Mark Scheme (Results)

Summer 2024

Pearson Edexcel GCSE
In Design & Technology (1DT0)
1E: Textiles

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

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Component 1 mark scheme

Section A – Core content

Question number	Answer	Mark
1 (a) (i)	Any **one** property from: • Soft / softness (1) • Absorbent / absorbs water (1) • Insulator of heat / thermal insulator (1)	**(1)**

Question number	Answer	Mark
1 (a) (ii)	Any **one** property from: • Sets rigid / rigid (1) • Hard / scratch resistant (1) • Transparent (1) • Non-toxic / skin safe (1)	**(1)**

Question number	Answer	Mark
1 (a) (iii)	Any **one** property from: • Smooth surface (1) • Printability / takes colour / ink / toner well (1) • Absorbent (1) • Opaque (1) • Flexible / flexibility (1)	**(1)**

Question number	Answer	Mark
1 (a) (iv)	Any **one** property from: • Hard (1) • Tough (1) • Fine grain / close grain / even texture (1) • Non-toxic / food safe (1) • Good heat resistance / thermal insulator / low thermal conductor (1)	**(1)**

Question number	Answer	Additional guidance	Mark
1 (b) (i)	Any **one** advantage of using cast iron for the frying pan (1) and a linked justification of that advantage (1) • It is a good conductor of heat (1) therefore the pan surface gets hot quickly / will transfer heat to the food to cook it (1) • It is dense / heavy (1) therefore it will be quite stable on the oven top / unlikely to get knocked over easily (1) • It has good dimensional stability when heated (1) therefore the pan will not distort / buckle (1) • It holds the heat well (1) therefore meaning it stays hot for some time / longer (1) • It has a high melting point (1) therefore it can withstand the temperatures involved in cooking (1)	Do not accept anything related to melting	**(2)**

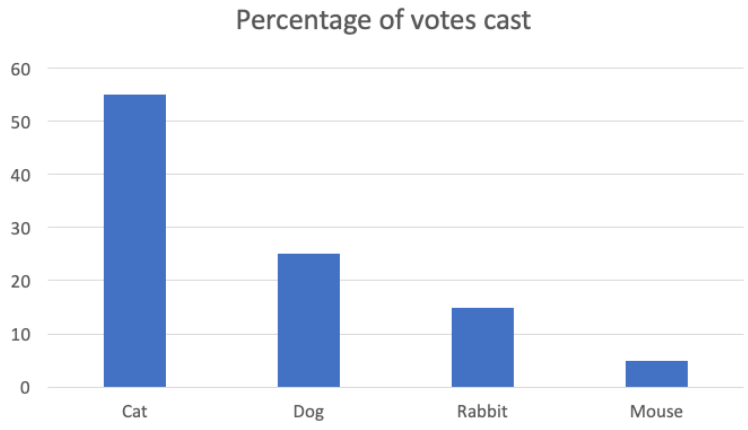
Question number	Answer	Additional guidance	Mark
1 (b) (ii)	A calculation that includes: • correct conversion of units 3 kg = 3000 grams (1) • correct answer 3000 x 2/100 = 60 grams (1) If no conversion of units: 3 x 2/100 = 0.06 grams (worth 1 mark)	Award full marks for correct numerical answer / correct numerical answer without working. Conversion of units could be done after the percentage calculation. Allow for ECF if candidate gets part of transposition wrong.	**(2)**

Question number	Answer	Additional guidance	Mark
2 (a)	Any **one** specific animal fibre from: • Wool (1) • Silk (1) • Mohair (1) • Horsehair (1) • Cashmere (1) • Angora (1) • Alpaca (1)	Do not accept plant fibres, e.g. cotton / cotton wool	**(1)**

Question number	Answer	Mark
2 (b)	Any **one** advantage of using biofuels (1) and a linked justification of that advantage (1) • Biofuels are a renewable / sustainable source of energy (1) which means there will always be a supply / not run out / reduce the rate at which conventional fuels are being used (1) • Less carbon emitted when burnt as fuel (1) which reduces pollution levels / emissions by the delivery vehicles (1) • Biofuels are relatively carbon neutral / smaller carbon footprint (1) which means the absorption of CO^2 during growth is almost equal to the emissions produced when being burnt (1)	**(2)**

