted information can be used in support of the critical evaluation but no marks should be awarded simply for duplicating text.</p> <p>There is no analysis or evaluation in Level 1.</p>	<p>Level 4 [10-12 marks] A comprehensive critical examination of concept ideas. Comprehensive understanding of how sustainability can be achieved in materials/components and manufacturing processes. Analysis of possible solutions is consistently and appropriately aligned with concept ideas. Well-constructed narrative in relation to question with clear and supported evaluative comments.</p> <p><i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i></p> <p>Level 3 [7-9 marks] A good critical examination of concept ideas. A good understanding of how sustainability can be achieved in materials/components and manufacturing processes. Analysis of possible solutions is appropriately aligned with concept ideas but one or two opportunities are missed to make connections. Well-constructed narrative in relation to question although one or two opportunities missed to develop response. Evaluative comments are clear but not always supported.</p> <p><i>There is a line of reasoning presented with some structure. The information presented is in the most part relevant and supported by some evidence.</i></p>
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		<ul style="list-style-type: none"> • Mushroom, apple and pineapple 'leathers' are a sustainable alternative. • Natural or recycled rubber as an alternative for the shoes soles. • The metal rivets on the apron could be made from brass or steel; both of which are derived from mining and are alloys. The process is not sustainable; an alternative would be to use recycled metals. • Alternative to glue for attaching the soles of the shoes to the top part could be using stitching. • Vegetable tanned leathers use less chemicals for the shoes. • Buttons on the chef jacket could be from recycled plastics or from natural wood. • Any other suitable response. <p>Manufacturing techniques:</p> <ul style="list-style-type: none"> • The process of how a raw fibre is turned into a textile, the impact of preparation and dyeing of the fibres, energy use in production and preparation and the material's total carbon footprint, transportation between production plants, shipping to retail and consumer, • High quality manufacture will ensure garment longevity and therefore need to be replaced less and less contribution to landfill. • The company can provide a repair package or service to ensure the product isn't replaced and thrown away. • Reduction of carbon emissions in the manufacturing and transportation process. • Zero waste could be used in pattern production for the apron and jacket where the pieces are tessellated to minimise waste. • Alternative dyeing methods to reduce chemicals and ensure 100% of the dyes are used and not disposed of. • Minimal seams in the design means less manufacture techniques and processes. • Dfd – design for disassembly which means all the pieces can be easily taken apart and reused at the end of the products life. • Using energy saving technology in the manufacturing process; renewable sources – solar, geothermal and wind power for example. • Use lean or additive manufacturing methods. • Any other suitable response. 			<p>Level 2 [4-6 marks] A sufficient critical examination of concept ideas. Sufficient understanding of how sustainability can be achieved in materials/components and manufacturing processes. Analysis of possible solutions is reasonably aligned but there are significant opportunities missed to make connections. Reasonable narrative in relation to the question although response at times lacks depth and cohesion. Evaluative comments lack clarity and are unsupported.</p> <p><i>The information has some relevance and is presented with limited structure. The information is supported by limited evidence.</i></p> <p>Level 1 [1-3 marks] A limited examination of concept ideas. Limited knowledge and next to no understanding of how sustainability can be achieved in materials/components or manufacturing processes. No analysis of possible solutions resulting in only weak alignment with concept ideas. Limited narrative in relation to Question. Response is basic and unstructured with no evaluative comments.</p> <p><i>The information is basic and communicated in an unstructured way. The information is supported by</i></p>
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						<p><i>limited evidence and the relationship to the evidence may not be clear.</i></p> <p>0 marks = No response or no response worthy of credit.</p>
						Guidance

