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DESIGN & TEXTILES **9631/03**

Paper 3 Textile Applications and Technology **October/November 2024**

MARK SCHEME

Maximum Mark: 100

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2024 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Social Science-Specific Marking Principles (for point-based marking)

1 Components using point-based marking:

- Point marking is often used to reward knowledge, understanding and application of skills. We give credit where the candidate's answer shows relevant knowledge, understanding and application of skills in answering the question. We do not give credit where the answer shows confusion.

From this it follows that we:

a DO credit answers which are worded differently from the mark scheme if they clearly convey the same meaning (unless the mark scheme requires a specific term)

b DO credit alternative answers/examples which are not written in the mark scheme if they are correct

c DO credit answers where candidates give more than one correct answer in one prompt/numbered/scaffolded space where extended writing is required rather than list-type answers. For example, questions that require *n* reasons (e.g. State two reasons …).

d DO NOT credit answers simply for using a 'key term' unless that is all that is required. (Check for evidence it is understood and not used wrongly.)

e DO NOT credit answers which are obviously self-contradicting or trying to cover all possibilities

f DO NOT give further credit for what is effectively repetition of a correct point already credited unless the language itself is being tested. This applies equally to 'mirror statements' (i.e. polluted/not polluted).

g DO NOT require spellings to be correct, unless this is part of the test. However spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. Corrasion/Corrosion)

2 Presentation of mark scheme:

- Slashes (/) or the word 'or' separate alternative ways of making the same point.
- Semi colons (;) bullet points (•) or figures in brackets (1) separate different points.
- Content in the answer column in brackets is for examiner information/context to clarify the marking but is not required to earn the mark (except Accounting syllabuses where they indicate negative numbers).

3 Calculation questions:

- The mark scheme will show the steps in the most likely correct method(s), the mark for each step, the correct answer(s) and the mark for each answer
- If working/explanation is considered essential for full credit, this will be indicated in the question paper and in the mark scheme. In all other instances, the correct answer to a calculation should be given full credit, even if no supporting working is shown.
- Where the candidate uses a valid method which is not covered by the mark scheme, award equivalent marks for reaching equivalent stages.
- Where an answer makes use of a candidate's own incorrect figure from previous working, the 'own figure rule' applies: full marks will be given if a correct and complete method is used. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted.

4 Annotation:

- For point marking, ticks can be used to indicate correct answers and crosses can be used to indicate wrong answers. There is no direct relationship between ticks and marks. Ticks have no defined meaning for levels of response marking.
- For levels of response marking, the level awarded should be annotated on the script.
- Other annotations will be used by examiners as agreed during standardisation, and the meaning will be understood by all examiners who marked that paper.

Question	Answer	Marks
1(a)	**Explain three factors to consider when selecting fabrics which would be suitable for a summer top.** Answer could include: • Weight of fabric (light in summer) • Fibre content of fabrics – natural/synthetic/regenerated • Fabric construction – woven/knitted • Design/pattern – fashion trends • Cost • User/gender • Occasion to be worn • Care of fabric • Durability • Breathability • Colour • Absorbency • Softness/comfortable • Drape Any other appropriate/relevant points 1 mark for a brief point 2 marks for a well explained point	**6**

Question	Answer	Marks
1(b)	**Discuss the safety considerations for a consumer when dyeing fashion items at home.** • Suitable space to work, cover surface • Separate items for dyeing/food production e.g. buckets, measuring jugs/spoons • Label carefully • Wear a mask • Don't throw things down sink • Protection: gloves • Handling and dispersal • Rinse thoroughly • Wash hands thoroughly • Follow instructions on packet because some are toxic • Don't eat and drink at same time • Tie hair up • Suitable clothing: apron, mask, gloves, eye protection, footwear • Store dyes safely in a labelled container • Keep out of reach of children • Look at label on garment to see if dye is suitable/fibre content • Some might be done by hand, some done in washing machine • If done in machine, will have to rinse afterwards • Rinse thoroughly so no loose dye next time you wash the item **High band: 6–8 marks:** demonstrates detailed knowledge and understanding of the importance of safety considerations when dyeing fashion items at home. Very good organisation of answer with skilled use of technical textile terms. **Middle band: 3–5 marks:** a good attempt showing some knowledge and understanding of safety considerations when dyeing fashion items at home. Shows good use of technical textile terms with good organisation and presentation of skills. **Low band: 0–2 marks:** satisfactory attempt with limited knowledge and understanding of safety considerations when dyeing fashion items at home. The answer may be presented as a list and not all information may be relevant. There may be few or no examples and some use of technical textile terms.	**8**

