A-level

DESIGN AND TECHNOLOGY: FASHION AND TEXTILES 7562/1

Paper 1 Technical Principles

Mark scheme

June 2024

Version: 1.0 Final

246A7562/1/MS

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 Examiner.

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.

No student should be disadvantaged on the basis of their gender identity and/or how they refer to the gender identity of others in their exam responses.

A consistent use of 'they/them' as a singular and pronouns beyond 'she/her' or 'he/him' will be credited in exam responses in line with existing mark scheme criteria.

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.

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]
Their	Accept an answer from the candidate if it has been inaccurately calculated but is subsequently used in a further stage of the question.

Questions which do not ask students to show working

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

<table>
<tr><th>Qu</th><th>Part</th><th>Marking Guidance</th><th>Total marks</th><th>AO</th></tr>
<tr><td>01</td><td></td><td>Complete Table 1 by inserting the correct textile term from the list below next to its description.

Do not use any term more than once.

Bouclé Chambray Corduroy False twist

Herringbone Madras Organdie Sateen

<table>
<tr><th>Description</th><th>Textile Term</th></tr>
<tr><td>A lightweight crisp fabric with a transparent appearance</td><td>Organdie</td></tr>
<tr><td>A yarn with snarls and crinkles made through heat setting</td><td>False twist</td></tr>
<tr><td>A checked pattern made with brightly coloured cotton yarns</td><td>Madras</td></tr>
<tr><td>A three-ply yarn with irregular loops along its length</td><td>Bouclé</td></tr>
<tr><td>A smooth weft-faced fabric with a very high lustre</td><td>Sateen</td></tr>
<tr><td>A cut pile fabric with rows running parallel to the selvage</td><td>Corduroy</td></tr>
</table>

Marking guidance: accept only one textile term in the answer space.</td><td>6 marks</td><td>AO4 1a</td></tr>
</table>

Qu	Part	Marking Guidance	Total marks	AO
02		Give **three** reasons for using linings in fashion garments. **Indicative content** • To add **warmth** • For added **drape/**to **hang** well • To create **structure/shape/stability** • Increase garment **durability/strength/to prevent fraying** • **Hides construction details**/raw edges/seams • To increase the **opacity** of sheer outer fabrics • **Aesthetic**/decoration/use of contrasting colour or printed fabric • **Soft** against skin/prevents itching of coarse fabrics/**comfort** • **Smooth**, allowing garments to slip on easily • **For quality**/neat finish. Award any other valid responses. Award 1 mark per correct answer, up to a maximum of 3 marks.	**3 marks**	AO4 1a

<table>
<tr><th>Qu</th><th>Part</th><th>Marking Guidance</th><th>Total marks</th><th>AO</th></tr>
<tr><td>03</td><td></td><td>Explain the differences between plain woven silk and polyester satin fabrics and the reasons why they are used for garment linings.

Refer to specific examples of products in your answer.

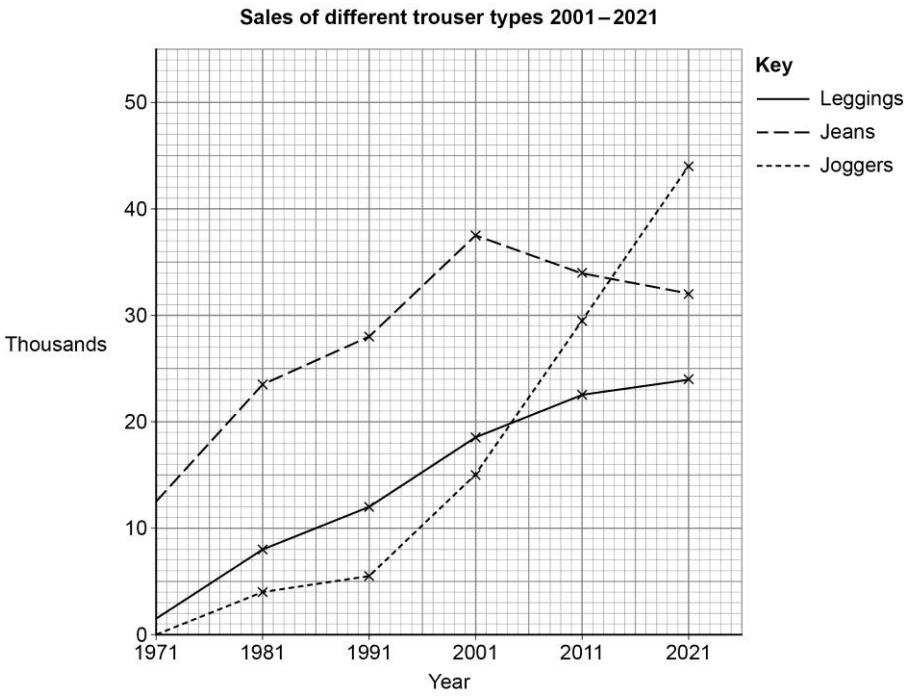
<table>
<tr><td>7–9 marks</td><td>Detailed explanation of the differences between plain woven silk and polyester satin fabrics for garment linings. The response sets out the main characteristics of both plain-woven silk and polyester satin, and is able to identify a range of differences between them. The information given about both the fibre and fabric type is mostly accurate and in particular relates to the use of garment linings. The more knowledgeable responses refer to specific examples of products in the answers. Although there may be a slight lack of detail at the low end of the mark band, the information is largely correct.</td></tr>
<tr><td>4–6 marks</td><td>Good explanation of the differences between plain woven silk and polyester satin fabrics for garment linings. The response sets out some of the main characteristics of plain-woven silk and polyester satin, and is able to identify a few differences between them. The information given about both the fibre and fabric type is somewhat accurate, and in most cases, relates to the use of garment linings. The more knowledgeable responses may refer to a few specific examples of products in the answers. Although there may be a slight lack of detail at the low end of the mark band, the information is broadly correct.</td></tr>
<tr><td>1–3 marks</td><td>Basic explanation of the differences between plain woven silk and polyester satin fabrics for garment linings. The response sets out a few characteristics of plain-woven silk and/or polyester satin, and is able to identify a limited number of differences between them. The information given about both the fibre and fabric type is slightly confused and may not relate to the use of garment linings, however there may be an attempt to link the fabrics with examples of products in the answers. There are likely to be inaccuracies and irrelevant points at the low end of the mark band.</td></tr>
<tr><td>0 marks</td><td>No response worthy of credit.</td></tr>
</table>
</td><td>9 marks</td><td>AO4 1b</td></tr>
</table>