Question number	Answer	Mark
2 (c)	Any **one** advantage of using CAD (1) and a linked justification of that advantage (1) • Colour / texture / grain / render can be added to the design (1) which means a realistic image is produced / able to see what it looks like / accurate visual representation (1) • Changes can be easily made (1) which means client feedback can be considered / design modified (1) • Files / part files can be output direct to CNC machines (1) which means prototypes can be produced quickly / reduce lead times to full production runs (1) • Files can be saved electronically (1) which means they can be sent to client / manufacturer as an email attachment (1) • Designs can be sent via email (1) which means stakeholders can provide immediate feedback (1) • Images / views can be manipulated / rotated / zoomed-in (1) which means the ideas can be seen from any angle / intricate details seen up close (1) • Design can be seen in 3D (1) which means thickness / proportions can be accurately represented / seen (1)	**(2)**

Question number	Answer	Additional guidance	Mark
2 (d) (i)	A calculation that includes: • correct calculation for the number of votes cast for the Rabbit (165 / 55) * 15 = 45 (1) • correct calculation for the number of votes cast for the Mouse • (165 / 55) * 5 = 15 (1) • Alternative method for second mark 300 – 165 – 75 – 45 = 15	Correct numerical answers only for full marks. Award full marks for correct numerical answers without working.	**(2)**

Question number	Answer	Mark
2 (d) (ii)	A completed bar chart that shows the two correct bars for the Rabbit at 15% and the Mouse at 5%: 	**(2)**

Question number	Answer	Mark
3 (a)	Award **one** mark from: • V-belt (1) • Vee belt (1) • V-shaped (1) • Vee shaped (1)	**(1)**

Question number	Answer	Mark
3 (b)	Any **one** reason for using aluminium rather than mild steel for the pulley (1) and a linked reason for the use (1) • Aluminium is a non-ferrous metal (1) therefore it will not rust if it comes into contact with water (1) • Mild steel is a ferrous metal / contains iron (1) therefore it is likely to rust / corrode (1) • Aluminium is lighter / less dense than mild steel (1) therefore it will have less of an impact on the weight of the boat / quicker to get up to speed (1) • Aluminium has a lower melting point than mild steel (1) which makes it easier / cheaper to cast (1) • Aluminium is softer than mild steel (1) which means it is easier to machine / turn on a lathe (1)	**(2)**

Question number	Answer	Mark
3 (c)	A calculation that includes: • Correct transposition of the formula Output speed = input speed / velocity ratio (1) • Correct calculation of output speed in rpm 2000 / (5/1) = 400 rpm (1)	**(2)**

Question number	Answer	Mark
3 (d)	Any **one** disadvantage of using the solar cell to power the motor (1) and a linked justification of the disadvantage (1) • The sun might not be bright enough / blocked by clouds (1) which means the boat could stop / get stranded in the middle of a lake / pond (1) • The solar cell might not be capable of providing the power required (1) which means the motor will not turn / turn fast enough to make the boat move (1) • A battery / storage system may be required to store electrical charge (1) which means an increase in weight in the boat hull / make the boat heavier / slower to move through the water (1) • Will not work in low light / dark (1) which means limited use in winter / late at night (1)	**(2)**

Question number	Answer	Mark
3 (e)	Any **two** benefits of using balsa wood to manufacture the frame for the model boat (1) and a linked justification of that benefit (1) • It is lightweight (1) making it easier to power with the solar cell (1) • It is soft (1) which means it is easy to cut with a sharp knife / sand to a smooth curve shape / form / work with (1) • It has a low density / buoyant material (1) which means it will float on the water / not sink (1)	**(4)**

Question number	Answer	Mark
4 (a)	Any **two** explanations that reference the way in which conductive inks can be used in products (1) and a linked justification of each way (1) • They can be used to draw / repair electronic circuits (1) which reduces the need for wires / soldering / expensive / dangerous chemicals to be used to make circuits / PCBs / can be drawn on flexible materials (1) • They can be used as antenna / wireless aerials in car windscreens (1) which means cars can have uninterrupted Wi-Fi connectivity / connected to internet for live traffic data / electric charging points (1) • They can be used to create interactive wall / visual displays / products (1) which means when parts of the wall / products are touched / connected electronic outputs are made to work / light up / move / sound (1) • They can be applied using a pen / printer / silk screen printed (1) which means circuits can be produced to decorate fashion / textiles garments / embed electrical components (1) • They reduce the need for dedicated circuit boards (1) which reduces product weight / useful in restricted spaces (1) • Conductive inks will bend / flex (1) therefore they will move without breaking / cracking (1)	**(4)**