Question	Answer	Marks
1(c)	**Evaluate the range of decorative effects that can be achieved with the use of dyes to create fabrics suitable for a summer top. Include examples of fabrics to support your answer.** Answer could include: **Examples of decorative effects achieved with the use of dyes:** • **Batik** – a technique of wax-resist dyeing. Batik is made by drawing dots and lines of the resist with a spouted tool called a tjanting. • **Tie dye** – a resist dyeing technique. The process consists of folding, twisting, pleating, or crumpling fabric or a garment, before binding with string or rubber bands, followed by the application of dye. • **Space dyeing** – involves dyeing of yarn/fabrics with multiple colours to create abstract colour patterns which may or may not repeat after fixed intervals. • **Ice dyeing** – the art of placing ice cubes on top of fabric, then sprinkling dye powder on top of the ice, letting the melting process dictate how the dye splits and bleeds, and where it ultimately lands on the fabric. • **Ikat –** resist dyeing on the yarns prior to dyeing and weaving the fabric. • **Discharge dyeing** – the process of removing dye (by destroying or altering the dye 'chromophores') with various chemicals or bleach, often in pleasing patterns or designs through shibori or tie dye methods, or by stamping, stencilling or block printing. • **Piece dyeing** – the fabric is all one solid colour. A continuous length of dry cloth is passed full-width through a trough of hot dye solution. The cloth then goes between padded rollers that squeeze in the colour evenly and removes the excess liquid. • **Tritik dyeing** – a resist dye process in which outline patterns are stitched into a double-layered cloth using small running stitches and tightly gathered to prevent substantial penetration of dye. This creates a 'mirror image,' or double rows of parallel lines of undyed dots. • **Flour resist batik –** a flour/water 'paste' is applied to fabric with a piping bag, in whatever pattern you choose. Let it dry overnight. Fabric paint is then brushed on. • **Shibori –** a Japanese dyeing technique that typically involves folding, twisting or bunching cloth and binding it, then dyeing it in indigo. • **Sponging** • **Other resists** Fabrics can be coloured in a variety of different ways. The choice of method depends on many factors including the type of fabric used, types of dyes used, method of application, amount of fabric to be dyed, methods used to fix the dyes, time available, suitability of the design for the method. Need to consider the type of fabric used for a summer top e.g. lightweight cotton lawn, linen, chambray, rayon, viscose, seersucker, poplin etc. and whether the decorative effect will be suitable for the fabric.	**11**

Question	Answer	Marks
1(c)	**Types of fabrics dyes:** • Wool/nylon – acid and reactive dyes • Cotton/viscose – a range of dyes including reactive, direct, pigment and vat dyes • Polyester – disperse dyes • Acrylic – basic dyes • Natural fibres can be dyed with natural dyes Any other appropriate/relevant point **High band: 9–11 marks:** demonstrates detailed knowledge and understanding when evaluating the range of decorative effects that can be achieved with the use of dyes to create fabrics suitable for a summer top. Shows a high level of skill in the selection of appropriate advantages, disadvantages and examples to illustrate the answer. Very good organisation of answer with skilled use of technical textile terms. **Middle band: 5–8 marks:** a good attempt showing some knowledge and understanding of the range of decorative effects that can be achieved with the use of dyes to create fabrics suitable for a summer top. Selects some suitable advantages and disadvantages, and gives some appropriate examples. Shows good use of technical textile terms with good organisation and presentation of skills. **Low band: 0–4 marks:** satisfactory attempt with limited knowledge and understanding of the range of decorative effects that can be achieved with the use of dyes to create fabrics suitable for a summer top. The answer may be presented as a list and not all information may be relevant. There may be few or no examples and some use of technical textile terms.	

Question	Answer	Marks
2(a)	**Describe THREE performance characteristics that make knitted fabrics a good choice for sportswear.** Answer could include: • **Stretchy and flexible** – since knit fabric forms from a series of loops, it's incredibly stretchy and can stretch both in width and length. This fabric type works well for zipper-less, form-fitting clothing items. The texture of knit fabric is also flexible and unstructured, so the wearer has full freedom of movement and impressive moisture absorption. It will also conform to most shapes and drapes or stretches over them giving a form-fitting look. • **Wrinkle-resistant** – due to knit fabric's elasticity, it is very wrinkle-resistant—if you crumple it into a ball in your hand and then release, the material should spring back into much the same shape it had before. This makes it ideal for sportswear (easy care). • **Soft/comfortable** – most knit fabrics are soft to the touch. If it is a tight-knit fabric, it will feel smooth; if it is a looser-knit fabric, it will feel bumpy or ridged due to the ribbing. This makes it comfortable to wear for sports activities. • **Easy care** – knit fabric can be machine washed easily and does not require a lot of special care (e.g., hand-washing). It does not require ironing, since it is generally wrinkle-resistant. • **Lightweight** – this makes it comfortable to wear for sports activities. • **Breathable** – knit fabrics have great breathability. In hot weather, knitted garments allow the body to breathe and in cold weather, knitted garments keep you warm. • **Cheap** – simple and quick to produce, easy to sew so more cost efficient than woven fabrics. Any other appropriate/relevant point 1 mark for a brief point 2 marks for a well explained point	**6**

