

Design and Technology

Advanced GCE

Unit **F524/01**: Product Design: Component 1

Mark Scheme for January 2013

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Question		Answer	Marks	Guidance
1	(a)	<ul style="list-style-type: none"> The durability of the finish – this will not only depend on the properties of the finish but also on the properties of the material it is applied to and the bond between the two materials The extent of the finish’s resistance to impact and how hardwearing it is The installation cost of the finish and the implications for on-going maintenance and replacement costs The finish may need to be waterproof or moisture resistant eg used in a kitchen or bathroom where there may be condensation The finish should be easy to clean, hygienic and resist mould growth The finish should have a low surface spread of flame rating or absorb sound The finish should be attractive or decorative The finish should be ecologically sound and does not contain substances that may be harmful to people, animals or plants. 	4	<p>Clear statement and justification required for a mark</p> <p>Must be related to the product – no marks for generic responses</p> <p>Must be a full response – no marks for identification only.</p> <p>Four justified design requirements.</p> <p>Give one mark if two valid points given but not fully justified.</p>
	(b)	<ul style="list-style-type: none"> Low labour cost Low product cost through economies of scale No production loss through disputes Consistent quality Very efficient, stock control system enables JIT manufacture System checks and modifications easy to carry Out. 	4	<p>brief description 1 mark</p> <p>detailed description 2 marks</p> <p>Two benefits clearly described</p>

Question	Answer	Marks	Guidance
(c)	<p>Employers duties include:</p> <ul style="list-style-type: none"> • Make sure the workplace is safe and without risks to health by assessing risks • Ensure plant and machinery are safe and that safe procedures of work are set and followed • Ensure articles and substances are moved, stored and used safely by providing correct equipment and training • Provide adequate welfare facilities including first aid arrangements • Provide the information, instruction, training and supervision necessary for personal health and safety • Make sure that work equipment is suitable for intended use, and that it is properly maintained and used • Ensure that appropriate safety signs are provided and maintained. <p>Employees duties include:</p> <ul style="list-style-type: none"> • Taking reasonable care for their own health and safety and that of others who may be affected by their actions • Correctly using work items provided by their employer, including personal protective equipment (PPE), in accordance with training or instructions • Using anything provided for health, safety or welfare correctly. 	4	<p>brief description 1 mark detailed description 2 marks</p> <p>Two key features clearly described</p>

Question		Answer	Marks	Guidance
	(d)	<p>Explanations of importance of aesthetics could include:</p> <ul style="list-style-type: none"> • Attracting consumers to products • Aesthetic integrity of product – quality – looks right • Fits environment • Use of colour for mood/safety • Enables matching ‘families’ of products • personal taste • cultural variations 	4	<p>Level 2 (3–4 marks) Detailed explanation, demonstrating clear understanding of aesthetics, covering two or more issues, examples used. Focus on product design for full marks, general explanation of aesthetics max 3</p> <p>Level 1 (0–2 marks) Brief description of issue/s relating to aesthetics outlined, limited explanation</p>

Question		Answer	Marks	Guidance
	(e) (i)	<p>Material – Plaster (wet finish) Properties or characteristics</p> <ul style="list-style-type: none"> • provides a smooth finish over irregular walls • once dry it can be painted or wallpaper applied • provides resistance to fire • provides resistance to surface abrasion • provides sound and thermal insulation • provides a hygienic surface. <p>Material – Plasterboard (dry lining) Properties or characteristics</p> <ul style="list-style-type: none"> • quicker than using wet plaster as no drying out period is required • requires less skill than applying wet plaster • provides resistance to fire • provides resistance to surface abrasion • provides sound and thermal insulation • provides a hygienic surface. <p>Material – Wall tiles Properties or characteristics</p> <ul style="list-style-type: none"> • wide range of finish, shape, size and pattern available • enhances the wall's appearance • provides resistance to moisture • provides resistant to fire • provides resistance to surface abrasion • provides a hygienic surface. <p>Material – Emulsion paint Properties or characteristics</p> <ul style="list-style-type: none"> • enhances the wall's appearance • a wide range of finish eg vinyl matt, silk etc and colours available • provides resistance to surface abrasion • provides a hygienic surface • easy to maintain. 	3	<p>award mark for other appropriate material not listed</p> <p>1x1 mark</p> <p>Award mark for other appropriate property/characteristic</p> <p>2x1 mark</p>

Question	Answer	Marks	Guidance
	<p>(ii) Plaster (wet finish) When plaster is mixed with water a hydration reaction occurs and a set or hardening is produced. Usually a 13mm thick backing or undercoat is applied to the wall followed by a 3mm finishing coat. Using a plastering trowel apply a vertical strip of backing plaster at intervals along the wall creating bays. Check that the strips are the correct thickness and are plumb. Starting 30mm from the bottom of wall infill between the strips with more backing plaster. Using a darby or timber straight edge, level the plaster by moving the darby upwards with a sawing motion, this will level the wall. Fill any low spots with plaster and then repeat the process until all the bays are completely flat. Using a wooden float with nails knocked in it, lightly scrape across the surface and it will score the plaster, ensuring that the finishing plaster adheres correctly. Leave to dry. Cover all of the wall with finishing plaster to a thickness of 3mm allowing it to dry for about twenty minutes. Although on a warm day this length of time would need to be reduced. Any marks can now be removed or hollows filled using the plasterer's trowel. After a further thirty minutes the wall can be polished by splashing water onto the plaster using a paint brush and then lightly trowel the surface. Leave to dry.</p> <p>Plasterboard (dry lining) Plasterboards can be fixed to the backing wall by means of a recommended adhesive applied to both contact surfaces; being nailed or screwed to vertical and horizontal timber battens, or pressed into dots and dabs of wet finishing plaster. Whichever method is used it is important that the wall is checked as the work progresses in its height for plumb and its width for hollows or bulges. A flat</p>	6	<p>Level 3 (5–6 marks) Process fully described, key features and technical details identified, Answer must include detail of specialist tooling for full marks.</p> <p>Level 2 (3–4 marks) Key stages presented, reasonably well described with key features identified</p> <p>Level 1 (0–2 marks) Some stages outlined (up to 2), very limited description</p> <p>Quality of description and communication</p> <p>Basic sketch or chart with limited annotation 1 mark</p> <p>Good sketch/chart with main features identified and labelled 2 marks</p> <p>Detailed sketch/chart with clear annotation 3 marks</p> <p>Max 1 if no sketch/chart used</p> <p>Award credit where possible if response doesn't link to chosen material.</p>

