
A-LEVEL DESIGN AND TECHNOLOGY (FASHION & TEXTILES

PAPER 1

Mark scheme

Version number 1.0

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

Qu	Part	Marking guidance	Total marks	AO								
1		<table border="1"> <tr> <td>5-6 marks</td> <td>Excellent demonstration of knowledge and understanding in relation to the fibre type and it's use is shown at the top end of this mark band. A detailed answer with good understanding of several points and clear explanation of these at the lower end of the mark band.</td> </tr> <tr> <td>3-4 marks</td> <td>A relevant answer showing good knowledge and understanding, at the lower end of this mark band the answer is good but lacks details or explanation in places.</td> </tr> <tr> <td>1-2 marks</td> <td>A basic answer given with limited knowledge and understanding, at the lower end of the mark band little or no explanation is given.</td> </tr> <tr> <td>0 mark</td> <td>No response worthy of credit.</td> </tr> </table> <p>Indicative content:</p> <ul style="list-style-type: none"> • low absorbency/hydrophobic– repels the rain • smooth surface – rain runs off / allows to be folded up easily • strong – for multiple usage / fabric will be under tension • durable – to resist abrasion when carried. • high lustre – aesthetically pleasing. • high biological resistance to environmental factors • some elasticity- can be pulled taught over the frame <p>Award any other valid responses</p>	5-6 marks	Excellent demonstration of knowledge and understanding in relation to the fibre type and it's use is shown at the top end of this mark band. A detailed answer with good understanding of several points and clear explanation of these at the lower end of the mark band.	3-4 marks	A relevant answer showing good knowledge and understanding, at the lower end of this mark band the answer is good but lacks details or explanation in places.	1-2 marks	A basic answer given with limited knowledge and understanding, at the lower end of the mark band little or no explanation is given.	0 mark	No response worthy of credit.	6 marks	AO4
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3	<p>Indicative content:</p> <p>Advantages of using of digital technology/CAD to create design ideas:</p> <ul style="list-style-type: none"> • A quick method of creating design work using existing templates • Can quickly make modifications to a design such as change of fabric colour, style, length, shape. • Easily emailed to the client for approval • Can use pantone colours • Colour accuracy and vibrancy • Saves on paper and ink costs • Electronic data exchange is preferred as it is a quick method. • Presentation boards can be created digitally <p>Award any other valid responses</p>		
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4	<p>Cost per jean Company A $\text{£}1260/250 = \text{£}5.04$ Cost per jean Company B $\text{£}1350/200 = \text{£}6.75$</p>	1 mark	AO4
	<p>Wastage Company A $\text{£}1260/100 \times 17 = \text{£}214.20$ Wastage Company B $\text{£}1350/8 = \text{£}168.75$</p>	1 mark	
	<p>Most cost effective jean production: Company A as the price per jean is cheaper, even though the wastage is slightly higher.</p>	1 mark	

5	<table border="1" style="width: 100%;"> <tr> <td style="text-align: center; vertical-align: top;">10-12 marks</td> <td> The answer is comprehensive in its evaluation of the environmental issues surrounding the production of fashion products. There are multiple examples given to fully illustrate the impact the production of fashion products have on the environment. The reasoning is valid and shows a specific understanding of environmental issues. The answer evaluates the negatives for the environment that the production of fashion products has associated with it, as well as balancing this with some well thought out and fully viable recommendations for the future. </td> </tr> <tr> <td style="text-align: center; vertical-align: top;">7-9 marks</td> <td> The answer demonstrates a good evaluation of the environmental issues surrounding the production of fashion products. There are several good examples given to illustrate the impact production of fashion products have on the environment. The reasoning is mainly valid and shows a specific understanding of environmental issues. The answer evaluates the negatives for the environment that the production of </td> </tr> </table>	10-12 marks	The answer is comprehensive in its evaluation of the environmental issues surrounding the production of fashion products. There are multiple examples given to fully illustrate the impact the production of fashion products have on the environment. The reasoning is valid and shows a specific understanding of environmental issues. The answer evaluates the negatives for the environment that the production of fashion products has associated with it, as well as balancing this with some well thought out and fully viable recommendations for the future.	7-9 marks	The answer demonstrates a good evaluation of the environmental issues surrounding the production of fashion products. There are several good examples given to illustrate the impact production of fashion products have on the environment. The reasoning is mainly valid and shows a specific understanding of environmental issues. The answer evaluates the negatives for the environment that the production of	12 marks	AO3
10-12 marks	The answer is comprehensive in its evaluation of the environmental issues surrounding the production of fashion products. There are multiple examples given to fully illustrate the impact the production of fashion products have on the environment. The reasoning is valid and shows a specific understanding of environmental issues. The answer evaluates the negatives for the environment that the production of fashion products has associated with it, as well as balancing this with some well thought out and fully viable recommendations for the future.						
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			fashion products has associated with it, as well as some plausible recommendations for the future.		
	4-6 marks		The answer has some evaluation of the environmental issues surrounding the production of fashion products. There may be one or two good examples given to illustrate the impact production of fashion products have on the environment. The reasoning is mainly valid and is mainly specific to environmental issues. In the lower end of the mark band there may be some confusion or inclusion of ethical issues that do not relate directly to the environment. The answer evaluates the negatives for the environment associated with the production of fashion products but makes few recommendations for the future which lack clarity.		
	1-3 marks		The answer has only basic evaluation of the environmental issues surrounding the production of fashion products. There may be one correct example given to illustrate the impact production of fashion products have on the environment. The reasoning is mainly valid and is mainly specific to environmental issues. In the lower end of the mark band there may be some confusion or inclusion of ethical issues relating to people or cultural traditions. The answer evaluates the negatives for the environment associated with the production of fashion products but makes no recommendations for the future.		
	0 mark		No response worthy of credit.		
	<p>Indicative content:</p> <p>Issues relating to the production and manufacturing of fashion products has on the environment:</p> <ul style="list-style-type: none"> • Over harvesting of cotton production may lead to loss of biodiversity and wildlife habitat • Use of water and water conservation methods • Use of poisonous pesticides in cotton production can lead to illness and death in the workers through contact with skin or through drinking in water streams. • Soil erosion is common through intensive cotton production which damages the nutrients in the soil for further production or growth of crops. • Waste dyes from the dyeing process must be disposed of responsibly to avoid wildlife in the water streams becoming polluted. • Waste fabric when cutting out layplans add to land fill if not used • Synthetic fibres and fabric production is using fossil fuels from the north sea and turning them into petro-chemicals 				

