

A-level DESIGN AND TECHNOLOGY: FASHION AND TEXTILES 7562/1

Paper 1 Technical Principles

Mark scheme

June 2019

Version: 1.0 Final

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 aga.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.

Glossary for maths

If a student uses a method which is not explicitly covered by the mark scheme the same principles of marking should be applied. Credit should be given to any valid methods. Examiners should seek advice from their senior examiner if in any doubt.

[a, b] Accept values between a and b inclusive.

For π Accept values in the range [3.14, 3.142]

As a general principle, a correct response is awarded full marks.

Qu	Part	Marking Guidance	Total marks	АО
1		Give two benefits of using standardised components in fashion product manufacture.	2 marks	AO4 1B
		Any 2 relevant points, 1 mark each.		
		Indicative content:		
		 It is more economical / cheaper for manufacturers to buy in standardised components because they do not need to invest in the machinery to make them. Manufacturers can buy in the right amount of stock of the component and not have to pay for storing the component if they are using a JIT production method. Manufacturers can easily source a range of standard components quickly. Machinery and jigs can be used to fit the components uniformly to the product. Skilled workers or specialist machinery may not be necessary. Improves efficiency / decreases manufacturing time. 		
		Award any other valid responses.		
2		Explain how sub-assembly is used in fashion manufacture.	3 marks	AO4 1B
		Any 3 relevant points, 1 mark each. Response may include 2 relevant points with clear explanations / examples for 3 marks.		
		Indicative content:		
		 A sub assembly line is a short line of workers, producing part of the product separately / in a different location to the main production line. The sub-assembly of certain part of the product may need to carried out by skilled workers which only produce this component for example a detailed embroidery on a sleeve Sub assembly can speed up / make the overall process of garment production more efficient. Sub assembly can be used for parts of the product which require specialist machinery. Parts of the product are already quality checked. Many JIT systems rely on ready-made component parts. Students may give a diagram to explain their answer. Marks should be awarded although a diagram is not necessary. Award any other valid responses. 		

AO4 1A Describe the structure of satin fabric. You may use a diagram. 3 marks 3 Any 3 relevant points, 1 mark each. Indicative content: • The structure is a satin weave / woven fabric. It is a warp faced fabric. • The structure is formed when the warp yarns floats over 4 or more weft yarns. • There are few interlacing points. • The weft yarns are almost completely hidden. The candidate may use a diagram to illustrate their answer. Also accept a plan diagram. Marks should be awarded although a diagram is not necessary. The following diagram, correctly drawn annotated with warp and weft yarns, should be given 3 marks. **WEFT WARP** WARP SATIN Award any other valid responses.

4	Evaluate the impact of offshore production on industrial and commercial practice.	6 marks	AO3 2A AO3 2B	
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5-6 marks	Detailed analysis and evaluation of the impact of offshore production reflects both positive and negative factors. There are links made between the evaluative points which are clearly relevant to industrial and commercial practice. There will be a variety of points and there may be a lack of clarity at the bottom end of the mark band, but this will not detract from the overall quality of the response.
3-4 marks	Good analysis and evaluation of the impact of offshore production which includes an imbalance of positive and negative factors. There may be a lack of precision in making links between the evaluations. Response will give a narrow range of points, especially at the lower end of the mark band, where there is limited relevance to industrial and commercial practice.
1-2 marks	Basic analysis and evaluation of the impact of offshore production which may focus on either positive or negative factors. Response may show a lack of understanding. There are little or no links made between the evaluative points and industrial or commercial practice.
0 marks	No response worthy of credit.

Indicative content:

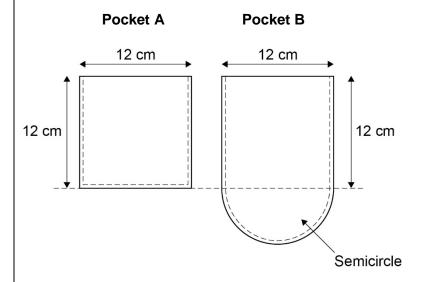
Positives:

- Different parts of the production can be in different countries according to which manufacturer can best make the product.
- The cost of production can be lowered by Offshore competition for manufacturing the product.
- Digital applications can be used to communicate the designing and manufacturing process.
- Offshore production means that smaller manufacturers can compete for work alongside each other.
- Offshore manufacturing contributes to the economy of LEDC countries which mainly manufacture export items.
- Offshore production means that the brand doesn't need to own factories and pay all of the overheads for products which are difficult to make or batch produced for a short time only.
- Offshore production means that you can employ a skilled worker in another country to make part of your product if you can't find the workers locally. This improves the overall quality of the product.

