



**General Certificate of Education**

**AS Design and Technology  
Product Design 5551**

**PD1T Materials and Components**

**Mark Scheme**

*2008 examination – January series*

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available to download from the AQA Website: [www.aqa.org.uk](http://www.aqa.org.uk)

Copyright © 2008 AQA and its licensors. All rights reserved.

#### COPYRIGHT

AQA retains the copyright on all its publications. However, registered centres for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to centres to photocopy any material that is acknowledged to a third party even for internal use within the centre.

Set and published by the Assessment and Qualifications Alliance.

---

## Quality of Written Communication

The following marks are allocated to the quality of the candidate's written communication. Make a separate assessment of the candidate's overall ability as demonstrated across the paper using the criteria given below.

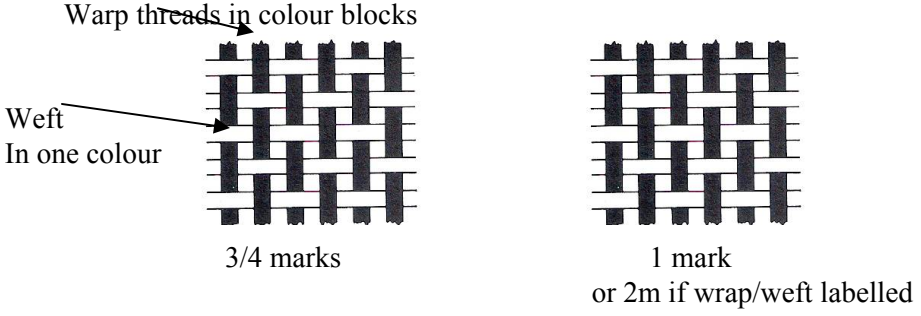
<i>Performance Criteria</i>	Marks
The candidate will express complex ideas extremely clearly and fluently. Sentences and paragraphs will follow on from one another smoothly and logically. Arguments will be consistently relevant and well structured. There will be few, if any, errors of grammar, punctuation and spelling.	4
The candidate will express moderately complex ideas clearly and reasonably fluently, through well-linked sentences and paragraphs. Arguments will be generally relevant and well structured. There may be occasional errors of grammar, punctuation and spelling.	3
The candidate will express straightforward ideas clearly, if not always fluently. Sentences and paragraphs may not always be well connected. Arguments may sometimes stray from the point or be weakly presented. There may be some errors of grammar, punctuation and spelling, but not such as to suggest a weakness in these areas.	2
The candidate will express simple ideas clearly, but may be imprecise and awkward in dealing with complex or subtle concepts. Arguments may be of doubtful relevance or obscurely presented. Errors in grammar, punctuation and spelling may be noticeable and intrusive, suggesting weaknesses in these areas.	1

This mark scheme is intended as a guide to the type of answer expected but is not intended to be exhaustive or prescriptive. If candidates offer other answers which are equally valid **they must be given full credit**.

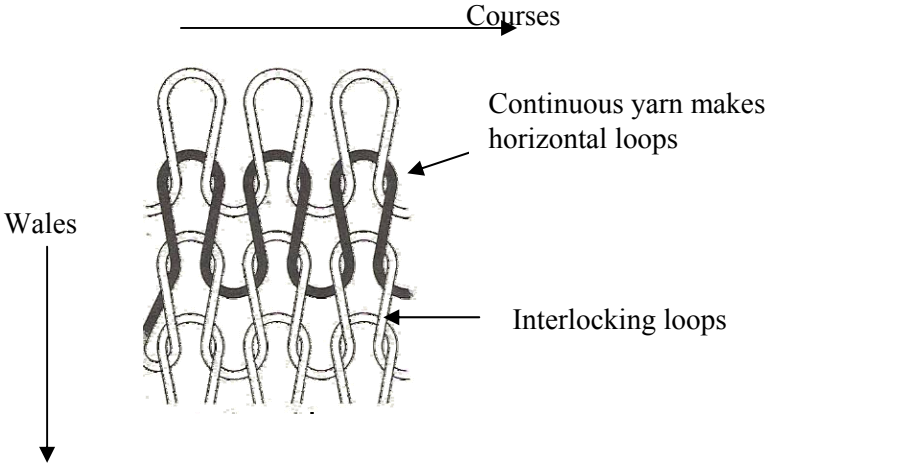
Many responses at this level are assessed according to the **quality** of the work rather than the number of points included. The following level descriptors are intended to be a guide when assessing the quality of a candidate's response.