Plain woven silk	Polyester satin
Naturally **breathable**, silk has its own thermal regulation qualities and maintains body temperature.	Synthetic polyester fibres are **not naturally breathable**; the fabric may get hot and clammy when worn.
Very absorbent, but can also absorb stains easily.	**Non-absorbent**, which makes it good at repelling stains.
Has **some strength**, but may not be durable in areas of high wear.	**Strong and durable** fabric in all areas.
Silk fibres usually **drape very well**, however the weave does not drape as easily.	The polyester filament fibres are very smooth, along with the satin weave this creates **excellent drape**.
Moisture in the fibre makes silk anti-static and comfortable to wear.	Polyester has **no moisture** in the fibre making it static, so may be uncomfortable to wear.
Both silk and the plain weave can **crease easily**, especially in areas of wear.	Both the fabric and the satin weave allow good **crease resistance**.
Silk has a fairly soft and smooth surface and usually a **lustrous texture**.	Has a luxury and very **shiny** appearance.
The fibre can be very **expensive**.	Polyester fibres are usually **inexpensive**.
The smoothness of the plain weave adds to the **durability** of the fabric.	The satin weave can **snag** and start to look unsightly and worn.

Products:
Coats, jackets, dresses, skirts and trousers are some examples of garments that may require lining.

Award any other valid responses.

Marking guidance: this question is not about the benefits of linings; credit should be awarded for explaining the differences between the two fabric types in relation to their use for linings.

Qu	Part	Marking Guidance	Total marks	AO
04		Complete the graph using the data given in **Table 2**.  1 mark for **each** correctly plotted line up to a maximum of three marks. **Marking guidance:** allow a half of one square as tolerance for correct plotted points. Line should be straight between each plotted point.	**3 marks**	AO4 1c

<table>
<tr><th>Qu</th><th>Part</th><th>Marking Guidance</th><th>Total marks</th><th>AO</th></tr>
<tr><td>05</td><td></td><td>Outline the specific fabric properties required in clothing for the following two jobs:

• Coffee shop worker
• Racing car driver

<table>
<tr><td>5–6 marks</td><td>Detailed outline of the fabric properties for two different job roles. The response shows an insight into the requirements of the question, with appropriate links made between specific fabric requirements for both a coffee shop worker and a racing car driver. The information is accurate and appropriate for each of the two jobs, although there may be slightly more information in one area/job over the other. There are a range of points, which may lack a slight amount of detail at the low end of the mark band, but this does not detract from an in-depth response.</td></tr>
<tr><td>3–4 marks</td><td>Good outline of the fabric properties for two different job roles. The response shows some insight into the requirements of the question, with some links made between specific fabric requirements for both a coffee shop worker and a racing car driver. The information is mostly accurate and appropriate for each of the two jobs, although there is likely to be more information in one area/job over the other. There are a few points, which may lack a slight amount of detail at the low end of the mark band, but this does not detract from the response.</td></tr>
<tr><td>2–1 marks</td><td>Basic outline of the fabric properties for two different job roles. The response shows a limited insight into the requirements of the question, with few appropriate links made between specific fabric requirements for both a coffee shop worker and a racing car driver. The information may be inaccurate and slightly inappropriate for the jobs, with more information in one area/job over the other. The points made are very generalised, and at the low end of the mark band there is some confusion and lack of knowledge.</td></tr>
<tr><td>0 marks</td><td>No response worthy of credit.</td></tr>
</table>

Indicative content</td><td>6 marks</td><td>AO4 1c</td></tr>
</table>

		Coffee shop worker • **Easy care** fabrics for regular washing • **Stain or water resistant** so garments look clean at all times • **Cost effective** for large quantities of garments • **Hardwearing** fabrics that do not need replacing often • **Water, crease resistance** or **sanitised finishes** such as Teflon® or Purista® • **Breathability** when working in warm environments • **Dark coloured or patterned** fabrics to hide stains. Racing car driver • **Comfortable** fabrics that are soft on the skin • **Breathable fabrics** that allow perspiration to be wicked away, keeping the wearer dry • **Stretch** and flexibility in fabrics that allow for ease of movement • **Heat/flame protection** such as Nomex® or Kevlar® • **Abrasion resistant** or **durable/strong** fabrics to protect wearer. Award any other valid responses. Marking guidance: no credit awarded for referencing specific fibre types or fabric structures.		

<table>
<tr><th>Qu</th><th>Part</th><th>Marking Guidance</th><th>Total marks</th><th>AO</th></tr>
<tr><td>06</td><td></td><td>Analyse and evaluate how guidance and requirements for manufacturers ensure that products are safe for consumers.

In your answer refer to:

• consumer legislation
• role of the BSI
• labelling advice.