Negatives:

- Offshore production means that smaller manufacturers may not be able to compete for work alongside larger companies.
- Offshore manufacturing can contribute to the exploitation of workers in LEDC countries which can be paid unfairly without the customer realising.
- Offshore production involves high amounts of transport and packaging as parts of garments are shipped and flown across the world. This is a major cause of global warming and climate change.
- Offshore production relies on a chain of designers and manufacturers across the world to work together. At some point in the production process parts of the production chain may break down or incur delays.
- The quality and overall finish of a garment produced in a offshore production system may be of a lower quality or standard of manufacture when it arrives for sale if parts of the production chain have compromised on the quality of the making.

5	A manufacturer must work out the cost of sewing pockets on to a product. The thread used to sew the pocket in place costs	6 marks	AO4 1C
	0.25p/cm. The stitch line is sewn 5 mm in from the edge. 5% extra thread must be added for the reverse stitch and waste thread.		
	Calculate the cost of the thread used on each pocket to two decimal places.		
	You must show your working.		



Correct length for Pocket A (11.5 + 11.5 + 11 =) 34

(1 mark)

Use of π for semicircle in Pocket B

 $n \times \pi$ or 3.14(..) $\times n$ seen (even if used with incorrect length)

Do not allow n^2

(1 mark)

Correct length for Pocket B

$$(12 + 12 + \frac{11}{2}\pi =)$$
 [41.27, 41.3] (1 mark)

Calculating cost

(1 mark)

Award mark even if the cost calculation is correct for only one pocket

Pocket A		Pocket B
their 34 × 0.25	(= 8.5)	their 41.27 × 0.25 (= 10.3())
Or		Or
their 35.7 × 0.25	(= 8.9(25))	their 43.34 x 0.25 (= 10.8())

Adding 5%

(1 mark)

Award mark even if the 5% addition is correct for only one pocket

Pocket A	Pocket B
their 34 × 1.05 (= 35.7)	their 41.27 × 1.05 (= 43.3())
Or	Or
their 34 + (their 34 × 0.05)	their 41.27 + (their 41.27 x
(= their 34 + their 1.7 = 35.7)	0.05) (= their 41.27 + their
	2.06() = 43.3()
Or	Or
their 8.5×1.05 (= $8.9(25)$)	their 10.31 × 1.05 (= 10.8())
Or	Or
their $8.5 + (\text{their } 8.5 \times 0.05)$	their 10.31 + (their 10.31 x
(= their 8.5 + their 0.425 =	0.05) (= their 10.31 + their
8.9(25)	0.5155 = 10.8()

Correct answer in £ or pence to 2 decimal places

(1 mark)

Pocket A Pocket B

8.93p or £0.09	10.83p or 10.84p or £0.11	

6	efficiency.	the number of manufacturing processes can increase Analyse and evaluate the different ways this can be n garment production.	12 marks	AO3 2A AO3 2B
	9-12 marks	Detailed analysis and evaluation of the different ways a reduction in manufacturing processes can increase efficiency in garment production. The links made between points are both positive and negative. A number of correct processes are given, although there may be some lack of clarity at the bottom end of the mark band, this will not detract from the overall quality of the response.		
	5-8 marks	Good analysis and evaluation of the different ways a reduction in manufacturing processes can increase efficiency in garment production. There are some links made between the points, however these are mostly positive, with few negative references. The processes given in the answer are relevant, but may lack some clarity at the bottom end of the mark band.		
	1-4 marks	Basic analysis and evaluation of the different ways a reduction in manufacturing processes can increase efficiency in garment production. There are only a few correct points, with little or no evaluation in the response. Information may be repetitive or confused.		
	0 marks	No response worthy of credit.		
	Indicative	content:		
	Fewer p reduce t Making sublimate	ing the number of pieces can save time in manufacturing. Dieces could possibly tessellate better on the lay plan and othe cutting time. In a simplified garment e.g. fewer seams, less embroidery or tion not screen printing will reduce the amount of threading and components used. This reduces the cost and time		