5		<p>Area of vinyl = $45 \times 45 = 2025 \text{ cm}^2$ [1]</p> <p>Calculation of total space across one row = $1.5 \times 5 = 7.5 \text{ cm}$ [1]</p> <p>Diameter of one logo = $[45 - 7.5^*] / 4 = 9.375 \text{ cm}$ [1]</p> <p>Radius of one logo = $9.375^* / 2 = 4.6875 \text{ cm}$</p> <p>Area of one logo = $\pi r^2 = 3.142 \times [4.6875^*]^2 = 69.0380859375 \text{ cm}^2$ [1]</p> <p>Total area for 16 logos = $69.0380856375^* \times 16 = 1104.609375 \text{ cm}^2$ [1]</p> <p>$2025^* - 1104.609375^* = 920.390625 \text{ cm}^2 = 920.39 \text{ cm}^2$ [1]</p> <p>Candidates may have rounded up answer throughout the calculations. Do not penalise as long as the final answer is correct.</p>	6	<p>1 mark for calculating the area of the vinyl.</p> <p>1 mark for calculating the 1.5cm spacing across a row of logos.</p> <p>1 mark for calculating the diameter of 1 logo.</p> <p>1 mark for applying πr^2</p> <p>1 mark for calculating total area of all 16 logos.</p> <p>1 mark for calculating wastage.</p> <p>If correct answer is given without working out shown award full marks.</p> <p>Where an incorrect answer is given working out should be used to credit appropriate marks.</p> <p>*Allow error carried forward (ECF) where correct working out is shown.</p>	
				Content	Levels of Response

<p>6</p>		<p>Indicative content:</p> <ul style="list-style-type: none"> • Easy to care for <ul style="list-style-type: none"> • The fabric used must be able to stand regular washing and be quick drying. Examples of such fabrics are: <ul style="list-style-type: none"> ○ Cotton ○ Cotton blends • Have a printed design <ul style="list-style-type: none"> • Children like designs on their clothes and the following designs could be considered: <ul style="list-style-type: none"> ○ images of chefs and/or chef hats ○ images of cooking utensils • The images must be brightly coloured and easy to see. Children like bright colours. <p>Fabric printing:</p> <ul style="list-style-type: none"> • The most suitable method would be flat bed screen printing. This process involves: • Fabric is stretched over the screen; only one screen would be required as there is only one colour in the design. • Stencil is created that is a 'negative' of the finished print. Where the holes are will be where the dye won't penetrate. • Light or photo reactive emulsion is put across the whole screen fabric. • The stencil is then placed on top of the fabric and exposed to UV light. The exposed areas of the screen harden and the unexposed areas are then rinsed away with water. • The screen is then fixed to the automated flatbed screen printing machine. • In automated screen printing the white base fabric is fed through from the main roll on a conveyor bed covered with a rubber blanket to prevent movement or slippage. • Once the fabric is in the correct position the screen is lowered. • An automated squeegee moves the print paste evenly across the screen pushing the paste through the exposed areas. • The screen is then raised, the 'blanket' conveyor moves the fabric to the next correct position and repeats the whole process to create a fabric repeated design. <p>Another suitable but more expensive printing process would be roller printing:</p>	<p>16</p>	<p>Candidates can draw on practical experience of iterative designing and product analysis to support response.</p> <p>The question assesses applied knowledge and technical principles to the existing design. Redesigning the existing solution will not be rewarded.</p> <p>Candidates are expected to demonstrate understanding of the processes through annotated sketches and/or notes. There may be variations to the process as indicated but to get into L3 candidates must show a clear understanding of the end to end process.</p>	<p>Level 4 [13-16 marks] A comprehensive demonstration of the manufacturing and assembly process for the jacket. Comprehensive understanding of how the technical specification can be met. Information in RB is used effectively to fully exemplify the points being made. Sketches will be clear and supported with relevant notes. The process will be end to end and clear in the way it is explained.</p> <p>Level 3 [9-12 marks] A good demonstration of the manufacturing and assembly process for the jacket. Good understanding of how the technical specification can be met. Information in RB is used for the most part effectively to exemplify points being made although one or two opportunities are missed. Sketches will for the most part be clear and supported with relevant notes. The process will be end to end and for the most part be clear in the way it is explained.</p> <p>Level 2 [5-8 marks] A sufficient demonstration of the manufacturing and assembly process for the jacket. Sufficient understanding of how the technical specification can be met. Information in RB is used to exemplify some points being made although much more could have been done to exploit the stimulus material available. Sketches will be</p>