<table>
<tr><td>7–9 marks</td><td>Detailed analysis and evaluation how guidance and requirements for manufacturers ensure that products are safe for consumers. There is an in-depth response, which includes points relating to all three specific areas of the question: consumer legislation, role of the BSI and labelling advice. The information is correct and relevant to each area, although there may be minimal detail in one or two over the other, but there is a good balance of information. The analysis and evaluation will focus more on positive points, but there are negative comments. At the low end of the mark band there may be a slight lack of detail, but this does not detract from a quality response.</td></tr>
<tr><td>4–6 marks</td><td>Good analysis and evaluation how guidance and requirements for manufacturers ensure that products are safe for consumers. There is a good response, which includes points relating to two/three areas of the question: consumer legislation, role of the BSI and labelling advice. The information is mostly correct and relevant to each area, although there is likely to be more detail in one or two over the other. The analysis and evaluation focuses on positive points, but there may be some negative comments, reflecting the indicative content. At the low end of the mark band there may be a lack of detail, along with some inaccuracies.</td></tr>
<tr><td>1–3 marks</td><td>Basic analysis and evaluation how guidance and requirements for manufacturers ensure that products are safe for consumers. A weak response, which may only relate to one or two areas of the question: consumer legislation, role of the BSI and labelling advice. The information is superficial, although there may be more detail in one area, there may be confusion. The analysis and evaluation will focus on positive points, with very few, if any, negative comments. At the low end of the mark band there is a lack of information and inaccuracies.</td></tr>
<tr><td>0 marks</td><td>No response worthy of credit.</td></tr>
</table>
</td><td>9 marks</td><td>AO3 2a
AO3 2b</td></tr>
</table>

Indicative content

Consumer legislation

- Consumers have the **legal right** to expect the products sold in retail stores are **safe** and suitable for their purpose.
- The **Consumer Rights Act 2015** (replaces the Sale of Goods Act 1979) sets out consumer protection laws and the way in which goods are purchased, whether in store or online. Manufacturers have a responsibility to ensure that their goods **meet with consumer needs**. They must be:
- **Of satisfactory quality** - goods must not be faulty or damaged.
- **Fit for purpose** - goods must do the job they were designed for e.g.; a waterproof coat must keep the wearer dry in rainy conditions.
- **As described** - goods must match any manufacturer samples or description at the time of purchase.

Evaluative points:

- However, not all manufacturers follow the legal guidelines. In the UK, most laws are enforced, but in offshore counties, where the majority of fashion products are made, the **laws are different**, or sometimes do not exist.
- Manufacturers who do not follow legislation can be **fined** and the consumer has a right to reject the products.
- It could also be **time consuming and costly** to pursue claims through the courts.

Role of the BSI

- The **BSI set standards** for a range of products. These standards are published, so that manufacturer can choose to **follow their recommendations** in ensuring the safety of products.
- The BSI will award certification for goods that pass their safety standards, and products will carry the **Kitemark**.
- Many standards are a **legal requirement**, for example:
- Quality & safety of products.
- Flammability levels of different fabrics and product types e.g. children's nightwear.

Evaluative points:

- However, some of the BSI's guidelines **are voluntary** - manufacturers do not have to follow them.
- The BSI mainly apply to British and European products, manufacturers who import products into the UK **do not have to follow** the recommendations as set out by BSI.
- This can compromise safety, leading to **bad reputations** for manufacturers are retailers.

		Labelling advice • Manufacturers have a responsibility to ensure the products they make are supplied with **correct labelling** information for consumers. Labelling could take many forms, they may be stitched into a seam, attached as a swing ticket or printed onto packaging. • Labelling is controlled by **UK and EU legislation**, and some by the manufacturer. For example: • Safety warnings such as **flammability labelling**, which is a legal requirement for a permanent label on children's' nightwear up to the age of 13. • Aftercare advice/care label - the care label is a requirement of all products, stating the **fibre content and their percentages** is a legal requirement, as is a **country of origin** label. The care advice is not a legal requirement, but is strongly encouraged. • The **Lion mark** is a voluntary code for toy makers to highlight products that need stringent safety guidelines. • **CE** on packaging for textile toy products certifies that the item has passed basic European safety guidelines. Evaluative points: • However, manufacturers often fail to include some of the labelling which can potentially be **unsafe for consumers**. • Consumers should be informed of as much detail on a product, if a manufacturer fails to label adequately, it may result in **loss of sales**. Award any other valid responses.		

Qu	Part	Marking Guidance	Total marks	AO
07	**01**	Use the data in **Table 3** to calculate the cost of all materials required to make **one** hoodie. Put your answer in the table. Answer: £**8.96**	**1 mark**	AO4 1c

Qu	Part	Marking Guidance	Total marks	AO
07	**02**	The cost of materials for a different hoodie is £11.29. The manufacturing cost for this hoodie is 56% of the materials cost. Calculate the amount of profit a retailer makes on a batch of 4500 hoodies retailing at £37.99. Give your answer to **two** decimal places. Show your working.	**4 marks**	AO4 1c

56% of £11.29: 11.29 x 0.56 or 6.3224	1 mark M
Total materials and manufacturing costs: 11.29 + their 6.3224 or their 17.612	1 mark M
Retail minus all costs: 37.99 – their 17.6124 or their 20.3776	1 mark M
Profit per hoodie x batch 20.3776 x 4500 **Answer: £91,699.20** (exact) or **Accept £91,710** (when rounding to nearest penny at each stage)	1 mark A Please note: a correct answer, with or without working, is credited with full marks.

<table>
<tr><th>Qu</th><th>Part</th><th>Marking Guidance</th><th>Total marks</th><th>AO</th></tr>
<tr><td>07</td><td>03</td><td>A retailer orders a batch of 1420 hoodies. The hoodies are either blue, white or grey in the ratio 5:1:4.

How many grey hoodies are in the batch?

Show your working.