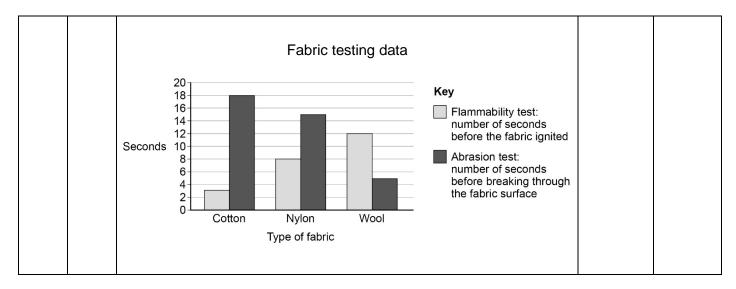
for including them in the production.

- Reducing the number of steps taken to make a garment simpler, can save time and increase efficiency in the overall process.
- Reducing the amount of dyes which are used to colour a fabric will
 make it more efficient on the use of water, chemicals and energy
 all saving costs for the product and increasing profits.
- Synthetic fibres can have colour added at the spinning solution so that the fabric doesn't need to be dyed at a later stage. Naturally coloured cotton fibres also reduce the need for dyeing.
- Reduce or omit special finishes which are used to make fabrics more functional or decorative eg shrink, crease or water resistant.
- A reduction in the number of manufacturing processes will reduce the time in takes to make the garment and increase profits. Use of automated machines can improve efficiency.

However,

- Reducing the decoration may not appeal to consumers
- The simplified design may not keep up with fashion trends
- Amendments to the garment may mean that the it won't sell as well
- Changes in manufacture may lose the quality and original style, therefore the overall process is negative for the manufacturer.

7	Show the fabr	ic testing data in a dual bar	chart on the grid below.	4 marks	AO4 1C
	Fabric	Flammability test number of seconds before the fabric ignited	Abrasion test number of seconds before breaking through the fabric surface		
	Cotton	3	18		
	Nylon	8	15		
	Wool	12	5		
	1 mark for cor 1 mark for lab	rect height of all bars rect structure of bars (paired elling both the axis and uniting a key (not given for just	ts correctly		



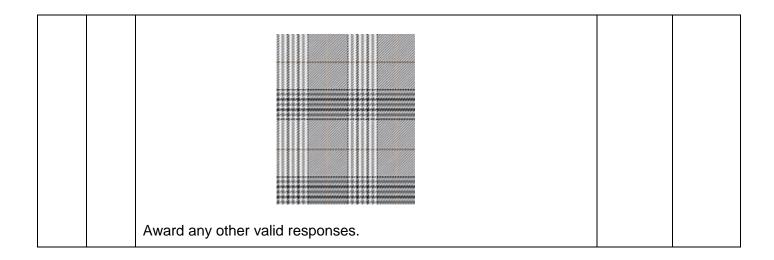
8		nd evaluate how designers and manufacturers ensure d textile products are safe for consumers to use.	12 marks	AO3 2A AO3 2B
	9-12 marks	Detailed analysis and evaluative points are made to explain how designers and manufacturer ensure textile and fashion products are safe for consumers to use. A number of correct points are made which reference to the implications for both designers and manufacturers. There may be some minor irrelevant points or lack of clarity in some points but this will not detract from the overall quality of the response.		
	5-8 marks	Good analysis and evaluative points are made to explain how designers and manufacturer ensure textile and fashion products are safe for consumers to use. A variety of points are made which refer to the implications for designers and manufacturers, although the points for each may be imbalanced.		
	1-4 marks	Basic analysis and evaluative points are made to explain how designers and/or manufacturers ensure textile and fashion products are safe for consumers to use. The answer is simplistic and may focus only on safety features of the product.		
	0 marks	No response worthy of credit.		
	Indicative	content:		
	which w children sharp or • Manufac public pl	ers must ensure that products don't have any features ould endanger the user. This is especially true with 's products which should have no choking hazards and small parts. Exturers must ensure that fabrics which are to be used in laces meet flammability tests, it is recommended that BSI is used to determine the safety.		