Question	Answer	Marks
2(b)	**Compare the types of stitching techniques available to manufacturers when constructing sportswear garments. Answer could include:** **<u>Examples of stitches for joining knits:</u>** • **Lockstitch –** a complete garment can be sewn on a lockstitch machine. Lockstitches are very secure, as a break in one stitch will not cause the seam to unravel, although it will compromise the overall seam performance. Lockstitch is the most widely used stitch in low-volume production. Applications of lock stitches include seaming operations on all types of garments and run stitching. Lockstitches are used for: • Comfort/stretch garments, because the stitch can extend by up to 30%. • Fabrics where it is important to have the same appearance on both sides. • Top-stitching collars, cuffs, pockets, sleeves etc. • **Chainstitch** – This is the original knitted stitch; it stretches with the jersey because it is constructed in the same way as the jersey. It looks just like a regular straight stitch on the top side, and it forms a chain on the underside. In principle, this is the best stitch to use on jersey and knits of all weights and thicknesses. They are more commonly used in industry. • **Overlocking** – many variations: three thread used for neatening edges; four thread used to stitch the seam as well as trim and neaten the edge. Very fast process. The overlock is normally used to finish raw edges or to sew light jersey like in T-shirts. • **Coverstitch** – three threads, produced on an overlocker, used for making flat seams where two pieces join, particularly on knitted fabrics e.g. sweatshirts. The coverstitch is done with the chain looper, and with 2 or 3 needles (or more, in industry). Similar to the overlock, it makes folds in the needle threads tucking it into the thickness of the material between stitches. These reserves allow it to stretch with the jersey. The left needle forms long loops, the right needle – short loops, and the chain looper knits them together. • **Zigzag stitch** – used to neaten edges, possibly in a contrasting colour. It has a little give to it, so when you wear it, those stitches do not get stressed, as the fabric stretches on your body. • **3-step zigzag stitch** – a great stitch for knits when you need an extra wide stitch. Great to use when you stitch down elastic to a knit. Good to use on nylon tricot which can slip and has a tendency to pucker. • **Narrow zigzag stitch** – great for ultra-stretchy fabrics e.g. Spandex. Looks less homemade than a regular zigzag on a hem. • **Stretch stitch** – a variation of zigzag stitch, looks like a lightning bolt. The side to side is quite narrow and the up and down is a little longer. Used on knit seams and thicker Lycra knits.	**8**

Question	Answer	Marks
2(b)	**Examples of stitches for hemming knits:** • **Blind Hem Stitch** • **Double needle with narrow zigzag** – great for necklines too. Any other appropriate/relevant example **High band: 6–8 marks:** demonstrates detailed knowledge and understanding when comparing the types of stitching techniques available to manufacturers when constructing sportswear garments. Shows a high level of skill in the selection of appropriate advantages, disadvantages and examples to illustrate the answer. Very good organisation of answer with skilled use of technical textile terms. **Middle band: 3–5 marks:** a good attempt showing some knowledge and understanding when comparing the types of stitching techniques available to manufacturers when constructing sportswear garments. Selects some suitable advantages and disadvantages, and gives some appropriate examples. Shows good use of technical textile terms with good organisation and presentation of skills. **Low band: 0–2 marks:** satisfactory attempt with limited knowledge and understanding when comparing the types of stitching techniques available to manufacturers when constructing sportswear garments. The answer may be presented as a list and not all information may be relevant. There may be few or no examples and some use of technical textile terms.	