Question number	Answer	Additional guidance	Mark
4 (b)	A calculation that includes: • correct working out of weight (40/100) x 9 or 9 x 0.4 (40 x 9) /100 (1) • correct answer 3.6 grams (1)	Award full marks for correct numerical answer without working. Allow for ECF if candidate gets part of calculation wrong.	**(2)**

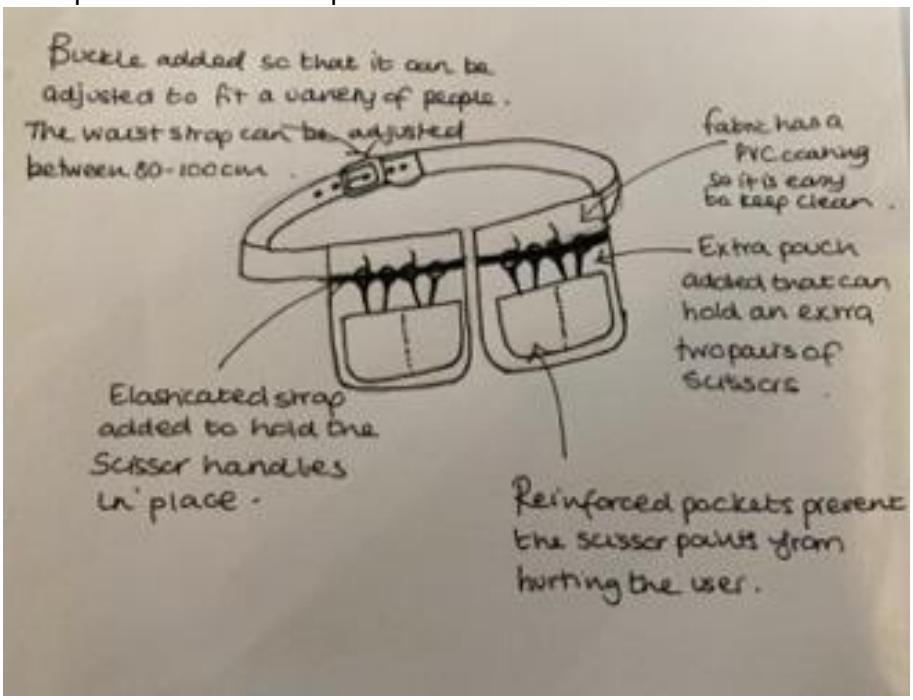
Question number	Indicative content	Mark
4 (c)	• Designers should consider / try to use fewer materials when designing new products / developing new technology so as to minimise the impact on the natural resources available • Designers should try to use as many recyclable materials as possible to reduce the need for new / virgin grade materials • Products / technology should be lighter therefore costing less to transport / distribute post manufacture • Fewer toxic materials / processes should be used therefore causing less damage to the environment during / post use / less to be taken into account when disposing of the item / recycling • The carbon footprint of the product / technology should be considered so that minimal impact on the environment can be made / use locally available materials / less transportation • LCA should be carried out during the design process to make sure that the product / technology can be assessed in terms of its carbon footprint • Consideration should be given to the origin of the raw materials in terms of mining for minerals / oil exploration / cutting down of trees / mining for ore • Designers should try to use biodegradable materials if possible / appropriate • Carry out research into new / emerging materials to assess environmental impact / carbon footprint • Designers could make use of standardised parts / modular components • Designers create products that are easily dismantled / disassembled / repaired allowing materials / parts to be recycled / reused	**(6)**

Level	Mark	Descriptor
	0	
Level 1	1 - 2	• Attempts to interrogate and deconstruct information but connections and logical chains of reasoning are flawed. • An unbalanced appraisal of the information/issues, containing judgements that show a limited awareness of the interrelationships between factors or competing arguments.
Level 2	3 – 4	• Interrogates and deconstructs information and provides some connections and logical chains of reasoning. • A balanced appraisal of the information/issues, containing judgements that show an awareness of the interrelationships between factors or competing arguments.
Level 3	5 - 6	• Interrogates and deconstructs information and provides sustained connections and logical chains of reasoning.

		• A well-balanced appraisal of the information/issues, containing judgements that show a thorough awareness of the interrelationships between factors or competing arguments.

