DTBase©

Design & Technology
Eduqas GCSE

Textiles: sources, origins, properties and footprint

Materials required for questions

- Pencil
- Rubber
- Calculator

Instructions

- Use black ink or ball-point pen
- Try answer all questions
- Use the space provided to answer questions
- Calculators can be used if necessary
- For the multiple choice questions, circle your answer

Advice

- Marks for each question are in brackets
- Read each question fully
- Try to answer every question
- Don’t spend too much time on one question

Good luck!

Q1. What is the name of the woven edge of a fabric that does not fray?

A Selvedge

B Weft

C Bias

Q2. Which knitted fabric can only be made by machine and does not ladder or unravel?

A Weft knit

B Warp knit

C Felt

Q3. Which novelty yarn has short tufts held between twisted core yarns, like a caterpillar?

A Textured yarn

B Staple yarn

C Chenille

Q4. How does a breathable waterproof membrane such as Gore-Tex work?

A Its pores let rain in but stop sweat escaping

B Its pores are too small for rain drops but let water vapour escape

C It is coated in wax so nothing can pass through

Q5. Which fibre has excellent insulation, is self-extinguishing and is damaged by moths?

A Wool

B Nylon

C Polyester

Q6. Which of these is a mixture rather than a blend?

A Polyester and cotton spun into one yarn

B Silk and viscose spun into one yarn

C Cotton yarns and wool yarns knitted together

Q7. A winter dress is made from a polyester pile fabric. The sleeve cuffs are made from a woven fabric.

Q7a. State the name of a pile fabric suitable for the dress. **(1 mark)**

Q7b. In the cuff fabric, each weft yarn passes over one warp yarn and then under the next. State the name of this woven construction. **(1 mark)**

Q8. Analyse the characteristics of woven and knitted fabrics that make them suitable for garment manufacture. **(5 marks)**

Q9. A kitchen apron is made from a woven twill cotton fabric. Explain one working property of a woven twill fabric that makes it suitable for the kitchen apron. **(3 marks)**

Q10. A uniform worn by nurses in hospitals is made from a woven cotton fabric. Explain two characteristics of cotton that make it an ideal fibre to use and make into the uniform. **(4 marks)**

Q11. A pair of swim shorts is made from a blended fabric of nylon and elastane. Making swim shorts from nylon and elastane is cost effective. Explain one other benefit of making the swim shorts from a blended fabric of nylon and elastane. **(2 marks)**

Q12. A pair of running tights is made from nylon. Explain two reasons why nylon may be considered an unsustainable fibre. **(4 marks)**

Q13. A children's book is made from upcycled fabrics. Explain two advantages of manufacturing the book from upcycled fabrics. **(4 marks)**

Q14. Wool and silk are natural protein fibres. A skirt is made from a blend of wool and silk. Analyse the impact farming these fibres has on our ecological footprint. **(5 marks)**

Q15. Billions of t-shirts are manufactured every year. Undertake a Life Cycle Analysis of a cotton t-shirt, explaining the impact it has on the environment. **(5 marks)**

Q16. A designer made a winter dress from a polyester pile fabric and a summer dress from a linen fabric. Evaluate why the designer selected a polyester pile fabric for the winter dress and a linen fabric for the summer dress. **(6 marks)**

Answers

Q1. A
Q2. B
Q3. C
Q4. B
Q5. A
Q6. C

Q7a.

Velvet, velveteen or velour (1). Also accept chenille, corduroy or plush. Do not accept terry towelling.

Q7b.

Plain weave (1). Only acceptable answer.

Q8. (5 marks)

Answers must analyse the characteristics of both woven and knitted fabrics to access the full 5 marks. Credit a description of the difference in structure: woven fabrics interlace warp and weft yarns at right angles on a loom; knitted fabrics are made from interlocking loops of yarn, either one continuous yarn (weft knit) or many yarns by machine (warp knit).