Question	Answer	Marks
2(c)	**Assess suitable finishes that can be used to improve the performance of fabrics used for sportswear. Include examples of finishes and fabrics to support your answer.** Answer could include: • **Water-repellent** – prevents staining, easier to care for. Ideal for outdoor sportswear garments. Examples include Scotchguard and Teflon. Other benefits of Teflon are that it does not affect the feel, appearance or breathability of fabric, so clothing remains comfortable, stain and crease resistant. • **Soil release/stain resistant** – a chemical finish that permits relatively easy removal of soils with ordinary laundering. The soil releasability characteristics of a given textile depend on the kind of fibres from which it is made and the kind of finishing agent which has been applied to it. Beneficial for sportswear as makes it easier to care for. • **Abrasion resist** – increases the ability of the clothing to resist abrasion and tearing, therefore making the garments longer lasting. Beneficial when doing lots of physical activity. • **Anti-static** – used for fabrics made from man-made fibres. The accumulation of static electricity in synthetic fibres as nylon, polyesters, and acrylics produces clinging, which may be reduced by applying permanent antistatic agents during processing. Consumers can partially reduce static electricity by adding commercial fabric softeners during laundering. This will make the sportswear garments more comfortable to wear. • **Crease resist/wrinkle resistant** – prevents the garments from becoming creased. Aftercare would be time consuming if garments needed ironing. These finishes can reduce fabric strength and their resistance to abrasion. • **Antibacterial and antifungal finishes** – antibacterial finishes are germicides applied to fabrics to prevent odours produced by bacterial decomposition, such as perspiration odours, and also to reduce the possibility of infection by contact with contaminated textiles. Fabrics may also be treated with germicides to prevent mildew, a parasitic fungus that may grow on fabrics that are not thoroughly dried. Both mildew and rot, another form of decay, may also be controlled by treatment with resins. • **Durable press** (or easy-care finishing) - is almost always used for cotton fabrics or textiles with a high content of cellulosic fibres. This finish provides resistance against shrinkage and improved wet and dry wrinkle recovery to cellulosic textiles. • **Minimum care/easy care** – sportswear garments get dirty easily therefore frequent washing is required. This finish will make the garments much easier to look after. • **Flammability –** used to protect sportswear worn for motorsports etc. • **UV/Sunlight resistant** Any other appropriate/relevant point	**11**

Question	Answer	Marks
2(c)	**High band: 9–11 marks:** demonstrates detailed knowledge and understanding of suitable finishes that can be used on fabrics for sportswear to improve performance. Shows a high level of skill in the selection of appropriate advantages, disadvantages and examples to illustrate the answer. Very good organisation of answer with skilled use of technical textile terms. **Middle band: 5–8 marks:** a good attempt showing some knowledge and understanding of suitable finishes that can be used on fabrics for sportswear to improve performance. Selects some suitable advantages and disadvantages, and gives some appropriate examples. Shows good use of technical textile terms with good organisation and presentation of skills. **Low band: 0–4 marks:** satisfactory attempt with limited knowledge and understanding of suitable finishes that can be used on fabrics for sportswear to improve performance. The answer may be presented as a list and not all information may be relevant. There may be few or no examples and some use of technical textile terms.	

Question	Answer	Marks
3(a)	**Discuss the environmental issues related to the textile industry. Include examples to support your answer.** Answer could include: The pollution produced by the textile industry has a huge impact on the environment and the fashion industry generates a massive amount of waste. The main environmental problems caused by the textile industry include **water pollution**, **air pollution** and **solid waste pollution**. • **Water Pollution** – The textile industry uses millions of gallons of water every day in washing the fibres, bleaching, dyeing and then cleaning the finished product. Waste waters are not treated to remove pollutants before they are disposed in the environment. Therefore, all freshwater pollution is made by textile treatment and dyeing as a consequence. • The high volumes of water discarded in the textile production process are responsible for aquatic life toxicity. Substances such as formaldehyde, chlorine and heavy metals are disposed into water bodies and they are consumed in daily activities by a large number of people. • **Air pollution** – the apparel industry is the second largest industrial polluter. • **Solid waste pollution** – The textile industry also produces lots of solid waste. Globally, each year, about 90 million items of clothing end up in landfills. The waste produced ends up in water bodies, causing environmental issues. Some of the pollutants that end up in landfills include: • Fibre lint, fibre scraps, trimmings and packaging waste produced in the fibre preparation • Wasted and retained sludge in wastewater treatment • Flock, chemical and dye containers used in dyeing and finishing of woven fabrics. **Other issues include:** • **Production of fibres/fabrics** – are they from a sustainable source e.g. cotton which can be re-planted; wool from sheep? Are they biodegradable? Coloured cotton. Are they environmentally friendly? Can the fabric be recycled? E.g. polyester fleece • **Production of fabric and fashion garments** – noise pollution, dust in atmosphere, use of energy, transport costs, cutting fabrics, reduction of waste, life expectancy of item, recycling etc. • **Production process** – amount of water used, dyeing/printing, fabric finishes used which contain chemicals can cause harm or pollution, reduce greenhouse gases in manufacture of fabrics/clothing • **Disposal of textiles** – can the product be re-used? • **Reduction or elimination of pesticides, fertilisers and other chemicals** which may harm the environment, to reduce harmful effects on the environment	**12**

Question	Answer	Marks
3(a)	• **Reduction of fossil fuels** • **More digital use to reduce the need for paper etc.** • **Transportation** – reduction of air miles, travel costs, fuel, carbon footprint etc. • **Packaging** – reduce or make recyclable to reduce landfill. Any other appropriate/relevant point **High band: 9–12 marks:** demonstrates detailed knowledge and understanding of the environmental issues related to the textile industry. Shows a high level of skill in the selection of appropriate examples to illustrate the answer. Very good organisation of answer with skilled use of technical textile terms. **Middle band: 5–8 marks**: a good attempt showing some knowledge and understanding of the environmental issues related to the textile industry. Selects some appropriate examples. Shows good use of technical textile terms with good organisation and presentation of skills. **Low band: 0–4 marks:** satisfactory attempt with limited knowledge and understanding of the environmental issues related to the textile industry The answer may be presented as a list and not all information may be relevant. There may be few or no examples and some use of technical textile terms.	