<table>
<tr><td>1420 ÷ 10

or

142</td><td>1 mark M</td></tr>
<tr><td>142 x 4

Answer: 568</td><td>1 mark A

Please note: a correct answer, with or without working, is credited with full marks.</td></tr>
</table>
</td><td>2 marks</td><td>AO4 1c</td></tr>
</table>

<table>
<tr><th>Qu</th><th>Part</th><th>Marking Guidance</th><th>Total marks</th><th>AO</th></tr>
<tr><td>07</td><td>04</td><td>In a sale a discount of 25% is offered on a hoodie priced at £37.99.

On the last day of the sale a further 10% is taken off the discount price.

Calculate the cost of one hoodie to the nearest penny after all discounts.

Show your working.

<table>
<tr><td>(37.99 – 25%)

0.25 x 37.99 = 9.4975
37.99 - 9.4975

or

0.75 x 37.99

or

28.4925</td><td>1 mark M</td></tr>
<tr><td>(28.4925 -10%)

0.10 x 28.4925 = 2.84925
28.4925 – 2. 84925

or

25.64325

Answer: £25.64</td><td>1 mark A

Please note: a correct answer, with or without working, is credited with full marks.</td></tr>
</table>
</td><td>2 marks</td><td>AO4 1c</td></tr>
</table>

<table>
<tr><th>Qu</th><th>Part</th><th>Marking Guidance</th><th>Total marks</th><th>AO</th></tr>
<tr><td>07</td><td>05</td><td>Calculate the length of ribbing needed to make the pocket.

Show your working.

<table>
<tr><td>¼ π 32

or

25.13

[25.12, 25.136]
(One half of the pocket)</td><td>1 mark M</td></tr>
<tr><td>[25.12, 25.136] x 2
(both pocket openings)</td><td>1 mark M</td></tr>
<tr><td>Answer:
[50.24, 50.272]</td><td>1 mark A

Please note: a correct answer, with or without working, is credited with full marks.</td></tr>
</table>
</td><td>3 marks</td><td>AO4 1c</td></tr>
</table>

<table>
<tr><th>Qu</th><th>Part</th><th>Marking Guidance</th><th>Total marks</th><th>AO</th></tr>
<tr><td>08</td><td></td><td>Explain why double jersey fabric is used for hoodies.

<table>
<tr><td>5–6 marks</td><td>Detailed explanation why double jersey fabric is used for hoodies. The response is thorough, with points that show an in-depth knowledge of the knitted structure of double jersey fabric and the reasons for its use. At the top end of the mark band the points made are relevant and correct, while at the low end there may be less detail and a slight lack of accuracy, but this does not detract from an overall response.</td></tr>
<tr><td>3–4 marks</td><td>Good explanation why double jersey fabric is used for hoodies. The response is good, with points that show a good knowledge of double jersey fabric and the reasons for its use. At the top end of the mark band some points are relevant and correct with a few points; at the low end, response will lack some detail however there is sufficient information with some accuracy.</td></tr>
<tr><td>1–2 marks</td><td>Basic explanation why double jersey fabric is used for hoodies. The response is weak, with few or no points that show knowledge of double jersey fabric and the reasons for its use. At the top end of the mark band there may be a little correct information, however, there is likely to be confusion and inaccuracy at the low end of the mark band.</td></tr>
<tr><td>0 marks</td><td>No response worthy of credit.</td></tr>
</table>

Indicative content

• Double jersey's knitted structure allows some stretch and flexibility, with good drape
• It has a fairly thick handle, making the fabric comfortable to wear
• Air trapped in the knit allows for warmth
• Moving air through the fabric can also keep the wearer cool/breathable
• It has very good durability, due to the two layers of knitted loops
• Does not crease easily, so looks newer for longer
• Both sides of the fabric look the same, creating a smooth surface
• It is stable structure, allowing printing or embroidering onto the surface
• Double jersey does not ladder or curl.

Award any other valid responses.

Marking guidance: this question is about knitted double jersey fabric, do not award credit for references to fibre content.</td><td>6 marks</td><td>AO4 1b</td></tr>
</table>

Qu	Part	Marking Guidance	Total marks	AO
09		Give **three** different types of mechanical finishes. **Indicative content** • Brushing/raising/napping • Calendering • Embossing • Heat setting/pleats/crinkles • Stone/sand washing. Award any other valid responses. Award 1 mark per correct answer, up to a maximum of 3 marks.	**3 marks**	AO4 1a

<table>
<tr><th>Qu</th><th>Part</th><th>Marking Guidance</th><th>Total marks</th><th>AO</th></tr>
<tr><td>10</td><td></td><td>Outline the differences between the manufacture of felt and needle felt.

<table>
<tr><td>3–4 marks</td><td>Good outline of the differences between felt and needle felt when manufacturing non-woven fabrics. At the top end of the mark band there will be many accurate references to the differences between the two fabrics, which are presented with a moderately balanced viewpoint that show good fabric knowledge. There is a clear knowledge that felt is made by hand, while needle felt is made with mechanical action. At the low end of the mark band there may be some confusion or inaccuracy in one fabric over the other, but on the whole, there is a good differentiation between the two fabrics.</td></tr>
<tr><td>1–2 marks</td><td>Basic outline of the differences between felt and needle felt when manufacturing non-woven fabrics. At the top end of the mark band there will be some accurate references to either the differences between the two fabrics or there may be limited points that show knowledge of one fabric only. There is a limited knowledge that felt is made by hand, while needle felt is made with mechanical action. At the low end of the mark band there is confusion or inaccuracy, with little knowledge shown of the differences between the two fabrics, although there may be very basic points that focus on one fabric only.</td></tr>
<tr><td>0 marks</td><td>No response worthy of credit.</td></tr>
</table>

Indicative content:

<u>Felt</u>
• Usually made by hand
• Uses the natural ability of wool fibres
• To cause the fibres to matt/lock together
• By the overlapping scales on the fibre
• In the presence of all three: water, heat and agitation.