Question	Answer	Marks	Guidance
	<p>surface is obtained by filling the tapered edge joint with a special plaster, applying a joint tape and a final coat of the filling plaster.</p> <p>Wall tiles Mark out a horizontal line along the base of the wall, at a height equal to the size of the tile. Mark out a vertical line through the middle of the wall, from top to bottom. Use a notched trowel to spread tile adhesive over the base of the wall, from just above the horizontal line to the floor, and spanning the whole length. Set a wall tile in place next to the vertical line and under the horizontal line. Press the tile firmly to the wall. Set additional tiles next to the first one, spanning out to the sides. Keep them all lined up under the horizontal line. Put spacers between each tile as the work proceeds. Cut the tile at each end to fit the remaining space. Repeat the procedure building up the wall in courses and covering the whole surface. Allow the adhesive to set overnight. Pull out the spacers. Spread grout over the wall starting at the top, using a grout float. Press the grout into the spaces, scraping the edge of the float over the surface. Wipe up the residual grout from the tile face with a damp sponge. Emulsion paint</p> <ul style="list-style-type: none"> • Ensure the surface of the block wall is clean and remove any loose material with a scraper or stiff brush • Ensure the surface is completely dry before applying any paint • Prime the wall with a stabilising solution or all-purpose primer, applied with a brush • Subsequent coatings of the emulsion paint can be applied by a brush, roller or spray. 		

Question		Answer	Marks	Guidance
	(f)	<p>Issues could be:</p> <ul style="list-style-type: none"> health issues (polluted air/water, carcinogenic materials) global warming – flooding, visual/noise pollution cost implications (filtering/disposal) regulation. <p>examples</p> <ul style="list-style-type: none"> specific details of causes – acid rain – SO₂, NO greenhouse effect – CO₂, CH₄, NO mercury in electricity production chemicals, excess and waste from the production process direct into rivers. 	8	<p>Level 3 (6–8 marks) Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary</p> <p>Level 2 (3–5 marks) One or two issues described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of concept. Introduction of one example or supporting evidence</p> <p>Level 1 (0–2 marks) Some issues outlined, bullet points (usually focussed on one issue) no further or very limited explanation, limited use of examples or supporting evidence</p>
Total			36	

Question		Answer	Marks	Guidance
2	(a)	<ul style="list-style-type: none"> • The tank must have the maximum capacity possible from its overall size to minimize size of hole needed • The material for the tank must be resistant to corrosion • The material for the tank must not react with the tanks contents • The tank must be able to withstand internal and external pressure without breaking • The tank must be water-tight in use to prevent leakage of waste water • Connections to the tank should be easy to make because of the difficulty in reaching them • The tank should be shaped to allow its contents to be removed completely • The tank must be fitted with a vent to allow it to fill and for gases to escape. 	4	<p>Clear statement and justification required for a mark</p> <p>Must be related to the product – no marks for generic responses</p> <p>Must be a full response – no marks for identification only.</p> <p>Four justified design requirements.</p> <p>Give one mark if two valid points given but not fully justified.</p>
	(b)	<ul style="list-style-type: none"> • Low labour cost • Low product cost through economies of scale • No production loss through disputes • Consistent quality • Very efficient, stock control system enables JIT manufacture • System checks and modifications easy to carry out. 	4	<p>brief description 1 mark</p> <p>detailed description 2 marks</p> <p>Two benefits clearly described</p>

Question	Answer	Marks	Guidance
(c)	<p>Employers duties include:</p> <ul style="list-style-type: none"> • Make sure the workplace is safe and without risks to health by assessing risks • Ensure plant and machinery are safe and that safe procedures of work are set and followed • Ensure articles and substances are moved, stored and used safely by providing correct equipment and training • Provide adequate welfare facilities including first aid arrangements • Provide the information, instruction, training and supervision necessary for personal health and safety • Make sure that work equipment is suitable for intended use, and that it is properly maintained and used • Ensure that appropriate safety signs are provided and maintained. <p>Employees duties include:</p> <ul style="list-style-type: none"> • Taking reasonable care for their own health and safety and that of others who may be affected by their actions • Correctly using work items provided by their employer, including personal protective equipment (PPE), in accordance with training or instructions • Using anything provided for health, safety or welfare correctly. 	4	<p>brief description 1 mark detailed description 2 marks</p> <p>Two key features clearly described</p>

Question		Answer	Marks	Guidance
	(d)	<p>Explanations of importance of aesthetics could include:</p> <ul style="list-style-type: none"> • Attracting consumers to products • Aesthetic integrity of product – quality – looks right • Fits environment • Use of colour for mood/safety • Enables matching ‘families’ of products • personal taste • cultural variations. 	4	<p>Level 2 (3–4 marks) Detailed explanation, demonstrating clear understanding of aesthetics, covering two or more issues, examples used. Focus on product design for full marks, general explanation of aesthetics max 3</p> <p>Level 1 (0–2 marks) Brief description of issue/s relating to aesthetics outlined, limited explanation</p>
	(e) (i)	<p>Material</p> <p>Suitable plastics – ABS, HIPS, Polypropylene, Polyamide</p> <p>Stainless steel</p> <p>Properties or characteristics</p> <ul style="list-style-type: none"> • corrosion resistant • durable/long lasting • produces a strong structure • easy to form into shapes required • readily recycled after use • accepts finishes easily. 	3	<p>Award mark for other appropriate material not listed</p> <p>1x1 mark</p> <p>Award mark for other appropriate property/characteristic, but must clearly relate to the material given</p> <p>2x1 mark</p>