	<p>Environmental Issues relating to the fashion products post production:</p> <ul style="list-style-type: none"> • Packaging used to transport clothing is used once and discarded, unlikely to be recycled. • Plastic bag production for the retail outlet to sell the clothing in is unlikely to be recyclable, though the charge for a bag in the UK is a step in the right direction. Customers being asked if they wish for a point of sale carrier bag is also raising some awareness. • Pollution caused in air miles and transportation from the port or airport to the retail premises. • The garment continues to use energy during the life cycle as it is laundered, the label could recommend washing at 30. • The garment may not be used for the possible full life cycle and be thrown away contributing to landfill, if not recycled or given to charity to be re-used. <p>The answer may make reference to ‘fast fashion’ being irresponsible in it’s effects on the environment through the quick and continual production of fashion products, which will only be worn a few times.</p> <p>The answer may also make reference to preventative practices which could be in place in the production of fashion products to protect the environment, such as:</p> <ul style="list-style-type: none"> • Organic cotton is grown without pesticides and so is better for the environment and it’s workers. • Fashion products can be recycled by taking them to a charity shop or recycling bin. • Recycling reduced the need for new materials and reduces waste. • Clothing can be made using a new specially designed yarn which dissolves in micro waves to help disassemble garments • Fashion product manufacturers are trying to reduce the use of packaging in order to promote an ethically responsible mission statement. • Packaging should be recyclable or biodegradable. • Labels should promote washing at lower temperatures and avoid dry cleaning and the use of biological washing detergents. <p>The answer will vary depending on the product which may be mentioned within the answer.</p> <p>Award any other valid responses</p>		
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6	5-6 marks	For several correct reasons identified contextual to the 1960's. The student will analyse and evaluate links to the events and attitudes of the time. For 6 marks the student will show an excellent level of understanding and evaluation of how these issues made the garment shocking. We would expect some conclusions to be made with regard to this in order to access the full range of marks	6 marks	AO3
	3-4 marks	For a detailed answer with one or more reasons identified contextual to the 1960's. For 4 marks the student will show a good level of understanding. We would expect to see a high level of analysis in this band, but limited evaluation / conclusions drawn.		
	1-2 marks	For 2 marks, one correct reason and some elements of the explanation are correct. Limited analysis may be present but no evaluation. 1 mark is given for a very basic answer, which may identify a reason, but contain no explanation, analysis or evaluation.		
	0 mark	No response worthy of credit.		
	<p>Indicative content: Androgynous garment which was not typical of the early 1960s, normally suits are worn by men with influence and power, suggests empowerment of women, a first of its kind to get recognition and attention in the fashion world. Appropriate links to events and attitudes of the time.</p> <p>Attitudes of the time include:</p> <ul style="list-style-type: none"> • 1960s were a time of great change socially, politically and in terms of gender equality. • It is the era in which the contraceptive pill was first available and many felt that this was a time in which women could make the same decisions as a man could about their role in society. • In the early 1960s women were still very much seen as mothers and jobs such as cooking and cleaning and keeping a good home were typical. After the contraceptive pill was available a 'sexual revolution' women questioned authority and government as well as tradition. • Consumerism was on the rise in the 1960s post WW2 and modern looks were sought after. • There was a women's right movement which demonstrated the equality by burning their bras in public. • Feminist views were growing in popularity. <p>Award any other valid responses</p>			