<b>(low mark range)</b>
The candidate has a basic but possibly confused grasp of the issues. Few correct examples are given to illustrate points made. This candidate does not have a clear idea of what s/he is writing about.
<b>(mid mark range)</b>
The candidate has some knowledge but there will be less clarity of understanding. Some correct examples given to illustrate points made. This candidate knows what s/he is writing about but is confused in part.
<b>(high mark range)</b>
The candidate has a thorough understanding of the issues and has provided relevant examples to support the knowledge shown. This candidate knows what s/he is writing about and provides clear evidence of understanding.

**Question 1**

<p>1(a)(i)</p>	<p>Candidate may respond through an annotated diagram and/or written description. e.g. Coloured warp threads (1 mark), arranged in loom as required (1 mark), coloured weft weaves in and out (1 mark), accurate reference to interlacing pattern of warp and weft (1 mark). An accurate diagram incorporating all points above, and clearly identifying warp and weft, will be acceptable for 4 marks.</p> <div style="text-align: center;">  </div> <p><b>Any 4 points, 1 mark each</b></p>	<p>4 marks</p>
<p>(a)(ii)</p>	<p>e.g. viscose has a soft handle and good drape, is absorbent and naturally breathable, easily dyed to give bright colours, non-static, inexpensive, biodegradable, could have good thermal insulation. But it is fairly weak, especially when wet, low resistance to abrasion, creases badly, can shrink, low thermal insulation.</p> <p><b>Marks awarded as follows:</b></p> <ul style="list-style-type: none"> <li>• Candidate shows little understanding of the properties of viscose and there will be little analysis of its suitability for the scarf. There will be some confused and inaccurate points. (0 – 2 marks)</li> <li>• Candidate shows knowledge of the properties of viscose and attempts to analyse its suitability for the scarf. Although mostly accurate, points will be limited in range. (3 – 4 marks)</li> <li>• Candidate shows sophisticated understanding of the properties of viscose and its appropriateness for the scarf. Information will be accurate with evidence of true evaluation. (5 – 6 marks)</li> </ul>	<p>6 marks</p>
<p>(a)(iii)</p>	<p>Warp/loom yarns (1 mark), twisted/plaited together (1 mark)</p>	<p>2 marks</p>

(b)(i)	Pile weave	1 mark
(b)(ii)	Candidate may respond through an annotated diagram and/or written description. Plain weave ground (1 mark), use of extra warp (1 mark), cut pile (1 mark), tufts arranged in rows along fabric length (1 mark)  <b>Any 3 points, 1 mark each</b>	3 marks
(b)(iii)	e.g. overlocking gives flat finish, suited to range of fabrics, adds decoration, quick for manufacture thus cheaper, may not be so attractive on finer fabrics used for scarf, can be costly for threads.  <b>Marks awarded as follows:</b> <ul style="list-style-type: none"> <li>• Candidate shows little understanding beyond the prevention of fraying. (1 mark)</li> <li>• Candidate gives a number of points but does not evaluate the suitability of overlocking. (2 marks)</li> <li>• Accurate points with evidence of true evaluation. (3 marks)</li> </ul>	3 marks
(b)(iv)	Pre-manufactured component ready to apply (1 mark), saves time which makes manufacture quicker/cheaper (1 mark), neat edge finish (1 mark), accurate/consistent width (1 mark). <b>Any 3 points, 1 mark each</b>	3 marks
(b)(v)	Fine fabrics can tear/snag easily (1 mark), fine needle required (1 mark), correct colour sequence (1 mark) need for even spacing of strips (1 mark), accurate stitching along edges (1 mark), use of polyester thread to match all fabrics (1 mark), colour matched threads (1 mark) references to stitch length (1 mark), bunching/ruching of fabrics (1 mark)  <b>Any 4 points, 1 mark each</b>	4 marks
(b)(vi)	Base/net fabric (1 mark), cut into even strips (1 mark) Allow strips of fabric sewn to ends of scarf.	2 marks

<p>(c)(i)</p>	<p><b>Weft knit</b> uses one continuous yarn (1 mark), horizontal rows of loops (1 mark), interlock with those in the row above and below (1 mark).  <b>Any 3 points, 1 mark each</b>                  An accurate diagram showing points above is acceptable for 3 marks.</p> <div style="text-align: center;">  </div>	<p>3 marks</p>
<p>(c)(ii)</p>	<p>Weft knit can be circular knitted (1 mark), so fabric produced as a tube (1 mark)</p>	<p>2 marks</p>
<p>(c)(iii)</p>	<p>e.g. Acrylic is warm to touch, crease resistant, shrink resistant, lightweight, soft to touch, easy care, not very absorbent/dries quickly, durable, not as irritating to skin as wool, inexpensive, pills easily, develops static electricity.</p> <p><b>Marks awarded as follows:</b></p> <ul style="list-style-type: none"> <li>• Candidate shows little understanding of the properties of acrylic, response will be in generalised terms and limited in scope. (0 – 2 marks)</li> <li>• Candidate gives a number of accurate and different points which are related to the scarf. There will be evidence that the properties of acrylic are understood. (3 – 5 marks)</li> </ul>	<p>5 marks</p>
<p>(c)(iv)</p>	<p>Groups of coloured yarn (1 mark), tasselled/knotted through ends (1 mark).</p>	<p>2 marks</p>