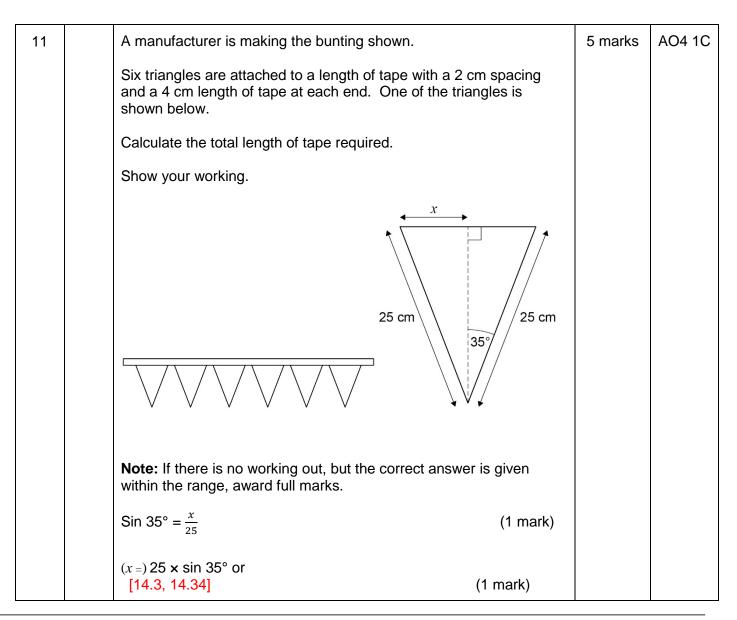
- Manufacturers must ensure that products are safe for consumers by using no-toxic dyes and finishes on products.
- Manufacturers must ensure that they correctly label the product to ensure the correct after care is given. This is particularly important if a product is fire retardant, for example with the use of Proban®, as detergent may remove this finish.
- Manufacturers use metal detectors in production lines to ensure that no pins or metal objects are hidden in the garment which would injure the consumer.
- Consumers can rely on the many laws designed protect them using the product they have bought from a manufacturer. The manufacturer must adhere to these laws when making and presenting goods to the market place to protect consumers when buying goods.
- Consumers can trust that a reputable manufacturer has kept up to date with this legislation and has ensured that their product meets the standards stipulated within them.
- If a consumer is dissatisfied with a product, they can appeal to the Trading Standards officers which have the necessary powers to take action if they believe a product is unsafe for consumers or does not meet the Sale of Good act 1979. This information can be found in the Consumers Rights act.
- Consumers can rely on manufacturers using relevant safety symbols to warn if there is a safety precaution which must be used with the product. In the case of children's clothing a warning label must be attached to nightwear that doesn't meet the BSI Standard for flammability. This is an informative, useful law for consumers and an easy way for manufacturers to communicate clearly about safety.
- Consumers can trust the testing is to a high standard if they see
 the kite mark symbol. The BSI kite mark printed on the label of a
 product means that it has passed the standard of testing for the
 product, its fibres or fabric.
- Consumers can trust that Lion Mark logo ensures that it conforms to Toy safety standards. Many toys are made from textile materials and they must meet high standards set to prevent potential dangers.
- Consumers must be aware that some products may seem safe but counterfeit labels can appear on products and the product hasn't passed the safety tests it proclaims to have. In this case the consumer doesn't have the same rights to appeal if safety is compromised.

9	Explain the products.	e factors that affect the dye fastness of fashion and textile	6 marks	AO4 1C
	5-6 marks	Demonstrates detailed knowledge and understanding of the factors that affect the dye fastness of fashion and textile products. The answer covers a wide range of different ways dye fastness can be affected. The information is correct and suitable examples are given to illustrate the answer. There may be some lack of clarity but this will not detract from the overall quality of the response.		
	3-4 marks	Demonstrates good knowledge and understanding of the factors that affect the dye fastness of fashion and textile products. There are a small range of different reasons dye fastness can be affected. The information is mainly correct and examples are quite obvious.		
	1-2 marks	Demonstrates basic knowledge and understanding of the factors that affect the dye fastness of fashion and textile products. Simple statements are made and if examples are given, they may be incorrectly matched with the type of dye fastness required.		
	0 marks	No response worthy of credit.		
	Indicative	content:		
	 Rubbing be apparubbing colour fa When we colour is Dye fast 	tness is the ability of a fabric or product to retain its colour. g or crocking can cause localised loss of colour and may arent on jeans and other items which may incur abrasion or . The manufacturer may want to ensure that denim is ast so that the dye doesn't rub off onto furnishings. yashing dye colour can be lost through bleeding- where is lost in water. tness to washing must be considered in fashion and sports othing which will be washed and worn regularly.		