Section B – Textiles

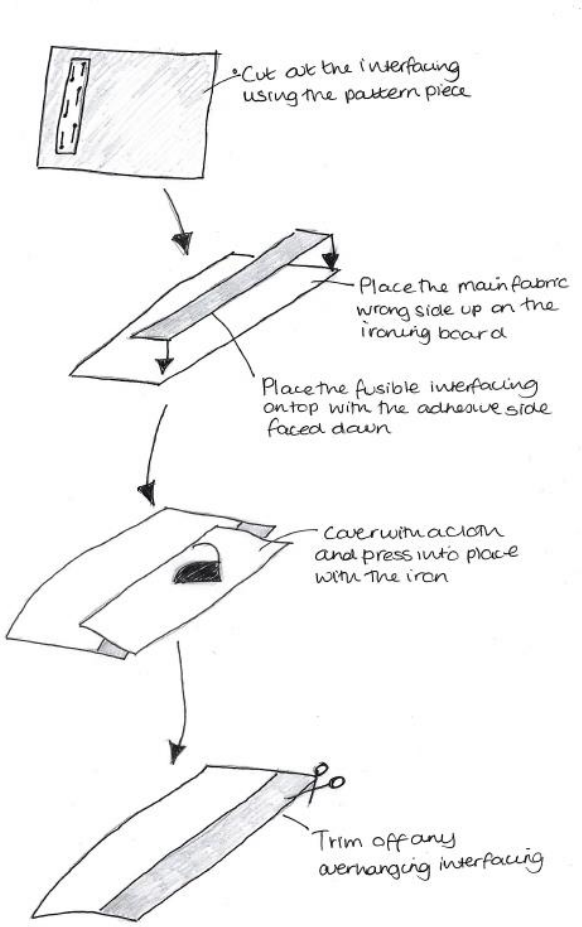
Question number	Answer	Mark
5 (a)	**Marks will be awarded for understanding of design and technology, not graphical skills.** Notes and sketches that include: • be able to hold an additional two pairs of scissors (1) and stop the handles of the scissors from moving as the pouch is carried around (1) e.g. extra pouch / extra pockets by the side of the original / extra pockets in front of the original / elasticated strap /strap with popper fastening / flap over the top of the handles / deeper pocket • protect the user from potential cuts when carrying the pouch (1) and have a surface finish that is easy to clean (1) e.g. padded pocket / reinforced pocket / leather pocket / double layered fabric / lined fabric / stain resistant finish / PVC coating / laminated fabric / synthetic fibres used • fit around a variety of waist sizes (1) and be easily adjustable (1) e.g. to fit between the men's and women's average waist size / buckle with holes / adjustable plastic buckle / Velcro strap / elasticated strap **See next page**	**(6)**

	Example of candidate response:  Notes: Buckle added so that it can be adjusted to fit a variety of people. The waist strap can be adjusted between 80-100cm. Elasticated strap added to hold the scissor handles in place. Fabric has a PVC coating so it is easy to keep clean. Extra pouch added that can hold an extra two pairs of scissors. Reinforced pockets prevent the scissor points from hurting the user.	

Question number	Answer	Mark
5(b)	Any **two** explanations that include a way the felt covered polymer food play set meets or fails to meet the requirement (1) and a linked justification of that way (1) • You can cut the fruit in half with the toy knife (1) therefore the child is able to see what the fruit looks like on the inside / stimulates preparing a healthy meal (1) • There are several different fruits (1) therefore there is quite a lot to be able to discuss with parents about the types of fruits / some have to be peeled to be eaten / others just eaten / benefits of eating fruit (1) • There are only fruits shown / featured in the set (1) therefore it only provides a narrow range of healthy foods / discussion points (1) • The fibres from the felt may get stuck in the Velcro pads / the hooks on the Velcro may get stuck in the felt fabric (1) making the Velcro lose its stickiness / damage the surface or aesthetics of the fruit (1)	**(4)**

Question number	Answer	Mark
6 (a)	Any **two** explanations for treating the denim shirt using the biostoning process (1) and a linked justification (1) • The process uses enzymes (1) which react with the cotton fibres and cause a distressed / acid-wash / washed out effect (1) • The process allows the denim fabric to undergo a mild washing process (1) which eliminates the need for using pumice stones / harsh chemical agents (1) • The process can be controlled more than using traditional methods (1) which means a more uniform distressed look can be achieved (1) • The process makes the fabric softer / more flexible (1) meaning that the shirt is more comfortable to wear against the skin (1) • The process guarantees a more controlled removal of the indigo dye from the cotton fibres (1) allowing the manufacturer to accurately control the positioning of the distressed areas (1)	**(4)**