**(40 marks)**

**Question 2**

2(a)(i)	<p>Denim has a twill weave which is able to resist abrasion because of interlacing of yarns. May refer to indigo dye sitting on fibre surface rather than penetrating the fibres.</p> <p>Corduroy is a cut pile weave, tufts are easily dragged from ground/base fabric when abraded thus causing bald/worn patches.</p> <p><b>Marks awarded as follows:</b></p> <ul style="list-style-type: none"> <li>Information about the two weaves will tend to be superficial, the candidate may refer to denim's origins as a work wear fabric, and will possibly repeat the experimental data. (0-2 marks)</li> <li>There will be some awareness of the differences in weave, especially points about twill weave, but there will be lack of detail and possibly some inaccuracies. (3-4 marks)</li> <li>Clear understanding of the differences in the two weaves with clear information to explain the different results from the testing. The candidate shows clear knowledge. (5-6 marks)</li> </ul>	6 marks
(a)(ii)	<p>Snagging occurs when yarns are pulled to the surface of the fabric, satin weave has long 'floats' on the fabric surface, abrasion brings these fine yarns to the surface, spoiling the appearance of the fabric. The appearance of the shiny satin is spoiled by snagging but the strength of the polyester fibre prevents a hole forming.</p> <p><b>Marks awarded as follows:</b></p> <ul style="list-style-type: none"> <li>Candidate shows little understanding of the contribution made by satin construction, there may be reference to the action of the metal file with no understanding of why the fabric was damaged. (0 – 1 marks)</li> <li>Candidate is aware of the limitations of the satin weave but there are some inaccurate points and misunderstandings. The term 'snagging' may not be explained and there may be little reference to the polyester content. (2 – 3 marks)</li> <li>A clear explanation of 'snagging' and detailed information about the satin weave which makes it susceptible to this form of damage. There will be accurate reference to the polyester fibre content. (4 – 5 marks)</li> </ul>	5 marks



(a)(iii)	<p>Pilling occurs when fibres on the surface of a fabric are rubbed up into small balls, which spoil the appearance, the weaker viscose fibres in the blend, work loose, and are held by the stronger polyester fibres.</p> <p><b>Marks awarded as follows:</b></p> <ul style="list-style-type: none"><li>• Candidate shows little understanding of pilling and how and why it affects the polyester/viscose fabric (0 – 1 marks)</li><li>• Candidate is aware of what is meant by pilling but is unable to offer a clear and accurate description of why it has occurred in the polyester/viscose fabric. There will be some misunderstanding. (2 – 3 marks)</li><li>• A clear explanation of ‘pilling’ and the damage it causes. There will be sound information about the nature of the 2 fibres which makes pilling likely to occur on such fabrics. (4 – 5 marks)</li></ul>	5 marks
----------	--	---------

(b)(i)	<p>e.g. clothing worn for work or everyday use may be subjected to wear and tear at particular points such as elbows, knees, collars and cuffs. Some garments are delicate e.g. eveningwear, and are not expected to be subjected to heavy usage. Clothing for children needs to last for some time whereas fashion garments may only be expected to last for only one season. Some garments may be spoiled by creams, oils, make-up or other staining. Rough treatment may shorten the useful life of a fabric.</p> <p><b>Marks awarded as follows:</b></p> <ul style="list-style-type: none"> <li>• Little understanding, simplistic statements only, candidate typically concentrates on fabric/fibre issues with few examples given. (0 – 2 marks)</li> <li>• Candidate shows understanding of the issues to be considered but in limited ways only. Some parts of the response will be descriptive of fabrics but there will be a sound attempts to analyse garment usage. Some appropriate examples given. (3 – 4 marks)</li> <li>• Candidate shows sophisticated understanding of issues to be considered and gives a range of appropriate examples. (5 – 6 marks)</li> </ul>	6 marks
(b)(ii)	<p>e.g. careless laundering may cause shrinkage or loss of colour, some fibres are weaker when wet and easily damaged, hot irons can damage synthetic fabrics, allowing a garment to become too dirty or badly stained may necessitate drastic treatment, moth and mildew attack if garments are not carefully stored, subjecting a delicate garment to sharp objects such as jewellery may cause damage.</p> <p><b>Marks awarded as follows:</b></p> <ul style="list-style-type: none"> <li>• Little understanding, simplistic statements only, candidate typically concentrates on fabric/fibre issues with few examples given. (0 – 2 marks)</li> <li>• Candidate shows understanding of the issues to be considered but in limited ways only. Some parts of the response will be descriptive of fabrics but there will be a sound attempts to analyse garment care. Some appropriate examples given. (3 – 4 marks)</li> <li>• Candidate shows sophisticated understanding of issues to be considered and gives a range of appropriate examples covering a number of areas of care. (5 – 6 marks)</li> </ul>	6 marks