<u>Needle felt</u>
• Made with mechanical action
• Usually made with synthetic fibres/wool fibres can be used for handmade pieces
• Fibres are entangled or loop together
• Through mechanical/needle action into the fibre batt
• By the use of a series of barbed needles.

Award any other valid responses.</td><td>4 marks</td><td>AO4 1a</td></tr>
</table>

Qu	Part	Marking Guidance	Total marks	AO
11		State what is meant by the term colour fast. **Indicative content** • The ability of a fabric to **retain** its colour/**not fade** or **lose** its colour. Award any other valid responses. Award 1 mark for a correct answer	**1 mark**	AO4 1a

<table>
<tr><th>Qu</th><th>Part</th><th>Marking Guidance</th><th>Total marks</th><th>AO</th></tr>
<tr><td>12</td><td></td><td>Describe an industrial test used to measure and compare colour fastness in fabrics when exposed to light.

<table>
<tr><td>5–6 marks</td><td>Detailed description of an industrial test used to measure and compare colour fastness in fabrics when exposed to light. The response gives a valid account of an appropriate testing method, with a high level of correct information and accuracy. There is a logical approach, setting out most of the steps required to carry out a successful test. There may be a slight lack of information at the low end of the mark band, however most points given in the indicative content will be described in detail.</td></tr>
<tr><td>3–4 marks</td><td>Good description of an industrial test used to measure and compare colour fastness in fabrics when exposed to light. The response gives a reasonably valid account of an appropriate testing method, with a good level of correct information and some accuracy. There is a fairly logical approach, setting out some of the steps required to carry out a successful test. There may be a slight lack of information at the low end of the mark band, however some points may be described with detail.</td></tr>
<tr><td>1–2 marks</td><td>Basic description of an industrial test used to measure and compare colour fastness in fabrics when exposed to light. The response gives a weak account of a testing method, which may be not be appropriate, with a limited amount of correct information and accuracy. There is confusion in the approach, which is unlikely to lead to a successful test. A general lack of information, with few, if any points given in the indicative content described with accuracy.</td></tr>
<tr><td>0 marks</td><td>No response worthy of credit.</td></tr>
</table>

Indicative content

• A sample of the fabric is cut to a smaller size for testing
• The fabric sample is exposed to artificial light/UV/lightbox
• A section of the sample fabric, used as a control, is covered with an opaque material to block the light
• The fabric sample is exposed to the light for a set period of time
• The two areas of the fabric sample are compared
• Results may show or a change of colour/fading of colour
• Grey scale cards are used to measure a change in appearance
• Colour fastness is rated from 1-5, a five indicating no change in the appearance of the fabric.

Award any other valid responses.</td><td>6 marks</td><td>AO4 1b</td></tr>
</table>

<table>
<tr><th>Qu</th><th>Part</th><th>Marking Guidance</th><th>Total marks</th><th>AO</th></tr>
<tr><td>13</td><td></td><td>Calculate the area of the centre square of the quilted pattern shown in Figure 3.

<table>
<tr><td>8.5^2</td><td>1 mark M</td></tr>
<tr><td>$\sqrt{8.5^2 + 8.5^2}$
or
$8.5^2 + 8.5^2$
or
8.5 x 8.5 x 2</td><td>1 mark M</td></tr>
<tr><td>144.5 cm^2</td><td>1 mark A</td></tr>
</table>
</td><td>3 marks</td><td>AO4 1c</td></tr>
</table>

Qu	Part	Marking Guidance	Total marks	AO
14	**1**	Give **one** example of a laminated fabric. **Indicative content** • Gore-Tex® • Sympatex® • Pleather, vegan, fake or faux leather/pvc or vinyl. Award any other valid responses. Award 1 mark for a correct answer.	**1 mark**	AO4 1a

Qu	Part	Marking Guidance	Total marks	AO
14	**2**	Explain what is meant by a laminated fabric. **Indicative content** • Two or more fabrics/layers • Held together with adhesive/the heat setting or thermoplastic properties of the fabrics. Award any other valid responses. Award 1 mark per correct answer, up to a maximum of 2 marks.	**2 marks**	AO4 1a

<table>
<tr><th>Qu</th><th>Part</th><th>Marking Guidance</th><th>Total marks</th><th>AO</th></tr>
<tr><td>15</td><td></td><td>Compare and contrast the environmental impact of applying colour to cotton and synthetic fibres.

In your answer refer to:

• fabric preparation
• dyeing methods.

<table>
<tr><td>7–9 marks</td><td>Detailed comparison of the environmental impact of applying colour to cotton and synthetic fibres. In this mark band, there are a wide range of points that refer to both fibre types. The response demonstrates a contrast between cotton and synthetic fibres, and also in relation to fabric preparation and dyeing methods. The information given is accurate, demonstrating an in-nj depth understanding of the different types of colouration methods, and the student has related these accurately to environmental impacts, with relevant evaluations. There may be a slight lack of detail at the low end , but the information is largely correct and does not detract from the quality of the response.</td></tr>
<tr><td>4–6 marks</td><td>Good comparison of the environmental impact of applying colour to cotton and synthetic fibres. In this mark band, there are some points that refer to both fibre types. The response demonstrates a contrast between cotton and synthetic fibres, and also refers to some aspects of fabric preparation and dyeing methods. The information given is mostly accurate, demonstrating some understanding of the different types of colouration methods, and the student has attempted to related these to environmental impacts, with a few evaluations. There may be a lack of detail and information at the low end, but it is largely correct and does not detract from the response.</td></tr>
<tr><td>1–3 marks</td><td>Basic comparison of the environmental impact of applying colour to cotton and synthetic fibres. In this mark band, there are a limited range of points that may focus on general points of both fibre types. The response demonstrates little contrast between cotton and synthetic fibres, and to fabric preparation and dyeing methods. The information given is likely to be inaccurate, although the student may attempt to relate these to environmental impacts, there is confusion and a lack of relevant evaluations. There is little detail at the low end of the mark band, and there may be more information about one or two methods of applying colour to fabrics.</td></tr>
<tr><td>0 marks</td><td>No response worthy of credit.</td></tr>
</table>
</td><td>9 marks</td><td>AO3 2a
AO3 2b</td></tr>
</table>