7	10-12 marks	The answer will reflect a comprehensive awareness of cultural issues facing a designer including race, gender and religious beliefs, which goes well beyond the obvious. The discussion will fully analyse and evaluate many of the factors relating to design and how they contribute to each other. The student will evaluate ways in which a designer can both damage and contribute positively to the issues highlighted.	12 marks	AO3
	7-9 marks	Discussion highlights many cultural factors facing a designer today including race, gender and religious beliefs. The student will analyse and evaluate ways in which a designer can both damage and contribute positively to the issues highlighted but only limited links between these. The answer will be strong in some areas but not fully consider all aspects of cultural awareness.		
	4-6 marks	Discussion highlights some cultural factors facing a designer today; examples are given which are clearly identified and different to one another. The answer will be weak in some areas and a little stronger in other areas but miss some obvious details. Analysis and evaluation is present but lacking in detail.		
	1-3 marks	Weak discussion which lacks clarity about cultural factors facing a designer today. There may be a lack of information and some of the points may be confused with one another. Some analysis present but no evaluation or conclusions drawn.		
	0 mark	No response worthy of credit.		
	<p>Indicative content: The answer may include some of the following factors:</p> <p>The development of products that are culturally acceptable, that will not offend people of different race:</p> <ul style="list-style-type: none"> • The development of products which are inclusive of all race. • A variety of skin colour may be used on graphics work and when drawing of models on fashion illustrations when designing. • Consideration of the target market is very important to determine the success of the product. • Examples of advertising may be given such as ‘United colours of Benetton’ • A deep understanding of different markets in different countries is very important regarding race inclusion. <p>The development of products that are culturally acceptable, that will not offend people of different gender:</p> <ul style="list-style-type: none"> • The development of products which are inclusive of all genders. • A variety of looks which reflect the range of LGBTQIAS 			

		<p>(Lesbian, Gay, Bisexual, Transgender, Queer, Intersexual, Asexual and Straight) may be used graphics work and when drawing of models on fashion illustrations when designing.</p> <ul style="list-style-type: none"> • Androgynous clothing may be of consideration as the attitudes of people are accepting of non-gender conformity. • A deep understanding of different accepted views regarding gender in different countries is very important in the success of a garment. <p>The development of products that are culturally acceptable, that will not offend people of different religious belief:</p> <ul style="list-style-type: none"> • The development of products which are inclusive of all religions or which doesn't offend a religious belief. • Some past designers have purposefully used offensive religious symbols on clothing as an anti-establishment demonstration which is seen as attractive to some groups of people. • A variety of religious styles of clothing may be incorporated into clothing designs to ensure that they are not offensive to one specific religious belief. • A good understanding of different acceptable parts of the body to be shown is of great benefit to a designer if designing for a country which has a predominant religion. This will affect styling, lengths of hems and shapes within the clothing range. • Consideration of the target market is very important to determine the success of the product, when marketing the product it is important to know what is a usual dress in a country and which religion is the majority of the population in that country. • A deep understanding of different markets in different countries is very important regarding religious belief inclusion. <p>Award any other valid responses</p>		
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8	1	<p>2 marks are awarded for understanding the use of the equilateral triangle and setting up the equation</p> <p>2 marks are awarded for use of the equation and finding the correct answer</p> <p>The answer may use Trigonometry or Pythagoras but only a total of 4 marks may be awarded.</p>		AO4
		<p>Using Trigonometry: Angle at apex of triangle is $360/6 = 60^\circ$ Therefore there are 6 equilateral triangles Divide one in half to use trigonometry (1 mark)</p> <p>(Sets up an equation) $\tan 30 = 10/x$ (1 mark)</p> <p>or</p> <p>Use of Pythagoras: Identify that by drawing in the perpendicular height of triangle, this forms a right-angled triangle with hypotenuse 20cm and base 10cm (1 mark)</p> <p>(Sets up an equation) $400 = 100 + a^2$</p> <p>$a^2 = 400 - 100$ (1 mark)</p>	2 marks	
		<p>(Rearranges the equations so that a value can be found) $x = 10/\tan 30 = 17.3$ or $a^2 = 400 - 100$ or $a^2 = 300$</p> <p>or</p> <p>$a = \sqrt{400 - 100}$ or $a = \sqrt{300}$</p> <p>(1 mark)</p>	1 mark	
		<p>$2a = 34.6\text{cm}$ (height of cushion) (Obtains the answer and correctly rounds to 1 dp)</p>	1 mark	

8	2	<p>(allow carry forward of incorrect total trim length)</p> <p>(Working out the perimeter and the cost of the trim)</p> <p>The length of the outer edges of the cushion= $40 \times 2 = 80 + 34.6 \times 2 = 69.2 = 149.2$</p> <p>Length of trim required is 149.2cm</p> <p>Cost of trim is $149.2 \times 0.90 = \text{£}1.34$</p>	1 mark	AO4
		<p>Realising that in this case the percentage increase is based on the original amount and correctly applying the formula)) and ensuring that units used are consistent</p> <p>Increase in cost of materials is</p> $\frac{1.34}{2.75} \times 100 \text{ or } \frac{134}{275} \times 100 = 48.7\%$	1 mark	