Question	Answer	Marks
3(b)	**Evaluate the benefits of using environmentally friendly fibres in clothing production. Give examples of fibres and fabrics to support your answer.** Answer may include: **Benefits include:** • Less impact than synthetic fibres on the environment due to fibres being sustainable • Reduced use of chemicals • Fibres grown that use less water • Production – dyes/self-coloured (what are they using instead?) • Biodegradable • Increased popularity with consumers • Greater demand for environmentally friendly products • Natural resources that can be turned into sustainable textiles • Many organic, eco-fabrics are naturally hypoallergenic. **Examples of environmentally friendly fibres:** • **Lyocell (Tencel) and Modal** – natural shine, long-lasting softness, sustainable production, gentle on skin, retains colour, breathable and support body temperature regulating properties through their moisture management, biodegradable, strong, smooth, unfavourable for bacterial growth, the cellulosic fibres are structured to regulate the absorption and release of moisture, contributing to fabric breathability that supports the body's natural thermal regulation, minimal static charge, drape well, have sheen to them • **Bamboo** – long-term freshness. Fabrics made using bamboo offer excellent ventilation thanks to the microscopic holes in bamboo fibres, soft, excellent heat regulation, hypoallergenic, offers protection against UV radiation, crease-resistant, sweat-resistant, eco-friendly • **Organic cotton** – combats climate change, organic farmers use natural methods to grow cotton, not fossil-fuel based fertilisers, saves and protects precious water, helps farmers feed their families, gives control to farmers not GM companies, eliminates hazardous synthetic pesticides. Compared to other materials on the market, organic cotton is one of the most environmentally friendly options, as it does not have a harsh manufacturing process. The production of organic cotton fabric uses less energy, releases fewer greenhouse gases and due to the improved soil quality, uses significantly less water • **SeaCell** – since the resources are renewable and the production method is energy-efficient and environmentally friendly, this fabric is an eco-friendly one. It blends well with other types of fibres, and is suitable for active wear due to its softness and breathable characteristics. The end product is also 100% biodegradable • **Hemp –** a biodegradable fibre, hemp's production requires less than a third of the water needed for cotton and yields 220% more fibre. The plant grows without the need for harmful herbicides and pesticides and also replenishes soil quality. • **Pineapple fibre e.g. Pinatex, orange skins, rose fibres**	**13**

Question	Answer	Marks
3(b)	• **Banana fibres** – banana textiles are minimal impact due to its low water consumption (local rivers and tropical climate), low energy (generally only using people power, though differs between makers), and they also require no chemicals in growing or fibre production. Owing to its excellent absorption and strength properties, banana fibre has great potential as the base material in sanitary pads manufacturing, which being made up of plastic currently are major pollutants. Therefore, banana fibre can be an eco-friendly and economical alternative to all the synthetic and natural fibres. Banana fibre is eco-friendly, chemical-free, non-toxic and odour-free. The natural coolant and medicinal property of banana fibres helps in the health of its user and is 100% safe as no harmful chemicals and colours are used. • **Recycled cotton** – The production of organic cotton fabric uses less energy, releases fewer greenhouse gases and due to the improved soil quality, uses significantly less water. On average, by using organic methods 1,982 gallons of water is saved per cotton T-shirt. Materials from animals are natural fibres and biodegradable unless heavily treated with chemicals. As synthetic pesticides and fertilizers are not used, it reduces nitrogen emission in the atmosphere. Therefore, organic cotton produces 94% less greenhouse gas emissions. In addition, cotton grown organically reduces soil erosion and creates healthy soil. • **Recycled coffee beans, fish skins** • **PET/polar fleece** – recycled plastic bottles. Recycled fleece has less of an impact. Recycled polyester uses 59% less energy. Any other appropriate/relevant point **High band: 10–13 marks:** demonstrates detailed knowledge and understanding of the benefits of using environmentally friendly fibres in clothing production. Shows a high level of skill in the selection of appropriate examples to illustrate the answer. Very good organisation of answer with skilled use of technical textile terms. **Middle band: 5–9 marks:** a good attempt showing some knowledge and understanding of the benefits of using environmentally friendly fibres in clothing production. Selects some appropriate examples. Shows good use of technical textile terms with good organisation and presentation of skills. **Low band: 0–4 marks:** satisfactory attempt with limited knowledge and understanding of the benefits of using environmentally friendly fibres in clothing production. The answer may be presented as a list and not all information may be relevant. There may be few or no examples and some use of technical textile terms.	