		 Dye fastness to light must be considered in home furnishing such as curtains and cushions which may fade in direct sunlight. Dye fastness to biological substances eg perspiration must be considered in fashion products, sportswear and underwear. Such biological substances can also lead to degradation of the fabric. Dye fastness to bleaching must be considered in the choice of fabric for swimwear as chlorine bleach is usually present in swimming pools. Synthetic fibres which are coloured in the spinning solution are more likely to retain colour. This question is not about absorbency of fibres, but about the factors that affect dye fastness in fashion and textile products. Award any other valid responses. 		
10	1	Describe the characteristics of brocade fabric. 3 relevant points, 1 mark each.	3 marks	AO4 1A
		Indicative content:		
		 Brocade is a woven jacquard fabric. Parts of the design are often mistaken for embroidery. Brocade may include metallic or shiny yarns. The fabric has a complex construction. Typical brocade patterns include floral designs The wrong side of the fabric can be a negative of the right side of the fabric or may show yarns floating on the back as part of the weave. 		
		Award any other valid responses.		
				<u> </u>
10	2	Describe the characteristics of tartan fabric.	3 marks	AO4 1A
		Any 3 relevant points, 1 mark each.		
		Indicative content:		
		Tartan is a twill or plain weave fabric		

Any 3 relevant points, 1 mark each.	
Indicative content:	
 Tartan is a twill or plain weave fabric. There are alternating coloured yarns on both the warp and the weft to create the design. The fabric has a checked / plaid appearance. Tartan is traditionally made from wool. 	
The candidate may use a diagram to illustrate their answer. Marks should be awarded although a diagram is not necessary.	





[14.3, 14.34] × 2 or 2 × 25 × sin 35° or [28.6, 28.7]	(1 mark)
Total Length = $[28.6, 28.7] \times 6 + (5 \times 2) + (4 \times 2)$ OR [171.6, 172.2] + 18	(1 mark)
= [190, 190.2] If correct answer in range [190,190.2] seen then all to be rounded up to an appropriate value e.g. 191,	

12		ow synthetic and manmade fibres can be engineered to be properties of the fabrics made from them.	6 marks	AO4 1B
	5-6 marks	Demonstrates a detailed understanding how synthetic and man-made fibres can be engineered to improve the properties of the fabrics made from them. The answer refers to cross sectional modifications which can be made to the fibre and how this affects the properties for the fabric and wearer. The discussion is made clearly and accurately. There may be some minor irrelevant points or lack of clarity in some points but this will not detract from the overall quality of the response.		
	3-4 marks	Demonstrates a good understanding of how synthetic and man-made fibres can be engineered to improve the properties of the fabrics made from them. The answer relates to fibre properties but little about how they can be engineered and is mainly correct.		
	1-2 marks	Demonstrates a basic understanding of how synthetic and man-made fibres can be engineered to improve the properties of the fabrics made from them. The answer may discuss properties of a similar type. At the lower end of the mark band the answer may include confused information.		
	0 marks	No response worthy of credit.		
	Indicative	content:		
	The ber	nefits of changing the shape of the fibre cross section can		

mean that the fibre has different properties which may be desirable to the designer and manufacturer. The benefits of this process can improve the appearance, softness, texture, handle, lustre or the warmth of the fibre.

- Nylon and Polyester are circular and round when extruded through a regular spinneret. When the holes in the spinneret head are changed to a different shape it forces the fibres to become a different shape.
- A fibre such as nylon may be made in a tri-lobal shape so that it has less surface area touching the skin and when it is worn this makes it feel more comfortable for the wearer.
- A crimped fibre can be engineered using heat setting to have better thermal capabilities similar to woollen fibres.
- A fibre may be engineered to have improved wicking properties, have a better handle or feel and higher or lower lustre.
- Microencapsulation this can dramatically change the fibres by adding moisturisers, perfumes, caffeine etc.
- Candidates may refer to Coolmax, Tactel or microfibres.