9	1	5-6 marks	The explanation shows excellent specific knowledge relating to polyester fleece and gives an excellent understanding of the issues which should be considered when designing a range of children's sleepwear.	6 marks	AO4
		3-4 marks	The explanation shows some good specific knowledge relating to polyester fleece and gives a clear understanding of the issues which should be considered when designing a range of children's sleepwear.		
		1-2 Marks	The explanation shows some knowledge relating to polyester fleece but it is confusing at times and shows some basic understanding of the issues which should be considered when designing a range of children's sleepwear.		
		0 mark	No response worthy of credit.		
		<p>Indicative content: Properties which may be desired from polyester fleece fibres with regard to the choice of sleep wear:</p> <ul style="list-style-type: none"> • Warmth • Low absorbency so is quick to dry after washing • Smooth surface will have a soft handle • Strong – for multiple usage • Durable – to resist damage by movement from a child • High biological resistance to environmental factors and staining. • Some elasticity- can be pulled on with ease 			

		<ul style="list-style-type: none"> • Fabrics with a brushed surface to create extra thermal properties • Soft fabric handle to ensure comfortable wearing and do not cause irritation • Washable fabrics • Passes including appropriate legal requirements • Low flammability fabrics which are suitable for sleepwear • Crease resistant for ease care <p>Award any other valid responses</p>		
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9	2	<table border="1"> <tr> <td>3-4 marks</td> <td>The answer shows a good understanding of polyester fleece construction and almost all of the main points are explained. The answer is detailed in understanding the stages taken to construct the finished fleece.</td> </tr> <tr> <td>1-2 Marks</td> <td>The answer shows some understanding of polyester fleece construction and almost some of the main points are explained. The answer is basic in understanding of the stages taken to construct the finished fleece.</td> </tr> <tr> <td>0 mark</td> <td>No response worthy of credit.</td> </tr> </table>		3-4 marks	The answer shows a good understanding of polyester fleece construction and almost all of the main points are explained. The answer is detailed in understanding the stages taken to construct the finished fleece.	1-2 Marks	The answer shows some understanding of polyester fleece construction and almost some of the main points are explained. The answer is basic in understanding of the stages taken to construct the finished fleece.	0 mark	No response worthy of credit.	4 marks	AO4
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		1-2 Marks	The answer shows some understanding of polyester fleece construction and almost some of the main points are explained. The answer is basic in understanding of the stages taken to construct the finished fleece.								
		0 mark	No response worthy of credit.								
<p>Indicative content:</p> <ul style="list-style-type: none"> • Polyester fleece has a tightly knitted construction which has been given a mechanical finish. • It is a weft knitted fabric • The knitting has an extra yarn to allow for the raised surface after brushing. • The knitted fabric is fed through a machine called a Napper which brushes the surface of the fabric and pulls the fibres to create a textured, soft surface. • The fabric is then put through another machine which shears the surface to cut the fibre to a uniform length. 											
Award any other valid responses											