Question	Answer	Marks
4(a)	**Discuss how the process of design and product development is important when a designer is creating a new fashion collection. Give examples to support your answer.** Answer could include: In order to succeed as a designer, you need to have an in-depth knowledge of the market and be able to make informed predictions about future trends. Research is a fundamental part of the design process. The design process helps the designer to generate an initial idea and take it all the way to the final design. They start with a design brief and a customer profile, allowing them to assess what their objective is and who their collection will be designed for. **The process of design includes:** • **Research and analysis** – scientific and inspiration. Designers look at the current fashion trends and forecast. Fashion forecast may be customised according to the client's requirements or accessed through existing ones in the market. Designers need to identify their target market and know exactly what their client's requirements are. They need to maintain an identity for the brand, a specific look and cater to a particular client (e.g. price). Research must be carried out into specific costs of production so that consumers/the client are able to afford the fashion items • **Market research** – Specific market research can be carried out to give direction to the designer. They can get the consumer/clients opinions. • **Concept** – where the ideas start. A theme/mood board, colour palette, trends and an entire outline of the collection. They can compare the designs to other potential companies/the opposition, to make sure they are following the correct trends/see if products need to be developed further • **Form** – the actual work on the design starts. The physical structure, shape etc. is determined and prototypes are created. The ideas and concepts decided and discussed earlier take form and shape. This is the first time that we can see what the product is going to look like. The consumers see only the product, but the success of the product and the design depends on careful and sincere planning, research and proper production decisions. In case of the fashion industry this is the stage where sampling of the designs is initiated • **Virtual reality** to show designs to clients • **Checks and Tests** – The Form of the design that is almost ready will never be successful unless we perform various tests which can also be called as quality inspections at various stages of production. The quality checks examine the design from various angles like aesthetics, performance, durability, strength, functionality etc. Only a design that passes these tests and checks will be sent for the final examination; that conducted by the customer or the consumer. • **Use of samples and prototypes** to test feasibility and popularity of the product. They can see if the fabrics chosen suit the design/style. They can discuss whether the designs are cost effective to produce. Different groups of consumers could be consulted and their views will be valuable in order to make suggestions and changes	**12**

Question	Answer	Marks
4(a)	• Thus design and designing both comprise of an ideal blend of art, aesthetics, creativity, strategic project management, good research, wonderful analysis and mind-blowing execution • **Feedback** throughout so improvements are constantly being made. Any other appropriate/relevant point **High band: 9–12 marks:** demonstrates detailed knowledge and understanding of the importance of the design process when a designer is creating a new fashion collection. Shows a high level of skill in the selection of appropriate examples to illustrate the answer. Very good organisation of answer with skilled use of technical textile terms. **Middle band: 5–8 marks:** a good attempt showing some knowledge and understanding of the importance of the design process when a designer is creating a new fashion collection. Selects some appropriate examples. Shows good use of technical textile terms with good organisation and presentation of skills. **Low band: 0–4 marks:** satisfactory attempt with limited knowledge and understanding of the importance of the design process when a designer is creating a new fashion collection. The answer may be presented as a list and not all information may be relevant. There may be few or no examples and some use of technical textile terms.	

Question	Answer	Marks
4(b)	**Evaluate how different speciality yarns can be used in knitted and woven fabrics to create interesting effects. Give examples to support your answer.** Answer could include: Speciality (novelty or complex) yarns are used to add textures, colours, and properties to knitted and woven fabrics. They give the fabrics an interesting appearance. Complex yarns are the uneven yarns which may be thick and thin or have curls, loops, twists and even differently coloured areas along their length. This look of the yarns is used to add interesting effects in fabrics. In complex ply two or more complex yarns are twisted around each other to form loops, curls and knots to create fancy effects. Many knitting yarns are complex ply yarns which give interesting textures in finished products. They consist of three parts: core-ply yarn, effect ply and binder yarn. They are usually made of synthetic fibres like polyester, and are considered in a separate category to conventional yarn types. Though they may seem fun, speciality yarns are usually much more difficult to work with than normal yarns. They are typically highly-textured, which, in knitted fabrics, can make it harder to identify stitches. Different combinations of yarns can be used (e.g. different colours, textures or fibre/yarn types together etc.). They can also be made by spinning different yarns together. **Examples of speciality yarns include:** • **Bouclé yarn** – this is composed of irregular knots and loops. It is typically made from cotton or wool fibres and has a bumpy texture. It is usually made of three plies. One thread is usually looser than the others which creates an interesting texture and appearance • **Chenille yarn** – this is soft and has a furry texture, like velvet. Fibres project from a central core yarn, velvety texture, thick and soft, fabric made from chenille yarn has a protruding pile • **Slub yarn** – variations in thickness of the yarn created by a soft lump, or slub of fibres. Interesting texture and style. Interesting effects can be produced for creative textiles using different colours of fibres. A slub or thick spot in a yarn is created by varying the tightness of the twist of the yarn at various intervals • **Metallic yarns** – very decorative, sparkly, metallic, glossy, glamourous, luxurious effects. Fabrics made from metallic yarns include lame and brocades • **Corkscrew/spiral yarn** – two yarns twisted together, so that one yarn spirals around the other • **Ribbon yarn** – designed to look like craft ribbon, ribbon yarn is a type of novelty yarn usually made from rayon or nylon. It is great for accessories, but it can be fiddly to knit with	**13**