Question	Answer	Marks	Guidance
	<p>(ii) Tank – plastics material rotational moulding using split moulds</p> <p>description of process to include:-</p> <ul style="list-style-type: none"> • preparation of mould – polishing and applying release agent. • add measured amount of powdered/granular plastics material • close mould tightly and begin multi-axis tumbling and heating of mould QC – check correct temperature setting and timing to ensure complete moulding of required thickness • allow to cool and open mould QC – check moulding is complete and to required spec. for thickness • cut holes for inlet and outlet pipes (and vent)- (radial) drilling machine with hole saw/trepanning tool • remove mould flash and drilling swarf • final QC check for defects. <p>Allow fabrication from sheet plastics material if production of individual parts is described and the tank is suitably sealed – plastics welding/solvent cement</p> <p>Tank – stainless steel</p> <ul style="list-style-type: none"> • Fabrication – description to include:- • cutting stainless steel sheets for component parts – • laser cutter/powered press brake(guillotine) • rolling part cylindrical section(s) in bending rolls • form end sections – pressing/laser cut and press formed. 	9	<p>Level 3 (5–6 marks) Process fully described, key features and technical details identified, Answer must include detail of specialist tooling for full marks.</p> <p>Level 2 (3–4 marks) Key stages presented, reasonably well described with key features identified</p> <p>Level 1 (0–2 marks) Some stages outlined (up to 2), very limited description</p> <p>Quality of description and communication</p> <p>Basic sketch or chart with limited annotation 1 mark</p> <p>Good sketch/chart with main features identified and labelled 2 marks</p> <p>Detailed sketch/chart with clear annotation 3 marks</p> <p>Max 1 if no sketch/chart used</p> <p>Award credit where possible if response doesn't link to chosen material or specified batch size.</p>

Question	Answer	Marks	Guidance
	<ul style="list-style-type: none"> • QC – check dimensional accuracy of parts prior to assembly • weld parts of tank together – jig held and using auto-feed TIG welding (stainless steel filler wire) • QC – visual check for weld and shape • cut holes for inlet and outlet pipes (and vent) – (radial) drilling machine with hole saw/trepanning tool • finish rough surfaces and drilling burrs and remove swarf from finished tank • Final QC – seal holes and pressure test tank for leaks. 		
(f)	<p>Issues could be:</p> <ul style="list-style-type: none"> • health issues (polluted air/water, carcinogenic materials) • global warming – flooding, • visual/noise pollution • cost implications (filtering/disposal) • regulation. <p>examples</p> <ul style="list-style-type: none"> • specific details of causes – acid rain – SO₂, NO • greenhouse effect – CO₂, CH₄, NO • mercury in electricity production • excess and waste dyes from textile production direct into rivers. 	8	<p>Level 3 (6–8 marks) Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary</p> <p>Level 2 (3–5 marks) One or two issues described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of concept. Introduction of one example or supporting evidence</p> <p>Level 1 (0–2 marks) Some issues outlined, bullet points (usually focussed on one issue) no further or very limited explanation, limited use of examples or supporting evidence</p>
	Total	36	

Question		Answer	Marks	Guidance
3	(a)	<ul style="list-style-type: none"> • The sandwiches must contain a protein food – as they are eaten as a main meal • The sandwiches must contain some salad ingredients – to contribute towards a day • The sandwiches must contain seasoning/dressing – to add flavour • The sandwiches must be made from whole-meal bread to increase the fibre content. • The bread must be spread with butter/margarine to lubricate and make easier to swallow • Margarine lower in polyunsaturated fatty acids • All ingredients must be fresh to increase shelf life • The filling must be seen and look attractive to appeal • Packaging must be see though – customers want to see what they look like. 	4	<p>Clear statement and justification required for a mark</p> <p>Must be related to the product – no marks for generic responses</p> <p>Must be a full response – no marks for identification only.</p> <p>Four justified design requirements.</p> <p>Give one mark if two valid points given but not fully justified.</p>
	(b)	<ul style="list-style-type: none"> • Low labour cost • Low product cost through economies of scale • No production loss through disputes • Consistent quality • Very efficient, stock control system enables JIT manufacture • System checks and modifications easy to carry Out • Less human error • Less risk of contamination. 	4	<p>brief description 1 mark</p> <p>detailed description 2 marks</p> <p>Two benefits clearly described</p>

Question	Answer	Marks	Guidance
(c)	<p>Employers duties include:</p> <ul style="list-style-type: none"> • Make sure the workplace is safe and without risks to health by assessing risks • Ensure plant and machinery are safe/hygienic and that safe procedures of work are set and followed • Ensure articles and substances are moved, stored and used safely by providing correct equipment and training • Provide adequate welfare facilities including first aid arrangements • Provide the information, instruction, training and supervision necessary for personal health and safety • Make sure that work equipment is suitable for intended use, and that it is properly maintained and used • Ensure that appropriate safety signs are provided and maintained. <p>Employees duties include:</p> <ul style="list-style-type: none"> • Taking reasonable care for their own health and safety and that of others who may be affected by their actions • Correctly using work items provided by their employer, including personal protective equipment (PPE), in accordance with training or instructions • Using anything provided for health, safety or welfare correctly. 	4	<p>brief description 1 mark detailed description 2 marks</p> <p>Two key features clearly described</p>

Question		Answer	Marks	Guidance
	(d)	<p>Explanations of importance of aesthetics could include:</p> <ul style="list-style-type: none"> • Attracting consumers to products • Aesthetic integrity of product – quality – looks right • Food must look appetising • Use of colour/shape appeal eg green packaging is perceived as a ‘healthy’ food • Enables matching ‘families’ of products • personal taste • cultural variations • Organoleptic qualities – flavour/smell. 	4	<p>Level 2 (3–4 marks) Detailed explanation, demonstrating clear understanding of aesthetics, covering two or more issues, examples used. Focus on product design for full marks, general explanation of aesthetics max 3</p> <p>Level 1 (0–2 marks) Brief description of issue/s relating to aesthetics outlined, limited explanation</p>
	(e) (i)	<p>DRV Reason for using on packaging:</p> <ul style="list-style-type: none"> • List of quantities of different nutrients and energy from food needed by different groups of people • Series of estimates about the amount of energy and nutrients needed by different groups of people in the Uk population.(target groups) Consists of RNI – estimated quantities for 97% population EAR – average estimated amount LRNI amount for only a small number Who have low needs • Can compare the calorific value of a product with the average estimated amount (EAR) • Enables people to follow current dietary guidelines • Often linked to ‘traffic light’ system of labelling • Helps reduce obesity/useful for people on weight reducing diets. 	3	<p>Statement, list of DRVs 1 mark Explanation with one reason 2 marks Detailed explanation including at least two reasons up to 3 marks</p>