13		e different processes that need to be followed when cotton fabric for dyeing and printing.	9 marks	AO4 1A
	7-9 marks	Detailed knowledge of the different processes that need to be followed when preparing cotton fabric for dyeing and printing is demonstrated. The information is clearly and accurately related to cotton fabric. At the top end of the mark band the answer links to most processes which would be followed. There may be some minor irrelevant points but this will not detract from the overall quality of the response.		
	4-6 marks	Good knowledge of the different processes that need to be followed when preparing cotton fabric for dyeing and printing is demonstrated. Some processes are explained with reasonable detail. The information is mainly clear and suitable for cotton fabric but may not use technical subject related vocabulary.		
	1-3 marks	Basic knowledge of the different processes that need to be followed when preparing cotton fabric for dyeing and printing is demonstrated. Few processes are given, with little explanation. The information is simplistic, lack the correct names of processes and may refer to classroom processes such as ironing and quality checks.		
	0 marks	No response worthy of credit.		
	Indicative	content:		
	Scouring	g: removed the oily impurities that would prevent the fabric		

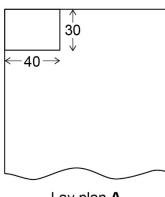
from being 'wetted' as they reduce the absorbency of the fabric. Cotton fibres are scoured by boiling them in caustic soda solution.

- Mercerising cotton can important, the process involves placing the fabric in a heated solution and then washing. This pre-shrinks the fabric and increases how well the dye will take.
- Desizing is the first stage fabric will have to undergo as it has imperfections and size (starch) which was added for strength to the yarns which will need to be removed. Most of the size is dissolvable in water and so can be removed by bathing the fabric.
- Fabrics are also bleached if the surface of the fabric must be without colour before dying and the white colour must be even.
 Cotton fabrics are bleached with a hypochlorite bleach or hydrogen peroxide.
- The fabric may be passed through a stenter (tenter also correct) machine to pull it back into shape (realign the warp and weft at 90°) after scouring and bleaching.

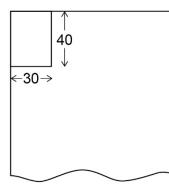
Award any other valid responses.

A manufacturer has a 10 m length of non-woven fabric measuring 140 cm wide.

Using each lay plan below calculate the maximum number of rectangular pieces measuring 30 x 40 cm that can be cut from the fabric.







Lay plan B

State if lay plan A or lay plan B gives more rectangular pieces.

You **must** show your working.

A mark cannot be given for a correct final answer, without supporting evidence in the working out.

Must get to step two for both layplans in order to award a mark for the final answer.

5 marks AC

AO4 1C

Lay plan A: 40cm across, 30cm down		
$140 \div 40 = 3(.5)$ Can be implied from diagram $1000 \div 30 = 33$ (.3) Can be implied on diagram	(1 mark)	
3 × 33 = 99 pieces	(1 mark)	
Lay plan B: 30cm across, 40cm down		
$140 \div 30 = 4 \text{ or } [4.6,4.7] \text{ or better}$ can be implied fro $1000 \div 40 = 25$	m diagram (1 mark)	
4 × 25 = 100 pieces	(1 mark)	
Answer: Lay plan B with 99 and 100 seen	(1 mark)	

15	•	ow ceramic and carbon fibres can be used to enhance and textile products.	6 marks	AO4 1B
	5-6 marks	A detailed understanding of how ceramic and carbon fibres can be used to enhance fashion and textile products is demonstrated in the answer. Both ceramic and carbon fibres are explained equally well. There may be some minor irrelevant points or lack of clarity in some points but this will not detract from the overall quality of the response.		
	3-4 marks	A good understanding of how ceramic and carbon fibres can be used to enhance fashion and textile products is demonstrated in the answer. There may be an imbalance of information about ceramic and carbon fibres, however there will be some points made to show a reasonable understanding.		
	1-2 marks	A basic understanding of how ceramic and carbon fibres can be used to enhance fashion and textile products is demonstrated in the answer. The candidate gives limited explanations, with few points to illustrate the answer. There may be confusion and incorrect information.		
	0 marks	No response worthy of credit.		
	Indicative	content:		
		c molecules can be incorporated into synthetic fibres, y coating them with ceramic particles or by encapsulating		

them within the fibre.

- The inclusion of ceramic molecules in a synthetic fibre can give the fabric UV protection properties, eg Esmo and Sunfit fabrics.
- Ceramic molecules can also make fabrics which are able to regulate body temperature, eg Thermolite, a lightweight fibre with a hollow core
- Ceramic molecules can also the strength of the finished fabric.
- Carbon fibres, including Graphene, are extremely strong.
- Carbon fibre is very lightweight and these properties make it very popular in aerospace, civil engineering, military, and motorsports.
- Carbon fibres are used in the production of electro-conductive fibres used to make intelligent fabrics or wearable computers.
- Carbon fibres are flame retardant and are used to make some specialised fabrics such as those used for aeroplane interiors.
- They are also very abrasion resistant, and can be used for protective sports clothing and tyres.
- Ceramic and carbon fibres are used to produce nano-fibres.