Woven fabrics

- Do not stretch (except on the bias or with elastane added), so garments need more pattern pieces to fit the body and cost more to make
- Less flexible than knitted fabrics because the structure is compact
- Generally more durable, as the warp and weft yarns interlink to give a compact structure
- Fray, so seams need to be finished
- Withstand many washes without losing shape; do not pill
- Breathable, but far less so than knitted fabrics
- Can feel more restrictive to wear; crease unless elastane is added

Knitted fabrics

- Very stretchy because of the open looped structure, so they fit a range of body shapes and sizes

- Can stretch out of shape, spoiling the look and fit
- Pill (bobble) easily, which weakens them and spoils the appearance
- Do not fray easily (although weft knits can unravel), so do not always need finishing
- Highly breathable and warm, as the open loops trap air; soft and comfortable next to the skin
- Crease resistant, even when made from cotton
- Can shrink or lose shape when washed and often need drying flat
- Need fewer pattern pieces, so they are cheaper to make

Band	Marks	Descriptor
3	4 to 5	A coherent answer with detailed, relevant knowledge and understanding of the characteristics of woven and knitted fabrics. Relevant examples and a well-developed, logical chain of reasoning, sustained throughout.
2	2 to 3	Some coherence, with partial knowledge and understanding. Mostly relevant examples and a logical chain of reasoning that may not be sustained throughout.
1	1	Basic knowledge and understanding. Limited relevant examples or logical chain of reasoning.
0	0	Incorrect or irrelevant answers.

Q9.

A working property (1) plus two linked justifications (1) + (1). For example:

- It is a close weave, durable, dense material (1), so it will take more wear and tear (1), which means it gives more protection from heat and fluids (1)
- It is a flexible material (1), so it is not too bulky (1) and lets the wearer move freely (1)
- It drapes well (1), so it stays looking presentable (1) and will not crease badly (1)

Q10.

Two characteristics (1 mark each), each with a linked justification (1 mark each). For example:

- Cotton is absorbent (1), so it will absorb sweat (1)

- Cotton can be washed at high temperatures (1), which makes the uniform more hygienic (1)
- Cotton can withstand biological detergents and bleach (1), so stains such as blood can be removed (1)
- Cotton is breathable (1), so it keeps the wearer comfortable in a working environment (1)
- Cotton is durable (1), so the uniform can withstand lots of wear and tear on a busy shift (1)

Q11.

A benefit (1) and a linked justification (1). For example:

- The fabric is hydrophobic (1), so it will not absorb lots of water in the swimming pool (1)
- The fibres can be made with a smooth surface (1), so it is comfortable next to the skin (1)
- The fabric is very stretchy (1), so the swim shorts fit closely to the wearer (1)
- The fabric is highly elastic (1), so the shorts go back to their original size and shape after wearing (1)

Q12.

Two reasons (1 mark each), each with a linked justification (1 mark each). For example:

- Nylon is made from oil or coal, which are finite resources (1), so they will run out and not be available for future manufacturing (1)
- Nylon will not biodegrade (1), so it will stay in landfill for a long time (1)
- Making nylon gives off greenhouse gases (1), which contribute to global warming (1)
- Making nylon uses large amounts of water and energy (1), which puts a large demand on natural resources (1)

Q13.

Two advantages (1 mark each), each with a linked justification (1 mark each). For example:

- The book can be marketed as made from upcycled material (1), which might increase sales, widen its appeal or let consumers make informed choices (1)
- The parts come from offcuts or waste fabric from other products (1), so less goes to landfill, fewer natural fibres are used and the carbon footprint is reduced (1)
- Less crude oil is used to make new synthetic fabrics (1), so resources last longer as demand is reduced (1)
- Material costs are reduced (1), because no new materials have to be bought (1)

Q14. (5 marks)

Indicative content. Farming wool and silk has both positive and negative impacts on our ecological footprint.

Negative

- Land can be damaged by sheep through constant use and overgrazing
- Sheep are treated with insecticides (to control mites), which contaminate soil and water
- Large numbers of sheep produce large amounts of the greenhouse gas methane
- Commercial silk farms kill the pupae so the silk thread stays continuous; this is criticised as cruel by animal welfare campaigners and vegetarians
- Processing (cleaning, bleaching, dyeing) needs huge amounts of water, which can be released back into the environment polluted
- Fibres are transported from farms to processing units, causing air pollution and using non-renewable energy and packaging

Positive

- Sheep can graze land that is unsuitable for crops, maintaining and fertilising it
- Wool and silk are biodegradable, unlike synthetic fibres, and do not use non-renewable resources to grow
- Silk is renewable, and organic silk worms can be left to complete their own life cycle