Question	Answer	Marks
4(b)	• **Self-striping yarn** – this has multiple colours spun together into one strand. This means the item you are knitting will gradually change colour as it progresses, without you having to switch between yarns. • **Faux fur** – manufacturers use fluffy fibres on a base of nylon to create a novelty yarn that looks like animal fur • **Marled (mouline) yarn** – used to add texture to knitted projects. Made by twisting plies of various colours together. They can be made with any number of plies to form a single yarn strand with different colours swirling around each other • **Variegated yarn** – these yarns are dyed in multiple different colours or shades of a single colour • **Thick-thin yarn** – these yarns alternate between thick and thin sections. This creates a bumpy, textured look in knitted fabrics • **Tweed yarn** – this yarn can be made out of lots of different fibres. Tweed yarns have a primary background colour that is speckled with tiny bits of fibre in other colours • **Heather yarn** – this is a wool yarn which is created by spinning multiple shades of yarn together to create a single fleece in a unique colour • **Eyelash yarn** – usually made from polyester or other synthetic fibres. It is a novelty material with long fluffy strands poking out from a central thread to create the look of eyelashes • **Plastic yarn, or 'plarn'** – this is constructed from plastic bags. Plarn can be used to knit or crochet plastic mats • **Fancy** – e.g. crepe, knop etc. • **Ratine yarn** – fancy yarns which have a nubbly surface. The ratine fabric created from these yarns is loosely woven and constructed using a plain weave. It is usually made from cotton, wool or silk and is a heavyweight fabric • **Cabled** – a yarn formed by twisting together two or more plied yarns • **Loop yarn** – a super bulky yarn • **Nub yarn** – a nub is a small bump or knot created by tightly twisting the fibre around the base fibre. The nub is most easily identified when the effect and base yarns are of different colour • **Crepe yarn** – crepe yarns may be classified as fancy yarns and are created by tightening the twist given to a yarn, resulting in a kinked or looped strand • **Ladder yarn** – resembles a ladder, with two flat threads representing the two sides of the ladder held together by a strip of material at the centre that represents the rungs. The material at the centre of ladder yarn can be metallic, beaded, or otherwise adorned. This type of yarn is more often used to create trim or embellishments than to knit or crochet entire garments. • **Core yarn** – a yarn in which the core has been wrapped by another strand, such as cotton or nylon around an elastic base as used in commercial socks • **Textured yarns** e.g. knit-de-knit, false twist, air-jet, stuffer-box texturing etc.	

Question	Answer	Marks
4(b)	**Examples of fabrics include:** • **Polyester jersey** – made from polyester filament yarns which will be weft knitted to produce a stretchy fabric. The fabric will be smooth and shiny with a right and wrong side • **Wool jersey** – using wool staple which are staple fibres so the yarn will be hairy and matt with no shine. There will be a right and wrong side Any other appropriate/relevant point **High band: 10–13 marks:** demonstrates detailed knowledge and understanding of how different speciality yarns can be used in knitted and woven fabrics to create interesting effects. Shows a high level of skill in the selection of appropriate examples to illustrate the answer. Very good organisation of answer with skilled use of technical textile terms. **Middle band: 5–9 marks:** a good attempt showing some knowledge and understanding of how different speciality yarns can be used in knitted and woven fabrics to create interesting effects. Selects some appropriate examples. Shows good use of technical textile terms with good organisation and presentation of skills. **Low band: 0–4 marks:** satisfactory attempt with limited knowledge and understanding of how different speciality yarns can be used in knitted and woven fabrics to create interesting effects. The answer may be presented as a list and not all information may be relevant. There may be few or no examples and some use of technical textile terms.	