Fabric preparation	
Cotton fibres	**Synthetic fibres**
Preparing cotton fibres uses **vast amounts of water** which may affect the local natural environment.	Preparing synthetic fibres uses **less water** than dyeing cotton, causing less damage to the natural environment.
Preparing cotton for dyeing usually requires the use of **many toxic chemicals** to remove all impurities from the fibres. These chemicals are damaging to the environment, and can leach into water courses.	Modern dyes used to colour synthetic fibres are chemical based, **but fewer are used** than cotton. These may cause water, air and soil pollution, however there are tough regulations about disposing of waste in the UK, but less so abroad.
Desizing - yarns are often coated in size or starch to strengthen them for weaving. Desizing is the process to remove the substance from the fabric, the starch can be environmentally damaging.	Preparing synthetic fibres often requires **heating water and dyes to high temperatures** to allow the dye to absorb into the fibre.
Scouring - removes oily impurities from the fabric, to allow dye to be fully absorbed. Caustic soda is often used for cotton fabrics; however, this is damaging to the environment, altering the ph level of water courses, make the water toxic to aquatic plants and animals.	
Bleaching - Many fibres and fabrics are bleached to give an even white colour before dyeing or printing. Cotton mainly uses hydrogen peroxide, which may be released into water courses if not regulated.	

		Dyeing Methods		
		Cotton fibres	**Synthetic fibres**	
		Most cotton dyeing is carried out in large factories that rely heavily on **finite resources such as coal and oil** to generate power. The use and burning of these resources creates CO2 and air pollution, increasing carbon emissions.	Synthetic dyeing is carried out in large factories that rely on **finite resources such as coal and oil** to generate power, but require less use of these resources, creating less CO2 and air pollution than cotton dyeing.	
		Vat dyeing is the traditional method of colouring fabrics in a commercial setting. This requires heating water mixed with synthetic dyes in large tanks, which produce toxic fumes. If discarded, toxic waste water can enter the food chain.	Synthetic fibres are often **dope dyed**, i.e. dye is added at the polymer stage of fibre production, before the fibres are extruded through the spinneret. This method has environmental benefits as no waste dyes are produced.	
		Greige goods – is a term given to cotton fabrics or garments in their natural state or colour, before any dyeing is carried out. Fabrics or garments can stay in the greige state and dyed when needed in required colour to save on wasted dyes and products.	**Transfer/dye sublimation** – is a method of direct dyeing, colour is applied to paper and transferred onto synthetic fabrics. This method is sustainable and efficient and does not use water or dyes to colour fabric.	
		Natural dyes – can be used to apply colour in a more environmentally friendly way.		
		Award any other valid responses.		

<table>
<tr><th>Qu</th><th>Part</th><th>Marking Guidance</th><th>Total marks</th><th>AO</th></tr>
<tr><td>16</td><td></td><td>Explain how advice given to consumers can encourage more sustainable care and maintenance of textile products.

In your answer refer to:

• washing
• drying
• storage.

<table>
<tr><td>5–6 marks</td><td>Detailed explanation of how advice given to consumers can encourage more sustainable care and maintenance of textile products. A wide range of points are given in the response, which refer to all three aspects of the question: washing, drying and storage. The information is mostly accurate; there may be more focus on one or two of the three areas, but this does not detract from a detailed response.</td></tr>
<tr><td>3–4 marks</td><td>Good explanation of how advice given to consumers can encourage more sustainable care and maintenance of textile products. A range of points are given in the response, which mainly refer to all three aspects of the question: washing, drying and storage. The information is mostly accurate, and there may be more focus on one or two of the three areas, but this does not detract from a good response.</td></tr>
<tr><td>1–2 marks</td><td>Basic explanation of how advice given to consumers can encourage more sustainable care and maintenance of textile products. A limited range of points are given in the response, which do not necessarily refer to all three aspects of the question: washing, drying and storage. The information is inaccurate, and it is likely there is more focus on one of the three areas, with a few generalised points.</td></tr>
<tr><td>0 marks</td><td>No response worthy of credit.</td></tr>
</table>

Indicative content

Washing:
• Wash clothing less often to conserve energy and water
• Wash textile products at cold or low temperatures, 30° or less is recommended to save on energy costs
• Handwashing may be recommended on care labelling, to keep fabrics looking newer for longer
• Use eco-friendly detergents so water courses are not polluted.</td><td>6 marks</td><td>AO4 1b</td></tr>
</table>

		Drying: • Line dry whenever possible, to avoid using energy required for tumble drying • Woollens may need to be dried flat to prevent distortion, keeping the garment looking newer for longer • Do not tumble dry, as this uses vast amounts of electricity and may shrink some fibre types, misshaping garments • Do not dry clean, chemicals used in the process can cause prolonged damage to fabrics and the environment. **Storage:** • Folding clothing rather than use hangers, which can cause garments to stretch out of shape and become no longer wearable • Woollen products may attract moths, mothballs will help to protect clothing from insect damage to fabric • Keep fabrics out of direct sunlight to preserve their colour. Award any other valid responses.		