16	Describe h	now virtual modelling and testing is used in fashion design facture.	9 marks	AO4 1C
	7-9 marks	Detailed knowledge and understanding of how virtual modelling and testing is used in fashion design and manufacture is demonstrated in the answer. A wide range of examples are given which relate to both designing and manufacturing processes accurately. There may be some minor irrelevant points or lack of clarity in some points but this will not detract from the overall quality of the response.		
	4-6 marks	Good knowledge and understanding of how virtual modelling and testing is used in fashion design and manufacture is demonstrated in the answer. There are some inaccuracies and lack of detail but some attempt has been made to designers and/or manufacturers.		
	1-3 marks	Basic or little knowledge and understanding of how virtual modelling and testing is used in fashion design and manufacture is demonstrated in the answer. The answer is simplistic and may only refer to CAD.		
	0 marks	No response worthy of credit.		
	Indicative	content:		
	virtual m	istomisation of a garment can be made by grading through nodelling easily, quickly and confidently. mer can select fabrics for a made to measure garment and		

see it modelled on their body measurements before it has been made. Customisation is sometimes offered in online shopping.

- When all of the digital information for a pattern is input into a computer system a virtual prototype can be modelled.
- Digital body scanners allow for the body measurements for a client or specifically sized model to be used to virtually model from the pattern pieces.
- The style, fabric and features can be changed / adapted at this stage before making a toile or cutting any fabric.
- A pattern design system works with the virtual modelling system on the computer to enable any changes to be synchronised.
- Testing through virtual modelling is important to save costs of fabric and human models.
- Virtual modelling can enable the garment to be shared electronically with clients, or others for collaboration.
- The system can simulate texture, draping and fit of garments by displaying them on a realistic human body form. This way the customer can see how the final product will look and drape on their own body.
- Virtual modelling can ensure that a pattern is matched properly and allow for different colourways to be tested. The designer may also want to trial different scales of motif in a pattern virtually.
- Creating a 3D model of the garment is important for visualisation of a concept.
- Designs can be saved and stored electronically, and adapted from existing pattern templates.

17	Name two aramid fibres.	2 marks	AO4 1A
	Nomex Kevlar		
	Any 2 aramid fibres, 1 mark for each.		
	Also accept: Twaron, Technora or Heracron.		
	Award any other valid responses.		

18		ne purposes and processes involved in establishing , patents and registered designs.	6 marks	AO4 1B
	5-6 marks	Detailed understanding of the purposes and processes involved in establishing copyright, patents and registered designs is demonstrated in the answer. The candidate refers to copyright, patents and registered designs fairly equally and does not confuse the information between each category. There may be some minor irrelevant points or lack of clarity in some points but this will not detract from the overall quality of the response.		
	3-4 marks	Good understanding of the purposes and processes involved in establishing copyright, patents and registered designs is demonstrated in the answer. The candidate refers to 2 of the categories of the copyright, patents and registered designs. If all 3 are referenced the information lacks detail. Some of the information blurs the lines between each category.		
	1-2 marks	Basic understanding of the purposes and processes involved in establishing copyright, patents and registered designs is demonstrated in the answer. The candidate refers to 1 of the categories of the copyright, patents and registered designs. If more than 1 is referenced the information is extremely simplistic. Much of the information blurs the lines between each category.		

0 marks No response worthy of credit.

Indicative content:

Copyright:

- Copyright artwork, illustrations and designs should be marked with a © Copyright symbol, the designers name and the year that it was created. This protects the work from being reproduced without permission.
- Copyrights last for up to 70 years after the owner/artists death. If a designer wishes to sell or allow others to use their work, they can license the copyright and make an agreement with them.
- There is no register for copyright work.

Patents:

- Patents are usually hard to obtain. The application for a patent provides a detailed description of the intention with diagrams to explain how it works
- A patent lasts for 20 years but has to be renewed annually.
- Patents are used to protect something which is new and inventive.
 This type of protection is not meant for aesthetic, creative or artist work.
- A patent protects the way in which a product works and prevents others from manufacturing it in the same manner.
- Patents also protect from others using, selling or importing the new invention without the inventor's permission.