Question	Answer	Marks	Guidance	
<p>(ii)</p>	<p>Sandwich production</p>	<p>9</p>	<p>Level 3 (5–6 marks) Process fully described, key features HACCP identified, For high marks must include HACCP details and temperature</p> <p>Level 2 (3–4 marks) Key stages presented, reasonably well described with key features identified</p> <p>Level 1 (0–2 marks) Some stages outlined (up to 2), very limited description</p> <p>Quality of description and communication</p> <p>Basic sketch or chart with limited annotation 1 mark</p> <p>Good sketch/chart with main features identified and labelled 2 marks</p> <p>Detailed sketch/chart with clear annotation 3 marks</p> <p>Max 1 if no sketch/chart used</p> <p>Award credit where possible if response doesn't link to chosen material</p>	
	<p>Intake of ingredients</p>			<p>Check for: Biological Chemical Physical hazards Date marking Temperature control</p>
	<p>Low risk Preparation area Temperature controlled below 8 °C</p>			<p>Washing of salad Storage of cheese/butter etc</p>
	<p>High risk preparation area Temperature controlled below 8 °C</p>			<p>Only authorised staff wearing full hygienic protection allowed in :</p>
	<p>Sandwich making Temperature controlled below 8 °C</p>			<p>Bread buttered Filling put in each weighed out Sandwich assembled</p>
	<p>Packaging Temperature controlled below 8 °C</p>			<p>Sandwiches cut by machine Packed and sealed Still under temperature control</p>
	<p>Distribution Temperature controlled below 8 °C</p>			<p>Time and temperature control is vital</p>

Question	Answer	Marks	Guidance
(f)	<p>Issues could be:</p> <ul style="list-style-type: none"> • health issues (polluted air/water, carcinogenic materials) • global warming – flooding, • visual/noise pollution • cost implications (filtering/disposal) • regulation • transportation. <p>examples</p> <ul style="list-style-type: none"> • specific details of causes – acid rain – SO₂, NO • greenhouse effect – CO₂, CH₄, NO • mercury in electricity production • chemical fertilisers/pesticides • waste water from industry • reducing output of waste to landfill • encouraging significant reductions in emissions of nitrogen oxides, sulphur dioxide, dust, asbestos and heavy metals in food industry • GM crops. 	8	<p>Level 3 (6–8 marks) Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary</p> <p>Level 2 (3–5 marks) One or two issues described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of concept. Introduction of one example or supporting evidence</p> <p>Level 1 (0–2 marks) Some issues outlined, bullet points (usually focussed on one issue) no further or very limited explanation, limited use of examples or supporting evidence</p>
	Total	36	

Question		Answer	Marks	Guidance
4	(a)	<p>The pop up card should be durable to withstand opening and closing. Should be free standing The construction should be hidden when used. The pop up card should be colourful and appropriate for the occasion As it is handmade it can be complex as a luxury item. Colour and three-dimensional decoration would be appropriate.</p>	4	<p>Clear statement and justification required for a mark</p> <p>Must be related to the product – no marks for generic responses</p> <p>Must be a full response – no marks for identification only.</p> <p>Four justified design requirements.</p> <p>Give one mark if two valid points given but not fully justified.</p>
	(b)	<ul style="list-style-type: none"> • Low labour cost • Low product cost through economies of scale • No production loss through disputes • Consistent quality • Very efficient, stock control system enables JIT manufacture • System checks and modifications easy to carry out. 	4	<p>brief description 1 mark detailed description 2 marks</p> <p>Two benefits clearly described</p>

Question	Answer	Marks	Guidance
(c)	<p>Employers duties include:</p> <ul style="list-style-type: none"> • Make sure the workplace is safe and without risks to health by assessing risks • Ensure plant and machinery are safe and that safe procedures of work are set and followed • Ensure articles and substances are moved, stored and used safely by providing correct equipment and training • Provide adequate welfare facilities including first aid arrangements • Provide the information, instruction, training and supervision necessary for personal health and safety • Make sure that work equipment is suitable for intended use, and that it is properly maintained and used • Ensure that appropriate safety signs are provided and maintained. <p>Employees duties include:</p> <ul style="list-style-type: none"> • Taking reasonable care for their own health and safety and that of others who may be affected by their actions • Correctly using work items provided by their employer, including personal protective equipment (PPE), in accordance with training or instructions • Using anything provided for health, safety or welfare correctly. 	4	<p>brief description 1 mark detailed description 2 marks</p> <p>Two key features clearly described</p>

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	(d)	<p>Explanations of importance of aesthetics could include:</p> <ul style="list-style-type: none"> • Attracting consumers to products • Aesthetic integrity of product – quality – looks right • Fits environment • Use of colour for mood/safety • Enables matching ‘families’ of products • personal taste • cultural variations. 	4	<p>Level 2 (3–4 marks) Detailed explanation, demonstrating clear understanding of aesthetics, covering two or more issues, examples used. Focus on product design for full marks, general explanation of aesthetics max 3</p> <p>Level 1 (0–2 marks) Brief description of issue/s relating to aesthetics outlined, limited explanation</p>
	(e) (i)	<p>Material – card/solid white board</p> <ul style="list-style-type: none"> • Must include the weight of the card – cartridge paper 120 gsm • As long as the weight has been mentioned award the mark. <p>Others accepted: Pearlised card, Foiled card</p> <p>Properties or characteristics</p> <ul style="list-style-type: none"> • high quality finish; • takes print well • lightweight • easy to finish • Ease of bespoke production. • Easy to fold. 	3	<p>award mark for other appropriate material not listed</p> <p>1x1 mark</p> <p>Award mark for other appropriate property/characteristic</p> <p>2x1 mark</p>