10	<table border="1" data-bbox="284 331 1214 878"> <tr> <td data-bbox="284 331 464 501">5-6 marks</td> <td data-bbox="464 331 1214 501">The answer demonstrates an excellent understanding of how dye sublimation works and why it is well suited for polyester. The student has a comprehensive knowledge and has written about all aspects of the printing method in detail.</td> </tr> <tr> <td data-bbox="284 501 464 672">3-4 marks</td> <td data-bbox="464 501 1214 672">The answer demonstrates a good understanding of how dye sublimation works and covers most aspects of why it is well suited for polyester. The student has some missing information which is important to the process.</td> </tr> <tr> <td data-bbox="284 672 464 842">1-2 marks</td> <td data-bbox="464 672 1214 842">The answer is basic but shows some understanding about polyester and dye sublimation but some aspects are confused. The student may have only made reference to either dye sublimation or polyester but not mentioned the interplay between the two elements.</td> </tr> <tr> <td data-bbox="284 842 464 878">0 mark</td> <td data-bbox="464 842 1214 878">No response of worthy credit.</td> </tr> </table> <p data-bbox="284 913 539 943">Indicative content</p> <p data-bbox="284 947 1214 1014">Dye-sublimation printing is a digital printing technology using full colour artwork that works with polyester and polymer-coated substrates.</p> <p data-bbox="284 1048 1214 1149">The process uses the science of sublimation, in which heat and pressure are applied to a solid, turning it into a gas through an endothermic reaction without passing through the liquid phase.</p> <p data-bbox="284 1182 1214 1417">In order to transfer the image from the paper to the substrate, it requires a heat press process that is a combination of time, temperature and pressure. The most common dyes used for sublimation activate at 150 Celsius or 350 degrees Fahrenheit. However, a range of 200 to 240 Celsius or 380 to 420 degrees Fahrenheit is normally recommended for optimal colour. Polyester is suitable to be heat pressed at this high temperature.</p> <p data-bbox="284 1451 1214 1653">The end result of the sublimation process is a nearly permanent, high resolution, full colour print. Because the dyes are infused into the substrate at the molecular level, rather than applied at a topical level (such as with screen printing and direct to garment printing), the prints will not crack, fade or peel from the substrate under normal conditions. Therefore dye sublimation is very well suited to polyester.</p> <p data-bbox="284 1686 715 1720">Award any other valid responses</p>	5-6 marks	The answer demonstrates an excellent understanding of how dye sublimation works and why it is well suited for polyester. The student has a comprehensive knowledge and has written about all aspects of the printing method in detail.	3-4 marks	The answer demonstrates a good understanding of how dye sublimation works and covers most aspects of why it is well suited for polyester. The student has some missing information which is important to the process.	1-2 marks	The answer is basic but shows some understanding about polyester and dye sublimation but some aspects are confused. The student may have only made reference to either dye sublimation or polyester but not mentioned the interplay between the two elements.	0 mark	No response of worthy credit.	6 marks	AO4
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11	1	1 mark for plotting the graph accurately as per below	1 mark	AO4																												
<p style="text-align: center;">Use of fibres</p> <p>The graph shows the use of three types of fibres in tonnes (x 000) from 1960 to 2010. The Y-axis ranges from 0 to 50,000 in increments of 10,000. The X-axis shows years from 1960 to 2010 in 10-year increments. Cotton (solid line) starts at 10,000 in 1960 and rises to approximately 24,000 by 2010. Viscose (dashed line) starts at about 2,000 in 1960, peaks at 4,000 in 1980, and ends at 5,000 in 2010. Polyester (dotted line) starts near 0 in 1960, remains low until 1980, then rises sharply to about 23,000 in 1990 and reaches 50,000 by 2010.</p> <table border="1"> <caption>Approximate data from the 'Use of fibres' graph</caption> <thead> <tr> <th>Year</th> <th>Cotton (Tonnes x 000)</th> <th>Viscose (Tonnes x 000)</th> <th>Polyester (Tonnes x 000)</th> </tr> </thead> <tbody> <tr><td>1960</td><td>10,000</td><td>2,000</td><td>0</td></tr> <tr><td>1970</td><td>12,000</td><td>4,000</td><td>2,000</td></tr> <tr><td>1980</td><td>14,000</td><td>4,000</td><td>2,000</td></tr> <tr><td>1990</td><td>18,000</td><td>2,000</td><td>23,000</td></tr> <tr><td>2000</td><td>21,000</td><td>3,000</td><td>30,000</td></tr> <tr><td>2010</td><td>24,000</td><td>5,000</td><td>50,000</td></tr> </tbody> </table>					Year	Cotton (Tonnes x 000)	Viscose (Tonnes x 000)	Polyester (Tonnes x 000)	1960	10,000	2,000	0	1970	12,000	4,000	2,000	1980	14,000	4,000	2,000	1990	18,000	2,000	23,000	2000	21,000	3,000	30,000	2010	24,000	5,000	50,000
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11	2	4-5 marks	Excellent analysis of the data with strong understanding of the reasons for the differing popularity of the fibres. For 5 marks comprehensive and accurate reasons are provided for the trends given with supporting evidence linking the fibres to the growth and demand that year.	5 marks	AO4
		2-3 marks	Good analysis of the data with some understanding of the reasons for the differing popularity of the fibres. For 3 marks more accurate reasons are provided for the trends given with supporting evidence linking the fibres to the growth and demand that year.		
		1 mark	Basic analysis of the data. Limited and generic understanding of the reasons for the		

		popularity of the three fibres.			
	0 mark	No work worthy of credit.			
		<p>Indicative content:</p> <ul style="list-style-type: none"> • Cotton use was fairly steady until 1990 when it grew more quickly, and its use is predicted to continue to grow in line with this trend. • Viscose is the least fibre popular with a low and fluctuating rate of use until the 1980s when it fell to below its 1960s usage. Since 1990 its use has grown steadily although it is still the least used fibre but is predicted to become used more in the future. • Very little polyester was used in 1960s but its use grew steadily between 1970 and 2000 when there was a surge in its popularity and this trend will probably continue. <p>Reasons for the differences in use of the three fibres include:</p> <ul style="list-style-type: none"> • Cotton fabrics have always been popular for fashion and furnishing products and are perceived as high quality. Denim fabrics and cotton T-shirt fabrics have grown in popularity since the 1980s and these account for some of the increased cotton usage. • Viscose fibres were not popular as they were seen as low quality replacement for cotton and because of their weakness and tendency to shrink and crease. The newly developed lyocell fibres, introduced in the 1990s were superior in these respects and quickly gained popularity with consumers. • Polyester fibres were invented in the 1950s and started to be used more generally in the 1960s. Their use grew slowly at first but very quickly from 1980 onwards, fuelled by consumer demand for easy-care fabrics. Polyester fibres are included in many blends, especially with cotton and viscose. • The development of microfibrils in the 1980s, used in clothing for sportswear which became a serious fashion trend, led to even greater demand for polyester. • The growth in smart and modern fabric technology has added to the demand for polyester fibres. • Although still a very popular fibre, demand for polyester may slow down as consumers are starting to demand products made from other more sustainable fibres. But developments in more sustainable production of polyester, the continued growth of smart textiles based on polyester fibres, and the fact that it is easy care thus requiring less energy use in the washing and ironing of products may support continued growth in its use. <p>Award any other valid responses</p>			