Registered designs:

- Registered designs can protect the shape, decoration and appearance of a product by register design.
- The registered design protection lasts for a long time although the registration must be renewed regularly.
- Each registered design is allocated a number and this can be displayed on the product or product label.
- To be registered the work must be the designers own new design with no offensive images, logos or words included in the designs

	Award any other valid responses.	

19	achieve di	ny it is important to select the correct type of thread to ifferent decorative effects. Inples of specific threads in your answer.	6 marks	AO4 1B
	5-6 marks	Detailed understanding of why it is important to select the correct type of thread to achieve different decorative effects. The candidate gives very good information about different types of thread, with accurate knowledge about the correctly matched decorative effect. The answer does not just mention aesthetics, some information may be given about the fibre content which contribute to the thread properties.		
	3-4 marks	Good understanding of why it is important to select the correct type of thread to achieve different decorative effects. The candidate gives some information about a small range of threads, and matches the decorative effect with some degree of accuracy. The answer may lack detail in parts, but demonstrates a reasonable understanding.		
	1-2 marks	Basic understanding of why it is important to select the correct type of thread to achieve different decorative effects is demonstrated in the answer. The candidate gives limited or little information about the thread, and may match decorative effects without clarity. There may be confusion and a lack of accuracy.		

0 marks	No response worthy of credit.
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Indicative content:

- It is important to select the correct thread for decorative stitching in order to get the best results of the technique which is being used.
- Embroidery threads are often used for decorative stitching, especially when sewing hand embroidery. There are a large range of different fibres types such as silk, cotton, wool and viscose.
 Embroidery thread is usually stranded and can be separated for different thicknesses.
- Machine embroidery a fine glossy thread, often popular brand Madeira, is required to give a lustrous finish to the lettering or motif being sewn. This thread is suited to machine decorative stitching as it doesn't tangle and gives added strength.
- Metallic effect threads are usually made with polyester, viscose and rayon and give lustrous 3D effect. Metallic threads have a polyester core and metallic foil wrapped around it to add sparkle.
- Variegated threads are multi-coloured and change colour as they unreel, this can give a graduated colour effect to a large area of machine embroidery.
- Glow in the dark threads may be used on children's clothing to add decoration.
- Textured threads may be used to create interest in couching on decorative items such as cushions.
- Invisible thread, such as nylon, allow techniques such as beading onto a fabric surface, without detracting from the effect.
- Conductive thread will allow products to make use of new developments, eg e-textiles.
- Shirring thread or elastic, can be used to add surface texture.

20	Explain the difference between fad, standard and classic fashion cycles.		6 marks	AO4 1B
	5-6 marks	Detailed understanding of the difference between fad, standard and classic fashion cycles is shown in the answer. The candidate refers to all 3 accurately, and makes links to the length of time each cycle usually lasts. The information is correct and clearly distinguishes between each type of cycle.		
	3-4 marks	Good understanding of the difference between fad, standard and classic fashion cycles is demonstrated in the answer. The candidate refers to all 3 of the cycles		

	fairly accurately and may mention timings of each cycle but the information may lack clarity.
1-2 marks	Basic understanding of the difference between fad, standard and classic fashion cycles is demonstrated in the answer. The candidate simplistically refers to all 3 of the cycles but the information may be quite confused and inaccurate.
0 marks	No response worthy of credit.

Indicative content:

Fad:

- Fads are a temporary craze to buy a particular fashion.
- Often seen in novelty seasonal products such as Christmas items.
- It quickly becomes the 'in thing' or 'must have' item and as people rush to buy it, it may sell out making the need greater to find the item still for sale.
- A fad may last for a few weeks or 1 season, it is a short-lived fashion cycle that quickly drops out of flavour.

Standard:

- Standard fashions have a longer popularity than fad fashions and can be seen worn for a longer time.
- These fashion cycles overlap with fad clothing and can be seen with different trends of the time. These styles may come back into fashion from time to time.
- A standard fashion may last for one or two seasons, a medium length of fashion cycle.

Classic:

- Classic clothing can be seen as a staple of the wardrobe to be worn over time.
- They remain popular for many years and never seem to go out of fashion.

Candidates may draw diagrams or graphs to illustrate their answer. Marks should be awarded for this information although this format is not necessary.