Question	Answer	Marks	Guidance
	<p>(ii) • Pop-up card production</p> <p>Artwork originated using a suitable software package – Corel, SignLab, Techsoft etc.</p> <p>Decide on design to be used for the card, the type of pop up mechanism – M folds, Vfolds .and the angle of the folding mechanism and how the design will stand in the card</p> <p>Include minimum parts/not too complex assembly (10,000 required)</p> <p>Print using offset system (accept screen print?) Prepare plates from artwork Tessellate/maximise cards per sheet Print, Quality control Guillotine main card Die cut/press form pop up shapes Apply folds Glue/assemble Quality control check</p>	9	<p>Level 3 (5–6 marks) Process fully described, key features and technical details identified, Answer must include detail of specialist tooling for full marks.</p> <p>Level 2 (3–4 marks) Key stages presented, reasonably well described with key features identified</p> <p>Level 1 (0–2 marks) Some stages outlined (up to 2), very limited description</p> <p>Quality of description and communication</p> <p>Basic sketch or chart with limited annotation 1 mark</p> <p>Good sketch/chart with main features identified and labelled 2 marks</p> <p>Detailed sketch/chart with clear annotation 3 marks</p> <p>Max 1 if no sketch/chart used</p> <p>Award credit where possible if response doesn't link to chosen material.</p>

Question		Answer	Marks	Guidance
	(f)	<p>Issues could be:</p> <ul style="list-style-type: none"> health issues (polluted air/water, carcinogenic materials) global warming – flooding, visual/noise pollution cost implications (filtering/disposal) regulation. <p>examples</p> <ul style="list-style-type: none"> specific details of causes – acid rain – SO₂, NO greenhouse effect – CO₂, CH₄, NO mercury in electricity production excess and waste dyes from textile production direct into rivers. 	8	<p>Level 3 (6–8 marks) Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary</p> <p>Level 2 (3–5 marks) One or two issues described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of concept. Introduction of one example or supporting evidence</p> <p>Level 1 (0–2 marks) Some issues outlined, bullet points (usually focussed on one issue) no further or very limited explanation, limited use of examples or supporting evidence</p>
		Total	36	

Question		Answer	Marks	Guidance
5	(a)	<ul style="list-style-type: none"> • The table must be heavy enough to be stable in use • The table must be a suitable height to enable all users to reach onto the top • Must be made of a material that will withstand outside use • The table top should be large enough to hold items for a number of people • The table should be aesthetically pleasing and fit into the garden surroundings • Should be reasonably easy to move into any required position • The table must be of strong construction to take the weight of any items without collapsing. 	4	<p>Clear statement and justification required for a mark</p> <p>Must be related to the product – no marks for generic responses</p> <p>Must be a full response – no marks for identification only.</p> <p>Four justified design requirements.</p> <p>Give one mark if two valid points given but not fully justified.</p>
	(b)	<ul style="list-style-type: none"> • Low labour cost • Low product cost through economies of scale • No production loss through disputes • Consistent quality • Very efficient, stock control system enables JIT manufacture • System checks and modifications easy to carry out. 	4	<p>brief description 1 mark detailed description 2 marks</p> <p>Two benefits clearly described</p>

Question	Answer	Marks	Guidance
(c)	<p>Employers duties include:</p> <ul style="list-style-type: none"> • Make sure the workplace is safe and without risks to health by assessing risks • Ensure plant and machinery are safe and that safe procedures of work are set and followed • Ensure articles and substances are moved, stored and used safely by providing correct equipment and training • Provide adequate welfare facilities including first aid arrangements • Provide the information, instruction, training and supervision necessary for personal health and safety • Make sure that work equipment is suitable for intended use, and that it is properly maintained and used • Ensure that appropriate safety signs are provided and maintained. <p>Employees duties include:</p> <ul style="list-style-type: none"> • Taking reasonable care for their own health and safety and that of others who may be affected by their actions • Correctly using work items provided by their employer, including personal protective equipment (PPE), in accordance with training or instructions • Using anything provided for health, safety or welfare correctly. 	4	<p>brief description 1 mark detailed description 2 marks</p> <p>Two key features clearly described</p>

Question		Answer	Marks	Guidance
	(d)	<p>Explanations of importance of aesthetics could include:</p> <ul style="list-style-type: none"> • Attracting consumers to products • Aesthetic integrity of product – quality – looks right • Fits environment • Use of colour for mood/safety • Enables matching ‘families’ of products • personal taste • cultural variations. 	4	<p>Level 2 (3–4 marks) Detailed explanation, demonstrating clear understanding of aesthetics, covering two or more issues, examples used. Focus on product design for full marks, general explanation of aesthetics max 3</p> <p>Level 1 (0–2 marks) Brief description of issue/s relating to aesthetics outlined, limited explanation</p>
	(e) (i)	<p>Material</p> <p>Suitable hardwood – teak, oak, beech, mahogany, meranti, iroko</p> <p>Accept pine and marine plywood, but <u>not</u> other manufactured boards such as MDF, blockboard, chipboard,</p> <p>Properties or characteristics</p> <ul style="list-style-type: none"> • weather resistant/durable • produces a strong structure • easy to machine for assembly • fits in well with garden surroundings • is a sustainable material • aesthetically pleasing grain • accepts finishes easily. 	3	<p>Material must be a type of wood (as stated in the question)</p> <p>Award mark for other appropriate wood not listed</p> <p>1x1 mark</p> <p>Award mark for other appropriate property/characteristic, but must clearly relate to the material given</p> <p>2x1 mark</p>

Question	Answer	Marks	Guidance
	<p>(ii) Table top:-</p> <ul style="list-style-type: none"> • prepared boards cut to size – band/circular saw; planer • boards edge-joined to give table top size (biscuit jointing along board edges; glued with external quality glue; clamped to set.) *allow use of dowel joints if jig-drilled holes; holes/biscuit slots may be cut on CNC router QC-Visual check for gaps in joints and adequate coverage of glue • top and bottom surfaces planed/sanded to give smooth, level surface QC-Visual and touch test; straight edge check for warping/distorting • edge moulding shape produced – CNC router; spindle moulder • central hole (for parasol) cut – jig drilled/CNC router • QC – moulding shape (template); hole position; finished quality • final sanding • finish applied – exterior varnish; teak oil; preservative stain. <p>No reference to the base or assembly of the table is required in the response.</p>	9	<p>Level 3 (5–6 marks) Process fully described, key features and technical details identified, Answer must include detail of specialist tooling for full marks.</p> <p>Level 2 (3–4 marks) Key stages presented, reasonably well described with key features identified</p> <p>Level 1 (0–2 marks) Some stages outlined (up to 2), very limited description</p> <p>Quality of description and communication</p> <p>Basic sketch or chart with limited annotation 1 mark</p> <p>Good sketch/chart with main features identified and labelled 2 marks</p> <p>Detailed sketch/chart with clear annotation 3 marks</p> <p>Max 1 if no sketch/chart used</p> <p>Award credit where possible if response doesn't link to chosen material or specified batch size.</p>