Question number	Answer	Additional Guidance	Mark
6 (b)	**Marks will be awarded for understanding of design and technology, not graphical skills.** Notes and sketches that include: • Cut the interfacing fabric to the desired shape / size using the pattern piece (1) • Place the main fabric wrong side up on the ironing board (1) • Place the fusible interfacing on top, with the adhesive side facing down onto the wrong side of the main fabric (1) • Cover the fabric and interfacing with a press cloth, and press the iron onto the fabric (1) • Trim any excess interfacing (1) **See next page**	Cap at 3 marks if no sketches or all sketches and no notes	**(4)**

	Example of candidate response:  Notes: • Cut out the interfacing using the pattern piece • Place the main fabric wrong side up on the ironing board. • Place the fusible interfacing on top with the adhesive side faced down. • Cover with a cloth and press into place with the iron. • Trim off any overhanging interfacing.		

Question number	Answer	Mark
6 (c)	Any **one** explanation of a physical characteristic of twill woven fabric (1) and a linked justification for that reason (1) • Twill woven fabric is less likely to show marks (1) than plain woven fabric (1) • Twill woven fabric is resistant to abrasion (1) which means it wears well (1) • Twill woven fabric has good resistance to creasing (1) so stays looking smart in wear (1) • Twill woven fabric has a good drape (1) which means that the shirt will hang well when worn on the body (1) • Twill woven fabric has many interlaced points (1) which means it is less likely to rip / tear (1)	**(2)**

Question number	Answer	Mark
6 (d)	Any **two** explanations that include a method (1), plus **two** linked justifications of that method (1) + (1) Dressmakers / fabric / shears / scissors (1) • These have long sharp blades (1) which allows the user to cut accurately (1) Rotary cutter (1) • This can be used against a ruler for a very straight cut (1) which leaves a very neat finish (1) Laser cutter (1) • The laser can seal the edges of the fabric (1) which prevents it from fraying and makes it easier to work with (1) • This can cut through multiple layers of fabric at once (1) which can increase speed in production (1) Band saw (1) • This can cut through multiple layers of fabric at once (1) which can increase speed in production (1) Die cut (1) • This can cut through multiple layers of fabric at once (1) which can increase speed in production (1)	**(6)**

Question number	Answer	Mark
7 (a)	• Rib / ribs / ribbed / ribbing (1) • Bone / bones / boned / boning (1) • Rib / ribs / ribbed / ribbing structure (1) • Bone / bones / boned / boning structure (1)	**(1)**

Question number	Answer	Mark
7 (b)	Any **two** working properties of non-woven bonded fabric explained (1) plus a linked justification of the property (1) • Non-woven fabric is porous (1) so it can allow the correct amount of moisture to reach the plants (1) • Non-woven fabric is breathable (1) so it allows the plants to be kept in the correct conditions (1) • Non-woven fabrics are flexible (1) so they can be bent / formed into the correct shape of the gardener's tunnel (1) • Non-woven fabrics are translucent / slightly see through (1) so they allow the sunlight to reach the plants below (1)	**(4)**

Question number	Answer	Additional guidance	Mark
7 (c)	A calculation that includes: • Calculation of the length of the semi-circle (1) $\pi D/2 = \pi$ (2 x 9) / 2 = 28.278 cm • Calculation of the total length of the part required (1) 28.278 cm + (2 x 16) = 60.278 cm • Calculation of how many whole strips can be cut from long length of the sheet (1) 244 / 30 = 8 • Calculation of how many whole strips can be cut from width of the sheet (1) 122 / 60.278 = 2 • Calculation of the number of whole pieces that can be cut from a single sheet (1) 8 x 2 = 16 pieces Alternative method from Step 3 (Step 1 and 2 same as above) • Calculation of small sheet area 60.278 x 30 = 1808.34 cm^2 (1) • Calculation of total sheet area 244 x 122 = 29768 cm^2 (1) • Calculation of number of sheets 29768 / 1808.34 = 16.46 rounded to 16 (1)	Award full marks for correct numerical answer without working. Allow ecf if candidate gets part of calculation wrong.	**(5)**

Question number	Answer	Mark
7 (d)	Any **two** explanations that include a benefit of using a zip on the front panel (1), plus **two** linked justifications of that benefit (1) + (1) • The zip allows the gardener quick access to the plants (1) which means it is more convenient (1) and less disruptive to tend to / water them (1) • The zip can be opened part way (1) which gives the plants more access to air (1) and creates the correct conditions for different plants (1) • The zip is easy to open / close (1) which means that the gardener can react quickly (1) to the changing weather conditions (1) • The zip can be fully / securely closed (1) to prevent insects / animals from entering (1) as they could destroy / eat the plants (1)	**(6)**