12	7-9 marks	A detailed explanation which fully demonstrates knowledge and understanding related to different fibres and end-uses. Information will be accurate and explained with many appropriate examples to support point made. Student will exhibit detailed awareness of blending which goes well beyond the obvious reasons and applications.	9 marks	AO4
	4-6 marks	A good explanation demonstrating knowledge and understanding of why fibres are blended with several examples including a variety of different fibres to support points made, many of these will be the most obvious, especially at the lower end of the mark range. There will be reasonably accurate information about the fibre properties and how the blend improves the overall qualities of the fabric, especially at the top end of the mark range. There will be some lack of detail and/or accuracy.		
	1-3 marks	Some sound awareness of why fibres are blended but this will tend to be in relation to the most common blends, especially cotton and polyester and may lack full understanding. There will be limited explanation of the properties of the fibres and how blending changes the nature of the fabrics. Examples will be basic. There will be some confused points and a lack of detail.		
	0 mark	No work of worthy credit		
	<p>Indicative content</p> <p>Most modern fabrics contain more than one fibre. This is because there is no such thing as a perfect fibre so manufacturers include different fibres in a blend. This enables a fabric to be made which is better suited to the product. The main reasons for blending fibres are to:</p> <p>Help reduce the cost of the fabric; give different effects in the texture and handle of the fabric; allow for novelty effects when the fabric is dyed; make a fabric with specific qualities for a particular use; make the fabric stronger; make a fabric easier to care for; enable fabrics to be more crease resistant; allow fabrics to be heat set.</p> <p>Answers should include different fibre blends with intended use specific. There should be an explanation of how the fibres in the blend relate to the intended use and a comparison with a single fibre.</p> <p>Award any other valid responses</p>			

13	1	D of logo $30 - 1.5 \times 5 = 22.5 / 4 = 5.62 \text{cm}$ R of logo $5.62 / 2 = 2.812$ $R^2 = 7.907$	1 mark	AO4
		$A = \pi r^2 = 24.84$ $24.84 \times 16 = 397.44$	1 mark	
		$900 - 397.44 = 502.56 \text{cm}^2$ Wastage	1 mark	

13	2	$\pi D = 17.65 \times 16 = 282.4 \text{cm}$ total length	1 mark	AO4
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13	3	$C \times 20 = 353.11 \text{cm}^2 \times 8 = 2824 \text{cm}^2$ $+ 16 \text{ logos} = 3221.44 \text{cm}^2$ 4m of fabric from the 1m width roll	1 mark	AO4
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14	10-12 marks	Excellent understanding of a variety of examples with accurate and detailed information. Response refers to knitted fabric related to CAD and CAM and will demonstrate understanding of the design complexities of knitted fabric.	12 marks	AO4
	7-9 marks	Good understanding of a variety of examples with detailed information. Will refer to both CAD and CAM and also relate answer to knitted fabric.		
	4-6 marks	Some understanding of how computers can benefit designing/manufacturing. Candidate will refer to both CAD and CAM.		
	1-3 marks	Basic statements, candidate will tend to concentrate superficially on only a few ideas and offers little information. Many aspects will be ignored. Little connection made between use of computer and how computers aid designing/manufacturing. May refer only to CAD or CAM.		
	0 marks	Nothing worthy of credit.		
	<p>Indicative content: students may make the following points regarding the use of CAD:</p> <ul style="list-style-type: none"> • Drawing software can be used to design, illustrate and show working drawings and graphical representations of knitted pattern and structure. • Artwork can be imported or scanned and then edited and manipulated to develop ideas. • Collections with a range of coordinating products or different colourways can be developed from one initial idea. • Can reuse past designs, modify them, and email them to get feedback from customer. • Designers can collaborate with other designers or producers globally. • Time can be saved and modifications made more easily. • With some specialist software it is possible to get a 3-D impression of the design, by rotating the design and seeing it from different viewpoints. The designer can use the computer to simulate draping and shadowing to create a realistic image of the knitwear design in use of 3-D models. • Complex repeat patterns can be efficiently created and costings worked out automatically. • Variations can be trialled on screen without using yarn in samples. • CAD allows designers to create, modify and visualise ideas rapidly. • Many CAM machines are linked to CAD programmes and designs can be made directly from design instructions. Knit 			