Question	Answer	Marks	Guidance
(f)	<p>Issues could be:</p> <ul style="list-style-type: none"> • health issues (polluted air/water, carcinogenic materials) • global warming – flooding, • visual/noise pollution • cost implications (filtering/disposal) • regulation. <p>examples</p> <ul style="list-style-type: none"> • specific details of causes – acid rain – SO₂, NO • greenhouse effect – CO₂, CH₄, NO • mercury in electricity production • excess and waste dyes from textile production direct into rivers. 	8	<p>Level 3 (6–8 marks) Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary</p> <p>Level 2 (3–5 marks) One or two issues described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of concept. Introduction of one example or supporting evidence</p> <p>Level 1 (0–2 marks) Some issues outlined, bullet points (usually focussed on one issue) no further or very limited explanation, limited use of examples or supporting evidence</p>
	Total	36	

Question		Answer	Marks	Guidance
6	(a)	<ul style="list-style-type: none"> • The stand must be stable in use to enable clear reading of music • The stand could be made adjustable for use by standing or seated performers • The stand must hold music at the correct angle for ease of reading • The stand could fold for easy moving and storage • The stand could have a light attached to read music in dark conditions when performances require. • The stand platform must be large enough to hold the maximum size sheet music. 	4	<p>Clear statement and justification required for a mark</p> <p>Must be related to the product – no marks for generic responses</p> <p>Must be a full response – no marks for identification only.</p> <p>Four justified design requirements.</p> <p>Give one mark if two valid points given but not fully justified.</p>
	(b)	<ul style="list-style-type: none"> • Low labour cost • Low product cost through economies of scale • No production loss through disputes • Consistent quality • Very efficient, stock control system enables JIT manufacture • System checks and modifications easy to carry out. 	4	<p>brief description 1 mark detailed description 2 marks</p> <p>Two benefits clearly described</p>

Question	Answer	Marks	Guidance
(c)	<p>Employers duties include:</p> <ul style="list-style-type: none"> • Make sure the workplace is safe and without risks to health by assessing risks • Ensure plant and machinery are safe and that safe procedures of work are set and followed • Ensure articles and substances are moved, stored and used safely by providing correct equipment and training • Provide adequate welfare facilities including first aid arrangements • Provide the information, instruction, training and supervision necessary for personal health and safety • Make sure that work equipment is suitable for intended use, and that it is properly maintained and used • Ensure that appropriate safety signs are provided and maintained. <p>Employees duties include:</p> <ul style="list-style-type: none"> • Taking reasonable care for their own health and safety and that of others who may be affected by their actions • Correctly using work items provided by their employer, including personal protective equipment (PPE), in accordance with training or instructions • Using anything provided for health, safety or welfare correctly. 	4	<p>brief description 1 mark detailed description 2 marks</p> <p>Two key features clearly described</p>

Question		Answer	Marks	Guidance
	(d)	<p>Explanations of importance of aesthetics could include:</p> <ul style="list-style-type: none"> • Attracting consumers to products • Aesthetic integrity of product – quality – looks right • Fits environment • Use of colour for mood/safety • Enables matching ‘families’ of products • personal taste • cultural variations. 	4	<p>Level 2 (3–4 marks) Detailed explanation, demonstrating clear understanding of aesthetics, covering two or more issues, examples used. Focus on product design for full marks, general explanation of aesthetics max 3</p> <p>Level 1 (0–2 marks) Brief description of issue/s relating to aesthetics outlined, limited explanation</p>

Question		Answer	Marks	Guidance
	(e) (i)	<p>Material-Platform</p> <ul style="list-style-type: none"> • abs • polypropylene • polystyrene • acrylic • aluminium alloy • laminated birch/beech/maple; • Stainless steel. <p>Properties or characteristics</p> <ul style="list-style-type: none"> • high quality finish • easily formed to required shape • produces rigid platform. <p>Material-Base</p> <ul style="list-style-type: none"> • mild steel • aluminium alloy • beech/appropriate hardwood • plywood. <p>Properties or characteristics</p> <ul style="list-style-type: none"> • rigid • can be turned and joined • can accept appropriate finish. 	3	<p>award mark for other appropriate material not listed</p> <p>1x1 mark</p> <p>Award mark for other appropriate property/characteristic</p> <p>2x1 mark</p>

Question	Answer	Marks	Guidance
	<p>(ii) Platform</p> <p>Heat formed in plastic</p> <ul style="list-style-type: none"> • plastic sheet cut to size • shapes cut (laser cutter, CNC router, use templates, drill, fine tooth saw) • male/female former prepared and finished • plastic evenly heated • pressed in former • edge treatment applied. <p>Metal shaping/forming</p> <ul style="list-style-type: none"> • sheet metal cut to shape (guillotine, nibbler, fine tooth saw) • shapes cut (plasma cutter), use templates, drill, fine tooth saw) • press former used to bend to shape – fly press or applied pressure, roller • finishing. <p>Laminated</p> <ul style="list-style-type: none"> • male/female former prepared • veneers pre cut • glue spreading (one side) • silicon release on former (prevent glue damage) • veneers inserted into former • former closed – pressure applied • shape released • edge shaping/finish applied. <p>Base-metal</p> <ul style="list-style-type: none"> • centre part turned and bored to size 	9	<p>Level 3 (5–6 marks) Process fully described, key features and technical details identified, Answer must include detail of specialist tooling for full marks.</p> <p>Level 2 (3–4 marks) Key stages presented, reasonably well described with key features identified</p> <p>Level 1 (0–2 marks) Some stages outlined (up to 2), very limited description</p> <p>Quality of description and communication</p> <p>Basic sketch or chart with limited annotation 1 mark</p> <p>Good sketch/chart with main features identified and labelled 2 marks</p> <p>Detailed sketch/chart with clear annotation 3 marks</p> <p>Max 1 if no sketch/chart used</p> <p>Award credit where possible if response doesn't link to chosen material.</p>