- Credit comparisons with synthetic fibres such as polyester and nylon, which use non-renewable fossil fuels

Band	Marks	Descriptor
3	4 to 5	A coherent answer with detailed, relevant knowledge and understanding of the ecological footprint of farming natural protein fibres. Relevant examples and a well-developed, logical chain of reasoning, sustained throughout.
2	2 to 3	Some coherence, with partial knowledge and understanding. Mostly relevant examples and a logical chain of reasoning that may not be sustained throughout.
1	1	Basic knowledge and understanding. Limited relevant examples or logical chain of reasoning.
0	0	Incorrect or irrelevant answers.

Q15. (5 marks)

Indicative content. A Life Cycle Analysis looks at the environmental impact of a product from growing or extracting the raw materials through to use and disposal. Transport (lorry, ship, aircraft) between every stage has a large impact and should be mentioned; most clothing is made in developing countries rather than the UK. There are at least six key stages:

- Growing and harvesting the raw material: fertiliser, pesticides, combine harvesters, water and energy
- Processing the material: detergents, bleach, caustic soda (mercerising cotton), dyes, water and energy
- Manufacture and assembly: cleaning oil from machines, bleaching, dyes, printing inks, water, energy and waste
- Packaging: paper, plastics, printing inks, energy and waste
- Use: bleach, detergents, water and energy for washing
- Disposal, recycling or reuse: carbon dioxide and methane if sent to landfill, plus detergents, water and energy

Band	Marks	Descriptor
3	4 to 5	A coherent answer with detailed, relevant knowledge and understanding of the environmental impact of the t-shirt's life cycle. Relevant examples and a well-developed, logical chain of reasoning, sustained throughout.
2	2 to 3	Some coherence, with partial knowledge and understanding. Mostly relevant examples and a logical chain of reasoning that may not be sustained throughout.
1	1	Basic knowledge and understanding. Limited relevant examples or logical chain of reasoning.
0	0	Incorrect or irrelevant answers.

Q16. (6 marks)

Answers must evaluate both the polyester pile fabric and the linen fabric to access full marks.

Polyester: advantages

- Light in weight, so comfortable to wear
- Good tensile strength, durable and abrasion resistant, so the garment has a long life
- Crease resistant and easy to care for; washes at low temperatures and dries quickly
- Low absorbency makes it stain resistant
- Good chemical resistance and not damaged by insects
- Colourfast, does not fade easily in sunlight, and has a lustre that gives a quality look
- Cheap and easy to make, using limited water and energy

Polyester: disadvantages

- Poor absorbency makes it hard to dye and causes static, which attracts dust (very noticeable on pile and black fabrics)
- Melts easily, so pressing and ironing are more difficult
- Made from non-renewable fossil fuels and does not biodegrade

Pile fabric

- The pile traps air, so the fabric is a good insulator even though polyester is not
- The extra yarn makes it thicker and more durable; soft handle, comfortable next to the skin

- The right and wrong sides are easy to tell apart
- It has a nap, so the colour shades differently if pieces are cut in different directions

Linen: advantages

- Very absorbent and breathable, so it is cool and comfortable to wear in summer
- Natural, attractive, quality appearance; easily dyed a range of colours
- Very good tensile strength and durability, giving a long life
- Washes easily, withstands high temperatures (up to 100°C) and can be ironed at high temperatures
- Anti-static, insect repellent, hypoallergenic and biodegradable, so more environmentally sound than polyester

Linen: disadvantages

- Poor elasticity, so it creases badly
- Expensive, because of growing and the many production processes
- Bleaching affects its ability to biodegrade; can shrink on the first wash at high temperatures

Credit references to finishes (e.g. brushing, calendering, mercerising) and to cutting on the bias.

Band	Marks	Descriptor
3	5 to 6	A coherent answer with detailed, relevant knowledge and understanding of why the designer selected each fabric. Relevant examples and well-developed, substantiated judgements in a logically structured response.
2	3 to 4	Some coherence, with partial knowledge and understanding. Mostly relevant examples and partly substantiated judgements in a generally well-structured response.
1	1 to 2	Basic knowledge and understanding. Limited relevant examples or judgements, with little structure.
0	0	Incorrect or irrelevant answers.