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		<ul style="list-style-type: none"> • The design is engraved onto copper rollers; only one roller would be required as there is only black to be printed. • The rollers are mounted against the large main cylinder, around which the fabric travels. • The printing paste is located in a trough. A transfer roller runs through the dye and in contact with the engraved roller. • A blade scraps away all of the paste except for that contained in the engraving. • The pressure of the engraved roller against the fabric causes the design to be transferred <ul style="list-style-type: none"> • Minimum construction stages <ul style="list-style-type: none"> • The design needs to be able to support young children playing and making a mess. Therefore, it is important that the construction of the design is kept as simple as possible without losing the overall concept of the chef's jacket. • The design should consist of an elasticated back strip so that it can fit easily and yet leave some room for growth. This will reduce the requirement for additional construction using darts. • The sections of the jacket should be kept to a minimal so that there are less seams which can wear and split over time with constant washing. • Easy for a child to put on/take off <ul style="list-style-type: none"> • The use of the Velcro fastening would be the most suitable for children of all ages and for the parents. It is easy to fasten and unfasten and there is not a risk of losing buttons or poppers through constant use putting the garment on and taking it off which a) means that they have to be replaced by the parent and b) can create a hazard and very young children may put buttons or poppers in their mouth and choke through swallowing them. • Two patch pockets <ul style="list-style-type: none"> • There must be two patch pockets on the front of the jacket. These can be the made from the same fabric as the main jacket or a contrasting fabric which compliments the printed design and adds more interest. • Construction method: 		<p>adequate and supported with notes. The process may not necessarily be end to end with some knowledge gaps evident.</p> <p>Level 1 [1-4 marks] A limited demonstration of the manufacturing and assembly process for the jacket. Limited knowledge and next to no understanding of how the technical specification can be met. Use of information from the RB is used in a simplistic way and adds limited value to the points being made. Sketches if used will be unclear with only basic notes to accompany them. The end to end process may not exist and if anything is basic in nature.</p> <p>0 marks = No response or no response worthy of credit.</p>
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			<ul style="list-style-type: none"> • The facing is stitched along the hem, (pivoting at the corners), front and around the neck to the shoulder seam. The corners and curved edges are clipped to reduce the bulk. • The facing is turned to the inside and under stitched to keep the facing back and prevent rolling. • The sleeves are stitched along the under-arm seam, right sides together. • The seams are overlocked, • The sleeves are pinned into the armholes with the position dots matching the shoulder seam and under arm seams matching. • The sleeves are machine stitched into place and the raw edges overlocked. • The hem is overlocked and folded towards the inside along the fold line. The hem is machine stitched. • The Velcro is machine stitched onto the reverse side of the front left panel and the right side of the front right panel following the position markings. • The false buttons are machine stitched into place following the position points. • Follow BSI safety guidelines e.g: <ul style="list-style-type: none"> • Neck area: <ul style="list-style-type: none"> ○ There will not be any drawstrings or tabs to fasten around any part of the jacket • Waist area: <ul style="list-style-type: none"> ○ There will not be any drawstring or belt used around the waist of the jacket • Back area: <ul style="list-style-type: none"> ○ Will have a sewn in elasticated back strip. There will not be any drawstrings or adjustable decorative cords emerging from the back or tied at the back. • Sleeves: <ul style="list-style-type: none"> ○ There will not be any drawstrings or decorative cords to fasten the sleeves around the wrist • The buttons, fasteners and labels will all be securely attached and will not detach at less than 70 Newtons (a force of approximately 7kg) to avoid becoming a choking hazard. • Although not a legal requirement it is recommended that the jacket is made from flame retardant material 			
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