Question	Answer	Marks	Guidance
	<ul style="list-style-type: none"> • legs shaped • parts brazed/welded • clean/flux/position/heated/apply spelter/rod • file/clean up • finish. <p>wood</p> <ul style="list-style-type: none"> • centre part turned and bored to size • legs shaped • joints cut • glued/cramped • cleaned up • finished. 		
(f)	<p>Issues could be:</p> <ul style="list-style-type: none"> • health issues (polluted air/water, carcinogenic materials) • global warming – flooding, • visual/noise pollution • cost implications (filtering/disposal) • regulation. <p>examples</p> <ul style="list-style-type: none"> • specific details of causes – acid rain – SO₂, NO • greenhouse effect – CO₂, CH₄, NO • mercury in electricity production • excess and waste dyes from textile production direct into rivers. 	8	<p>Level 3 (6–8 marks) Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary</p> <p>Level 2 (3–5 marks) One or two issues described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of concept. Introduction of one example or supporting evidence</p> <p>Level 1 (0–2 marks) Some issues outlined, bullet points (usually focussed on one issue) no further or very limited explanation, limited use of examples or supporting evidence</p>
	Total	36	

Question		Answer	Marks	Guidance
7	(a)	<ul style="list-style-type: none"> • The toothbrush must be cordless for ease of use. • The toothbrush must be waterproof as the user will wash it under a running tap. • The toothbrush must have an easy-to-grip handle as the user will be holding it with wet, slippery hands. • There must be a simple on/off control so that the user can operate it single-handed with their thumb. • Any power supply must be safe to use in a bathroom environment to prevent an electrical hazard to the user. • The toothbrush should clean teeth and gums gently to prevent any injuries to the user. 	4	<p>Clear statement and justification required for a mark</p> <p>Must be related to the product – no marks for generic responses</p> <p>Must be a full response – no marks for identification only.</p> <p>Four justified design requirements.</p> <p>Give one mark if two valid points given but not fully justified.</p>
	(b)	<ul style="list-style-type: none"> • Low labour cost • Low product cost through economies of scale • No production loss through disputes • Consistent quality • Very efficient, stock control system enables JIT manufacture • System checks and modifications easy to carry out. 	4	<p>brief description 1 mark detailed description 2 marks</p> <p>Two benefits clearly described</p>

Question	Answer	Marks	Guidance
(c)	<p>Employers duties include:</p> <ul style="list-style-type: none"> • Make sure the workplace is safe and without risks to health by assessing risks • Ensure plant and machinery are safe and that safe procedures of work are set and followed • Ensure articles and substances are moved, stored and used safely by providing correct equipment and training • Provide adequate welfare facilities including first aid arrangements • Provide the information, instruction, training and supervision necessary for personal health and safety • Make sure that work equipment is suitable for intended use, and that it is properly maintained and used • Ensure that appropriate safety signs are provided and maintained. <p>Employees duties include:</p> <ul style="list-style-type: none"> • Taking reasonable care for their own health and safety and that of others who may be affected by their actions • Correctly using work items provided by their employer, including personal protective equipment (PPE), in accordance with training or instructions • Using anything provided for health, safety or welfare correctly. 	4	<p>brief description 1 mark detailed description 2 marks</p> <p>Two key features clearly described</p>

Question		Answer	Marks	Guidance
	(d)	<p>Explanations of importance of aesthetics could include:</p> <ul style="list-style-type: none"> • Attracting consumers to products • Aesthetic integrity of product – quality – looks right • Fits environment • Use of colour for mood/safety • Enables matching ‘families’ of products • personal taste • cultural variations. 	4	<p>Level 2 (3–4 marks) Detailed explanation, demonstrating clear understanding of aesthetics, covering two or more issues, examples used. Focus on product design for full marks, general explanation of aesthetics max 3</p> <p>Level 1 (0–2 marks) Brief description of issue/s relating to aesthetics outlined, limited explanation</p>
	(e)	(i) <p>Expected answers might use the following mechanisms: Cam and follower, Crank and slider, Eccentric peg and slot.</p> <p>Candidates should label or annotate the diagram sufficiently for the principle of operation to be clear.</p>	3	<p>Award marks for any other mechanism that will convert rotary to reciprocating or oscillatory motion.</p> <p>Principle of operation clear 1 mark Rotary input clearly indicated 1 mark Oscillatory output clearly achieved 1 mark</p>

Question	Answer	Marks	Guidance
	<p>(ii) Candidates should produce a circuit diagram to produce a bleep every 30s. There are a number of different ways of achieving this function. Expected answers might include some of the following features:</p> <ul style="list-style-type: none"> • Circuit diagram of an astable (eg 555 astable or NAND gate astable) with a 30s period. • Circuit diagram of monostable (eg 555 monostable or NOR gate monostable) with a 30s period. • Monostable to produce a short bleep, eg 1s period. • Power supply lines identified. • Output buzzer correctly connected. • Calculations to determine component values to achieve the correct time periods. • Use of a programmable microcontroller (eg PIC or GENIE) with input/output connections to appropriate transducers. An accompanying program flowchart must be given for full marks to be awarded. 	9	<p>Level 3 (5–6 marks) Clear and correctly functional circuit diagram with few errors and relevant component values calculated or stated.</p> <p>Level 2 (3–4 marks) Clear circuit diagram of a timer. Some attempt to calculate or state appropriate component values.</p> <p>Level 1 (0–2 marks) Attempt at a circuit diagram with some aspect of a timing function. No component values calculated or stated.</p> <p>Quality of description and communication</p> <p>Circuit diagram with some correct BSI symbols 1 mark</p> <p>Complete circuit diagram with mostly correct BSI symbols 2 marks</p> <p>Complete circuit diagram with correct BSI symbols and appropriate annotation (eg labelled power supply) 3 marks</p>

Question	Answer	Marks	Guidance
(f)	<p>Issues could be:</p> <ul style="list-style-type: none"> • health issues (polluted air/water, carcinogenic materials) • global warming – flooding, • visual/noise pollution • cost implications (filtering/disposal) • regulation. <p>examples</p> <ul style="list-style-type: none"> • specific details of causes – acid rain – SO₂, NO • greenhouse effect – CO₂, CH₄, NO • mercury and other toxic chemicals in battery production • Waste produced by failed quality check items • Transportation of components and products. 	8	<p>Level 3 (6–8 marks) Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary</p> <p>Level 2 (3–5 marks) One or two issues described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of concept. Introduction of one example or supporting evidence</p> <p>Level 1 (0–2 marks) Some issues outlined, bullet points (usually focussed on one issue) no further or very limited explanation, limited use of examples or supporting evidence</p>
	Total	36	