		<p>production machinery may be driven with design files from a CAD system.</p> <ul style="list-style-type: none"> • The yarn colours and combinations of knit stitches can be integrated with garment design. • Textile products made using computerised machinery are often made more efficiently, and with increased consistency and accuracy. • Production can be closely monitored for quality and safety, and costs reduced due to efficiency. • Complex 3-D knit structures can be knitted. • Health and safety of workers can be monitored and working conditions made safer using computers. <p>Award any other valid responses.</p>		
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15	1	5-6 marks	The answer will reflect an excellent knowledge and understanding of the effects of finishes and the reasons they are needed in relation to the fibre/fabric properties and end use of the product. A mechanical finish will be correctly referenced to an appropriate textile product, and the reasons for the finish in relation to the fibre/fabric characteristics. At the top end of the mark band it is clear that the student displays a comprehensive understanding of the scientific and technical principles related to the finish.	6 marks	AO4
		3-4 marks	The answer will reflect a sound knowledge and understanding of the effects of a mechanical finish and the reasons they are needed in relation to the fibre/fabric properties and end use of an appropriate textile product. There will be some limited understanding of the scientific and technical principles related to the finishes. At the lower end of the mark band there are some omissions of information about fibre characteristics.		
		1-2 marks	Basic statements with no reference to the scientific and technical principles underlying the need for the finish, candidate will tend to concentrate superficially on only a few ideas and offers little information. Many aspects of the fibre characteristics will be ignored and little connection made between the finish and the product's end-use. Some information may be confused at the lower end of the mark band.		
		0 marks	Nothing worthy of credit.		

	<p>Indicative content: Students may include textiles products which have the following mechanical finishes and explain why the finish is necessary in relation to the fabric/fibre characteristics:</p> <ul style="list-style-type: none"> • Brushing/raising- using rollers covered in brushes to change the surface of the fabric to a napped (raised) surface to the fabric which is able to trap air thereby increasing the thermal properties of the textiles product such as in sleep wear or outdoor wear. The finish may be required on fabrics made from cotton (eg flannel and winceyette), and polyester (polar fleece) which are not naturally warm to wear. • Calendering- using rollers to apply pressure and heat to smooth or thin a fabric. This may be used to change the handle and lustre of the fabric and used in textiles products made usually from cotton but also polyester, wool, silk and viscose. Calendering can be used with water to create a water effect called 'Moire'. These fabrics are usually suitable for evening wear. The wash durability of a calendered finish on thermoplastic fibres like polyester is higher than on cellulosic fibres such as cotton. On blended fabrics such as a Polycotton the durability depends largely on the proportion of the synthetic fibre present. • Embossing- used on thermoplastic fibres to give a permanent heat set pattern which is raised in the fabric. This is achieved by pushing the fabric through embossed rollers at a high temperature and then the fabric is rapidly cooled. This finish may be used to increase the decorative qualities of the fabric in textiles products such as fashion clothing. • Stone and sand washing- widely used on natural fibres types, especially denim to give a worn or faded look to the surface of the fabric. The fabric is moved through a tank where stones or sand is jetted at the fabric before a final washing and drying. This finish is often used in textiles products such as denim jeans. • Heat setting- used on thermoplastic fibres to give permanent pleats or crinkles and make fabrics non crease and non-shrink. This finish may be used to increase the decorative qualities of the fabric in textiles products such as fashion clothing. • Mechanical shrinking- sometime referred to as sanforising, this is when a fabric, usually natural in fibre and susceptible to shrinkage, is forced to shrink using water and heat. This is to prevent any further shrinkage along the width and length in the fabric after laundering the textile product. This finish is often used in textiles products such as fashion clothing, leisure wear and children's clothing. <p>Award any other valid responses.</p>		
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15	2	<table border="1"> <tr> <td data-bbox="284 264 485 600">5-6 marks</td> <td data-bbox="485 264 1206 600">The answer will reflect an excellent knowledge and understanding of the effects of finishes and the reasons they are needed in relation to the fibre/fabric properties and end use of the product. A chemical finish will be correctly referenced to an appropriate textile product, and the reasons for the finish in relation to the fibre/fabric characteristics. At the top end of the mark band it is clear that the student displays a comprehensive understanding of the scientific and technical principles related to the finish.</td> </tr> <tr> <td data-bbox="284 600 485 904">3-4 marks</td> <td data-bbox="485 600 1206 904">The answer will reflect a sound knowledge and understanding of the effects of a chemical finish and the reasons they are needed in relation to the fibre/fabric properties and end use of an appropriate textile product. There will be some limited understanding of the scientific and technical principles related to the finishes. At the lower end of the mark band there are some omissions of information about fibre characteristics.</td> </tr> <tr> <td data-bbox="284 904 485 1173">1-2 marks</td> <td data-bbox="485 904 1206 1173">Basic statements with no reference to the scientific and technical principles underlying the need for the finish, candidate will tend to concentrate superficially on only a few ideas and offers little information. Many aspects of the fibre characteristics will be ignored and little connection made between the finish and the product's end-use. Some information may be confused at the lower end of the mark band.</td> </tr> <tr> <td data-bbox="284 1173 485 1245">0 marks</td> <td data-bbox="485 1173 1206 1245">Nothing worthy of credit.</td> </tr> </table>	5-6 marks	The answer will reflect an excellent knowledge and understanding of the effects of finishes and the reasons they are needed in relation to the fibre/fabric properties and end use of the product. A chemical finish will be correctly referenced to an appropriate textile product, and the reasons for the finish in relation to the fibre/fabric characteristics. At the top end of the mark band it is clear that the student displays a comprehensive understanding of the scientific and technical principles related to the finish.	3-4 marks	The answer will reflect a sound knowledge and understanding of the effects of a chemical finish and the reasons they are needed in relation to the fibre/fabric properties and end use of an appropriate textile product. There will be some limited understanding of the scientific and technical principles related to the finishes. At the lower end of the mark band there are some omissions of information about fibre characteristics.	1-2 marks	Basic statements with no reference to the scientific and technical principles underlying the need for the finish, candidate will tend to concentrate superficially on only a few ideas and offers little information. Many aspects of the fibre characteristics will be ignored and little connection made between the finish and the product's end-use. Some information may be confused at the lower end of the mark band.	0 marks	Nothing worthy of credit.	6 marks	AO4
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		<p>Indicative content guidance The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant.</p> <p>Indicative content: Students may include textiles products which have the following chemical finishes and explain why the finish is necessary in relation to the fabric/fibre characteristics:</p> <ul style="list-style-type: none"> • Mercerisation- used on cotton which has a naturally dull surface. The fabric is treated with a caustic soda/chemical solution to cause swelling of the fibres. This improves the lustre, strength and ability to take on dye colouration. This can only take place on grey cloth or after bleaching. This finish is often used on many cotton products such as fashion clothing, leisure wear and children's clothing. • Flame retardancy- Proban and Pyrovatex are chemicals used on cotton fibres (which being cellulosic ignite easily), to inhibit or delay the spread of fire by suppressing the chemical reactions in the flame or the ability to ignite. This finish may be used on textiles products within the home or on uniforms where there is a risk of fire. 										