<table>
<tr><th>Qu</th><th>Part</th><th>Marking Guidance</th><th>Total marks</th><th>AO</th></tr>
<tr><td>17</td><td></td><td>A wide variety of different thread types is available for use when stitching by hand or machine.

Describe specific thread types and how they can be used to create decorative effects.

<table>
<tr><td>5–6 marks</td><td>Detailed description of specific thread types and how they create decorative effects. The response is perceptive and demonstrates an in-depth knowledge of a wide range of different types of threads. The student may be able to relate the threads to both hand and machine stitching, with the focus on many decorative effects, and not functional uses. Specific threads are included in the response, which are correctly described. There may be a slight lack of detail at the low end of the mark band, but this does not detract from a detailed overall response.</td></tr>
<tr><td>3–4 marks</td><td>Good description of specific thread types and how they create decorative effects. The response is good and demonstrates a moderate knowledge of some different types of threads. The student is mostly able to relate the threads to both hand and machine stitching, with the focus on many decorative effects, and not functional uses. Specific threads are included in the response, which are described with some detail. There may be a slight lack of information at the low end of the mark band, but this does not detract from a good response.</td></tr>
<tr><td>1–2 marks</td><td>Basic description of specific thread types and how they create decorative effects. The response is poor and demonstrates a lack of knowledge of different types of threads. The student is not able to relate the threads to both hand and machine stitching, but there may be more information about one over the other. A limited amount of decorative effects are included in the response, which are described with a little accuracy. There is a lack of detail at the low end of the mark band, with some confusion and generalised points.</td></tr>
<tr><td>0 marks</td><td>No response worthy of credit.</td></tr>
</table>
</td><td>6 marks</td><td>AO4 1b</td></tr>
</table>

		Indicative content: <u>Sewing threads</u> • Polyester and cotton machine thread can give a **matte or lustrous** effect in many colours • Buttonhole thread is a thick thread, giving a **raised or contrasting coloured** effect when hand stitching buttonholes. <u>Embroidery thread</u> • Embroidery threads are stranded and can be separated into different thicknesses to give a **textured effect** when hand stitching • Machine embroidery thread is a fine glossy thread e.g. madeira or viscose that gives a **lustrous** finish. <u>Special effect threads</u> • Metallic threads are made with laminated foil to create a **sparkly** effect which can be hand or machine stitched • Glow-in-the-dark machine threads emit UV energy to give a **glimmer** effect in the dark • Multi-coloured effects such as variegated threads **change colour** along the length at regular intervals • Elastic /shirring thread for creating **smocking detail**. Award any other valid responses.		

Qu	Part	Marking Guidance	Total marks	AO
18		$y = 2$ and $x = 3$ are lines of symmetry. Work out the coordinates of **point B**. **(12, 5)** Marking guidance: 1 mark for identifying one correct coordinate. 2 marks for both correct coordinates.	**2 marks**	AO4 1c

<table>
<tr><th>Qu</th><th>Part</th><th>Marking Guidance</th><th>Total marks</th><th>AO</th></tr>
<tr><td>19</td><td></td><td>Analyse and evaluate different modern manufacturing systems used in garment production to increase efficiency and reduce textile waste.

<table>
<tr><td>9–12 marks</td><td>Detailed analysis and evaluation of different modern manufacturing systems used in garment production that help to increase efficiency and reduce textile waste. The response gives a wide range of points that are relevant to the question, and broadly in line with the indicative content, showing an excellent grasp of the concept of increasing efficiency and reducing waste. In this mark band, there will be a range of positive and negative points, not necessarily in equal balance, but the information is relevant and accurate. There may be information that slightly lacks detail, however the response presents a cohesive balance of different ways in which modern manufacturing systems can reduce waste.</td></tr>
<tr><td>5–8 marks</td><td>Good analysis and evaluation of different modern manufacturing systems used in garment production that help to increase efficiency and reduce textile waste. The response gives a range of points that are mostly relevant to the question, and in line with some of the indicative content, showing a good grasp of the concept of increasing efficiency and reducing waste. In this mark band, there will be a range of positive points, there may be some negative points, not necessarily in equal balance, but the information is mainly relevant and most points are correct. There may be information that lacks detail, but the response presents a fair balance of different ways in which modern manufacturing systems can reduce waste.</td></tr>
<tr><td>1–4 marks</td><td>Basic analysis and evaluation of different modern manufacturing systems used in garment production that help to increase efficiency and reduce textile waste. The response gives a limited range of points that are not always relevant to the question, and may be in line with a few of the indicative points, showing a weak grasp of the concept of increasing efficiency and reducing waste. In this mark band, there will be a narrow range of points, and are likely to be positive, with few, if any negative points, and may not be relevant or correct. There is information that lacks detail, however the response will outline limited ways in which modern manufacturing systems can reduce waste.</td></tr>
<tr><td>0 marks</td><td>No response worthy of credit.</td></tr>
</table>
</td><td>12 marks</td><td>AO3 2a
AO3 2b</td></tr>
</table>