Question		Answer	Marks	Guidance
8	(a)	<ul style="list-style-type: none"> • The apron must be made of a durable/hardwearing fabric to protect the user and hold the tools • It must be washable and quick drying-ease and cost of laundering • It must fit a range of sizes for male/female workers • Four pockets in widths to hold a range of different sized tools • Pockets must be deep enough to prevent tools falling out • Pockets must be strong enough not to wear out at the base • Edges of apron must be finished neatly to make it hard wearing • Apron size must give good body coverage • Made in a dark colour to give it a longer useable life. 	4	<p>Clear statement and justification required for a mark</p> <p>Must be related to the product – no marks for generic responses</p> <p>Must be a full response – no marks for identification only.</p> <p>Four justified design requirements.</p> <p>Give one mark if two valid points given but not fully justified.</p>
	(b)	<p>Benefits:</p> <ul style="list-style-type: none"> • Low labour cost • Can perform specialist functions to suit any construction process eg embroidery/printing • Consistent quality/increased accuracy in cutting, sewing, printing, finishing • Computer controlled weaving can transfer designs straight to the loom. Type of weave, colour, size can easily be changed • Very efficient, stock control system enables JIT manufacture • System checks and modifications easy to carry out • Machines are built to withstand rigorous and continuous use. 	4	<p>brief description 1 mark detailed description 2 marks</p> <p>Two benefits clearly described</p>

Question	Answer	Marks	Guidance
(c)	<p>Employers duties include:</p> <ul style="list-style-type: none"> • Make sure the workplace is safe and without risks to health by assessing risks • Ensure plant and machinery are safe and that safe procedures of work are set and followed • Ensure articles and substances are moved, stored and used safely by providing correct equipment and training • Provide adequate welfare facilities including first aid arrangements • Provide the information, instruction, training and supervision necessary for personal health and safety • Make sure that work equipment is suitable for intended use, and that it is properly maintained and used • Ensure that appropriate safety signs are provided and maintained. <p>Employees duties include:</p> <ul style="list-style-type: none"> • Taking reasonable care for their own health and safety and that of others who may be affected by their actions • Correctly using work items provided by their employer, including personal protective equipment (PPE), in accordance with training or instructions • Using anything provided for health, safety or welfare correctly. 	4	<p>brief description 1 mark detailed description 2 marks</p> <p>Two key features clearly described</p>

Question		Answer	Marks	Guidance
	(d)	<p>Explanations of importance of aesthetics could include:</p> <ul style="list-style-type: none"> • Attracting consumers to products; • Fashion trends • Aesthetic integrity of product – quality – looks right • Fits environment • Use of colour for mood/safety • Enables matching ‘families’ of products • Personal taste • Cultural variations. 	4	<p>Level 2 (3–4 marks) Detailed explanation, demonstrating clear understanding of aesthetics, covering two or more issues, examples used. Focus on product design for full marks, general explanation of aesthetics max 3</p> <p>Level 1 (0–2 marks) Brief description of issue/s relating to aesthetics outlined, limited explanation</p>
	(e) (i)	<p>Properties or characteristics of woven polyamide</p> <ul style="list-style-type: none"> • Hard wearing/durable • Could be waterproof • Not damaged by alkalis/bleach/water • Will not rot • Not affected by mildew • Not absorbent; • Firm, stable fabric/will not stretch • Easy to wipe clean/wash. 	3	<p>Award mark for other appropriate property/characteristic</p> <p>3x1 mark</p>

Question	Answer	Marks	Guidance
	<p>(ii)</p> <ul style="list-style-type: none"> • Details of the pattern pieces (Apron front + Pocket) • Check fabric for faults • Place pattern pieces on fabric (pin or cut using laser controlled or knife) • Transfer pattern markings for position of pocket (hot notcher/UV pens). • Hem on top of pockets • Turn over remaining edges of the pocket and position on the apron (stitch around pocket) • Tab for hammer pinned to the edge of the apron • Bias binding would be stitched around the apron (not overlocked) • Stitch neck strap • Stitch down the pockets to create sections 	9	<p>Level 3 (5–6 marks) Process fully described, key features and technical details identified, Answer must include detail of specialist tooling for full marks.</p> <p>Level 2 (3–4 marks) Key stages presented, reasonably well described with key features identified</p> <p>Level 1 (0–2 marks) Some stages outlined (up to 2), very limited description</p> <p>Quality of description and communication</p> <p>Basic sketch or chart with limited annotation 1 mark</p> <p>Good sketch/chart with main features identified and labelled 2 marks</p> <p>Detailed sketch/chart with clear annotation 3 marks</p> <p>Max 1 if no sketch/chart used</p> <p>Award credit where possible if response doesn't link to chosen material.</p>

Question	Answer	Marks	Guidance
(f)	<p>Issues could be:</p> <ul style="list-style-type: none"> • health issues (polluted air/water, carcinogenic materials) • global warming – flooding, • visual/noise pollution • cost implications (filtering/disposal) • regulation. <p>examples</p> <ul style="list-style-type: none"> • Mordents are chemicals use in dyeing that could be harmful if released into the atmosphere • Collection of raw materials ie cotton • Transportation and production pollution • 25% of all pesticide use is in the cotton industry – use pest resistant plants/predators • specific details of causes – acid rain – SO₂, NO • greenhouse effect – CO₂, CH₄, NO • mercury in electricity production • excess and waste dyes from textile production direct into rivers-recycle water and use heat/remove dyes and chemicals from waste or use biodegradables. 	8	<p>Level 3 (6–8 marks) Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary</p> <p>Level 2 (3–5 marks) One or two issues described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of concept. Introduction of one example or supporting evidence</p> <p>Level 1 (0–2 marks) Some issues outlined, bullet points (usually focussed on one issue) no further or very limited explanation, limited use of examples or supporting evidence</p>
	Total	36	

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