Question	Answer	Marks
5(a)	**Evaluate the importance of following detailed specifications when designing and manufacturing fashion items. Give examples to support your answer.** Answer may include: **Importance of specifications when designing:** • They have a set of design criteria from their client, outlining what they want their product to be like, to use for designing • Ensures their product is relevant for what it is being designed for • It sets out the specific parameters (e.g. the product function, aesthetic qualities, the target market, the performance, the materials and the environmental issues) • While designing, the designer has criteria to evaluate their designs against to see where improvements could be made • Designers can measure how effective their design ideas are **Importance of specifications when manufacturing:** • They have a set of criteria such as material selection and manufacturing processes/methods or finishes • Ensures that the product is manufactured to the quality that is required and in the correct way • Ensures each garment is made/looks/performs identically • Ensures each garment is fit for purpose • Details/illustrations of front and back of garment so the manufacturer knows what it should look like • Stitch details so the manufacturer knows which stitch type/length/width to use – each garment must be identical • Size so garment will fit standard sizes • Types of seams and hems to be used • Decorative techniques • Type of threads to be used • Seam allowances, so all garments fit well • Fabric details and quantities required so the manufacturer buys enough fabric for the batch, avoids shade variations from different fabric suppliers or between batches • Provides details of any specialist machinery needed • Fastenings/components to be used – specific details given on zip colour/length/teeth type specified, button size specified so correct fastening is used on all garments • Safety issues (e.g. for children, to make sure the clothing is safe for the consumer) • Finishes required (e.g. waterproof/stain resistant/easy care finish so fit for the intended use) • Costs specified • Method of production will be specified • Quality control checks essential so products are identical Any other appropriate/relevant point	**12**

Question	Answer	Marks
5(a)	**High band: 9–12 marks**: demonstrates detailed knowledge and understanding of the importance for designers and manufacturers of following specifications. Shows a high level of skill in the selection of appropriate examples to illustrate the answer. Very good organisation of answer with skilled use of technical textile terms. **Middle band: 5–8 marks:** a good attempt showing some knowledge and understanding of the importance for designers and manufacturers of following specifications. Selects some appropriate examples. Shows good use of technical textile terms with good organisation and presentation of skills. **Low band: 0–4 marks:** satisfactory attempt with limited knowledge and understanding of the importance for designers and manufacturers of following specifications. The answer may be presented as a list and not all information may be relevant. There may be few or no examples and some use of technical textile terms.	

Question	Answer	Marks
5(b)	**Discuss ways in which fabrics can be manipulated to create texture and surface pattern. Include examples of fabrics to support your answer.** Answer could include: **Fabric manipulation techniques:** • **Appliqué** – adding one or more layers to produce texture • **Mola** – handmade using a reverse appliqué technique. Several layers (usually two to seven) of different coloured fabric (usually cotton) are sewn together; the design is then formed by cutting away parts of each layer. The edges of the layers are then turned under and sewn down. Often, the stitches are nearly invisible. This is achieved by using a thread the same colour as the layer being sewn, sewing blind stitches, and sewing tiny stitches. The finest molas have extremely fine stitching, made using tiny needles • **Soft sculpture:** *any fabrics* • **Gathering** the fabric, evenly or unevenly (similar effect to shirring) • **Quilting** – add wadding/padding to a fabric to produce a quilted/3D effect (e.g. trapunto or shadow quilting). *Light to medium fabrics e.g. cotton lawn, polyester satin*. Can be used for a variety of purposes (e.g. decoration, insulation, protection etc.) • **Smocking** – an embroidery technique used to gather fabric so that it can stretch. Requires lightweight fabric with a stable weave that gathers well (e.g. cotton and silk, often in lawn or voile) • **Shirring** – using shirring elastic, produces a gathered effect on the surface. *Lightweight fabric (e.g. cotton lawn)* • **Pleating** – folding the fabric (e.g. knife pleats or tucks) which will produce a thicker layered surface. Light to medium-weight fabrics (e.g. cotton polyester gabardine, cotton twill, polyester twill) • **Use of textured fabrics**, possibly in sections, to produce a varied textured surface • **Removing threads** from sections of the fabric to produce a distressed effect • **Removing areas of fabrics** to produce holes, and adding other fabrics to fill holes • **Weaving effects** • **Drawn thread work** • **Chemical treatments –** e.g. devore, fibre etching, burn out, puff binder, flocking etc. Fabric manipulation can be done by hand or machine. Any other appropriate/relevant point **High band: 10–13 marks:** demonstrates detailed knowledge and understanding of the ways in which fabrics can be manipulated to create texture and surface pattern. Shows a high level of skill in the selection of appropriate examples to illustrate the answer. Very good organisation of answer with skilled use of technical textile terms.	**13**

Question	Answer	Marks
5(b)	**Middle band: 5–9 marks:** a good attempt showing some knowledge and understanding of the ways in which fabrics can be manipulated to create texture and surface pattern. Selects some appropriate examples. Shows good use of technical textile terms with good organisation and presentation of skills. **Low band: 0–4 marks:** satisfactory attempt with limited knowledge and understanding of the ways in which fabrics can be manipulated to create texture and surface pattern. The answer may be presented as a list and not all information may be relevant. There may be few or no examples and some use of technical textile terms.	