		Indicative content: • **Just in time** (JIT) is a stock control system designed to reduce waste, ensuring fabrics and components are ordered as and when needed. • **Electronic point of sale** (EPOS) is a computer-controlled system that records sales of products and stock levels. This system communicates with the manufacturer, ensuring minimum over production of garments. • **Vertical in-house production** - retailers design and manufacture in one place, allowing more control over errors and waste. • **Quick response manufacturing** (QRM) Workers operate in teams or cells and become skilled in efficient manufacturing processes. This allows a quick response to changes in trends and sales, allowing flexibility to make orders to meet demand. • **Computer aided manufacturing** (CAM) is very accurate and generates less faulty products that may go to waste. • **UPC systems**, allow manufacturers to track garments through the factory via barcodes on overhead rails. This ensures a high level of stock control, monitoring efficiency and reducing waste. • **Batch production** allows small runs of batches, anywhere between 10 - 500, that respond to changes in demand, potentially reducing left over and unsold stock. • **Total Quality Management** (TQM) are quality systems that ensure the highest level of accuracy throughout the production process, so faults are identified at an early stage, reducing rejected garments. • **Production planning and control** (PPC) is a system designed to plan and control all aspects of garment production, from the availability of materials, scheduling of machines and people and coordinating suppliers and customers for efficiency. • **Bespoke production** is a manufacturing system designed for an individual client. This system virtually eliminates all waste, as it creates very little textile waste. • **Sub assembly** speeds up manufacturing as parts of garments are produced alongside the main assembly line. • **CAD** Lay plans reduce wastage, using as much fabric as possible. • However, it is **difficult to completely reduce** all waste in garment production. Manufacturers aim to **minimise** waste and faulty products during manufacture. • Setting up systems that are efficient are usually **costly,** and require significant financial investment from the manufacturer. • These systems are appropriate for larger companies, but small companies may find it difficult to **keep up with competition**, and may allow a certain number of garments to be discarded. • Keeping up to date with modern technology requires **specialist** companies and employees who can set up such systems. • Garments that are discarded usually end up in **landfill** or are **incinerated**, which contributes to environmental issues. Award any other valid responses.		

Qu	Part	Marking Guidance	Total marks	AO
20		Give **two** reasons why carbon and ceramic fibres are often used in the production of nano-fibres. **Indicative content:** Carbon and ceramic nano-fibres are: • extremely **fine/thin** in diameter • exceptionally **strong** • very **lightweight** • have high **abrasion resistance/durability** • **heat/flame** resistant • **UV** resistant. Award any other valid responses. Award 1 mark per correct answer, up to a maximum of 2 marks.	**2 marks**	AO4 1b

<table>
<tr><th>Qu</th><th>Part</th><th>Marking Guidance</th><th>Total marks</th><th>AO</th></tr>
<tr><td>21</td><td></td><td>Explain how modern and smart materials benefit the wearer of clothing and accessories designed for walking and hiking.

In your answer refer to specific materials.

<table>
<tr><td>7–9 marks</td><td>Detailed explanation of how modern and smart materials benefit clothing and accessories designed for walking and hiking. The response shows an in-depth knowledge and understanding of both modern and smart materials, and gives a wide range of points in the answer. The information given for specific materials is mostly accurate; there may be some more detail focused on one area over the other, but this does not detract from the quality of the response. The materials referred to in the answer are appropriate for walking and hiking, the student is able to explain their relevance to both clothing and accessories.</td></tr>
<tr><td>4–6 marks</td><td>Good explanation of how modern and smart materials benefit clothing and accessories designed for walking and hiking. The response shows a good knowledge and understanding of both modern and smart materials, and gives a range of points in the answer. The information given for specific materials is mostly correct; there may be some more detail focused on one area over the other, along with some inaccuracies. The materials referred to in the answer are mostly appropriate for walking and hiking, the student has attempted to explain their relevance to both clothing and/or accessories.</td></tr>
<tr><td>1–3 marks</td><td>Basic explanation of how modern and smart materials benefit clothing and accessories designed for walking and hiking. The response shows a poor knowledge and understanding of modern and smart materials, and gives a limited range of points in the answer. The information given for specific materials is likely to be inaccurate; there may be some more detail focused on one area over the other, along with some irrelevant information. The materials referred to in the answer are somewhat appropriate for walking and hiking, the student has made little attempts to explain their relevance to both clothing and/or accessories.</td></tr>
<tr><td>0 marks</td><td>No response worthy of credit.</td></tr>
</table>
</td><td>9 marks</td><td>AO4 1c</td></tr>
</table>

		Indicative content • **Thermochromic and photochromic** dyes are examples of heat reactive materials. Thermochromic garments change colour in response to high body temperatures; photochromic materials change colour in response to UV light, alerting the wearer of significant changes in heat. • **Phase change materials** are designed to regulate body temperature. Examples may include **Outlast**® contains wax capsules that change from a sold to liquid in high temperatures. • **Stomatex**® uses dome-shaped chambers that release excess body heat, allowing it to be worn for long periods without overheatin**g** • **Modified synthetic materials** e.g. Coolmax® fibre with channels along its length, that moves moisture away from the body to help keep the wearer dry. Usually worn as base layer garments Coolmax® is used for next to skin comfort • **Microencapsulated** fabrics trap small particles in the fibres, for example oils and moisturisers, keeping skin moisturised and free from chaffing. • **Microfibres** are finer than human hair and create soft and absorbent fabrics that are comfortable for the wearer. • **Nano-fibres** are microscopic fibres that include a number of applications such as self-cleaning properties. Silver nano-particles can be encapsulated into clothing such as socks to repel bacteria, keeping feet fresh for longer. • **Polar fleece** - modern hollow polyester fibres create garments that are lightweight and warm. Polar fleece allows for warm layers without bulk and is soft on the skin and easy care. • **Membrane systems** - such as Gore-tex® and Sympatex® are three layer breathable systems that repel rainwater but allow perspiration to escape through the fabric. Gore-tex® is also windproof and suitable for clothing such as jackets and footwear, and accessories such as hats and gloves • **Electronic devices** such as GPS for safety and location tracking, heart monitors for health conditions and heating elements in gilets and gloves. Marking guidance: materials that are unsuitable for walking and hiking are Fastskin and Aramids such as Nomex. Award any other valid responses.		