		<ul style="list-style-type: none"> • Water resistance- This involves the fabric being treated with a chemical to coat the fibres and seal the surface to prevent some or all absorbency. This finish is mainly used on natural fibres as these are highly absorbent and on some blends of synthetic and natural fibres which have some absorbency qualities. Textile product which often have a water resistant finish are often outdoor clothing such as jackets and trousers for walking and trekking, outdoor equipment, such as tents and uniforms which are subjected to water frequently. • Stain resistance- Teflon coating gives a non-stick surface to the fabric which then allows a wipe free surface and therefore stain resistance. This finish is often used in textiles products such as uniform and children's clothing. • Shrink resistance/Non-iron/crease resistance- This involves the fabric being treated with resins which go into the fibre structure and prevent shrinkage. This finish is often used on work wear, uniforms made from cellulosic fibres to reduce ironing, and after care. • Anti-felting- This finish enables wool items to be washed in the washing machine at the similar temperatures to that of other fibres. The fabric is treated with a chemical solution which limits the felting of fibres and shrinkage by either removing the tips of the fibre's scales or coating them with a resin to prevent them tangling with each other, whilst maintaining the original properties of the surface of the fabric. This finish would be used on woollen and other animal fibre clothing such as jumpers, dresses and cardigans to improve the after-care requirements. • Moth proofing- This finish is given to the finished fabric to prevent the holes which can form when a moth has fed on the clothing fibres. Moths consume the keratin found mainly in wool and other animal fibres. In order to prevent this, the fabric is given a chemical protection. This type of finish would be used on clothing made from wool and animal hairs such as jumpers and cardigans, suits and some occasional wear. • Anti-pilling- This finish alleviates pilling, which occurs when fabrics are subject to friction and fibres are more readily brought to the surface and gather together in small mounds. The fabric is treated with a chemical solution which prevents fibre movement from happening as quickly. This finish is used on fashion clothing or work wear with a high wear frequency, such as cardigans and jumpers, with a part or fully synthetic fibre content, to prolong the life cycle of the garment. • Hygienic/sanitised- An anti-microbial chemical finish is applied to the fabric to inhibit the growth of microbes and bacteria. The warmth and humidity found in textiles fibres encourages the growth and can develop odour when fabric is worn next to the skin. This finish is most commonly used in textiles products such as sportswear, uniform for medical practitioners and in dressings and gowns worn by patients in hospital. 		
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		Detailed knowledge of the chemicals involved is not required. Award any other valid responses.		
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