Question number	Answer	Mark
8 (a)	Any **one** explanation that includes a benefit of using acrylic fibres (1) and a linked justification of that benefit (1) • Acrylic fibres can be sourced / dyed in a wide variety of colours (1) and so therefore the jumper can be adapted to suit most school uniforms (1) • Acrylic is non-allergenic (1) and so is therefore suitable for more wearers than using wool fibres (1) • Acrylic fibres are easy care (1) and so therefore are suitable for a school uniform which is frequently laundered (1) • Acrylic fibres do not shrink (1) and so therefore the jumper will look the same after laundering (1) • Acrylic fibres are crease resistant (1) therefore the jumper will not need ironing before being worn (1) • Acrylic fibres are durable (1) and so are suitable for a garment which would be worn every day (1) • Acrylic fibres are colourfast (1) therefore they retain their colour when laundered (1)	**(2)**

Question number	Answer	Mark
8 (b)	Any explanation of an advantage of using a regular denier acrylic yarn (1) plus **two** linked justifications of that advantage (1) + (1) • Fewer different sizes of materials have to be bought (1) which means less money tied up in stock / more readily available (1) therefore providing better cash flow for the company (1) • The yarns can be pre-made / machined (1) which means stock levels can be maintained (1) therefore ensuring there are always sufficient number of materials ready to respond to consumer demand (1) • The manufacturer's machinery can be set to use a certain denier of yarn (1) which mean that there will be less issues / speedier manufacture (1) therefore allowing the company to meet consumer demand (1)	**(3)**

Question number	Answer	Mark
8 (c)	Any **two** reasons why the embroidered badge has been produced as a sub-assembly (1) and a linked justification (1) • It means it will be manufactured to its own specification (1) which means it will be subjected to its own QC checks (1) • It could be made by a separate specialist company (1) which means the jumper manufacturer does not need to invest in specialist embroidery machines (1) • The embroidered badge can be purchased separately (1) meaning that a variety of different schools could purchase the same basic jumper (1) • The same badge can be applied to a variety of school uniform pieces e.g. sweatshirts, polo tops (1) meaning that the manufacturer could increase its uniform sales (1)	**(4)**

Question number	Indicative content	Mark
8 (d)	Impact on **cost factors** in relation to: • Acrylic fibres are readily available making them ideal for use in a school uniform • Acrylic fibres can be dyed in a variety of colours and this makes them suitable for a variety of school uniforms • Acrylic is non-allergenic and so is therefore suitable for more wearers than using wool fibres • Acrylic fibres do not shrink and so therefore are suitable to be made into a regularly used school uniform • Acrylic fibres have crease resistance therefore the jumper will not need ironing before being worn • Acrylic fibres are easy to launder and so therefore suitable for the regularly used school jumper • Acrylic fibres are easy to work with and so widely used by textiles manufacturers • Acrylic fibres are widely used to imitate wool fibres but are easier for manufacturers to work with / need less processes in their manufacture • Acrylic fibres are widely used by textiles manufacturers and so most of their machinery will be suitable to produce the garments • Acrylic fibres can be made into various shapes during manufacture e.g. crimped which can provide extra warmth when they are manufactured into a school uniform jumper • Acrylic fibres need little in the way of surface treatments **See next page**	**(9)**

Level	Mark	Descriptor
	0	
Level 1	1 - 3	• Attempts to interrogate and deconstruct information but connections and logical chains of reasoning are flawed. • An unbalanced appraisal of the information/issues, containing judgements that show a limited awareness of the interrelationships between factors or competing arguments. • A conclusion may be presented but it is likely to be generic assertions rather than supported by relevant judgements.
Level 2	4 – 6	• Interrogates and deconstructs information and provides some connections and logical chains of reasoning. • A balanced appraisal of the information/issues, containing judgements that show an awareness of the interrelationships between factors or competing arguments. • A conclusion is presented that is partially supported by relevant judgements.
Level 3	7 - 9	• Interrogates and deconstructs information and provides sustained connections and logical chains of reasoning. • A well-balanced appraisal of the information/issues, containing judgements that show a thorough awareness of the interrelationships between factors or competing arguments. • A conclusion is presented that is fully supported by relevant judgements.