**(28 marks)**

**Question 3**

3(a)	<p>e.g. Denim is made from cotton which requires large amounts of pesticide and chemical fertilizers, land use for large cotton crops could be more effectively used, deforestation and intensive farming of crops damages environment and changes landscape, bleaching and dyeing of fabrics require vast amounts of water and produce toxic effluent, do not biodegrade easily and chemicals leach out of fabric and components when disposed of in landfill sites. Metal components made from heavy metals which leach out in landfill. Fast changes in fashion encourage consumers to discard wearable jeans, low price outlets do not encourage the buying of better quality and longer lasting jeans, many jeans are manufactured overseas which has implications for fuel used for transportation, fewer environmental controls in some poorer countries mean greater environmental damage. Organic cotton and coloured cotton growth are more eco-friendly.</p> <p><b>Marks awarded as follows:</b></p> <ul style="list-style-type: none"> <li>• Basic information with evidence of only limited knowledge and understanding of environmental issues. Candidate will give only superficial reasons for the environmental damage caused by jeans; there will typically be comments that bleaching and dyeing cause environmental damage but specific problems will not be given. Information will be generalised rather than specific and there will be evidence of misunderstanding. (0 - 3 marks)</li> <li>• Candidate shows knowledge of the different problems caused and will relate specifically to jeans although there may be a lack of specific information. There will be a tendency to relate to a narrow area of environmental concern. At the top end, there will typically be good coverage of one area of concern, e.g. dyeing or pesticides. There may be elements of confusion and inappropriateness. (4 - 7 marks)</li> <li>• Candidate shows detailed knowledge and understanding of the environmental problems and relates specifically and accurately to jeans. There will be a range of varied points with clear explanation of the issues involved. (8 - 10marks)</li> </ul>	10 marks
------	--	----------

(b)	<p>e.g. Tencel and Lyocell are designed to minimise impact on environment, they are made from regenerated cellulose from renewable sources and manufacturing processes recycle solvents used in manufacture in a ‘closed loop process, these solvents are non-toxic. The fabrics can be recycled easily or sent to sewage farms to be fully degraded. Fabrics are versatile with enhanced properties.</p> <p><b>Marks awarded as follows:</b></p> <ul style="list-style-type: none"> <li>• Basic generalised comments based on limited information, e.g. ‘the fibres are made from regenerated cellulose or they can be recycled’ (0 - 2 marks)</li> <li>• Some accurate information about the fibre manufacture using recycled processes or are recyclable fibres made from renewable resources. (3 - 4 marks)</li> <li>• Clear and detailed information, this candidate is aware that the fibres are designed to have low environmental impact and is able to explain why. (5 - 6 marks)</li> </ul>	6 marks
-----	---	---------

(c)	<p>e.g. Synthetic fibres come from non-renewable oil products, when discarded, they take a long time to break down or if incinerated they produce damaging fumes. Manufacturing processes involve damaging chemicals and the factories where the fibres are produced use non-renewable energy sources. Transportation of materials uses energy and produces CO<sub>2</sub>, use of precious fuels for transport. Colouring of fabrics requires high temperature dyeing. However, these fibres are very hardwearing and can give a long life to products, and can be laundered at lower temperatures and dry quickly, newer polyester fibres have been developed to be recyclable.</p> <p><b>Marks awarded as follows:</b></p> <ul style="list-style-type: none"> <li>• Basic generalised comments based on limited information, e.g. ‘the fibres are made from oil and can not be recycled’ (0 - 2 marks)</li> <li>• Some accurate information about the fibres but there will be some misunderstandings at the lower end of the mark range. Candidates at the top end of the mark range will show clear and detailed understanding of a range of issues. (3 - 5 marks)</li> </ul>	5 marks
(d)	<p>e.g. laundering requires energy to heat water and dry clothes, detergent effluent can cause damage, new detergents which work at low temperatures, fabrics which can be washed at low temperatures are better, use of ‘eco-balls’ instead of traditional detergents, quick drying and non-crease fabrics reduce energy usage. Energy efficient and water efficient washing machines reduce effects, only use washing machine for full loads, washing products which are not really dirty is wasteful, line dry rather than tumble dry to reduce energy usage, finishes to reduce soiling means fewer washes.</p> <p><b>Marks awarded as follows:</b></p> <ul style="list-style-type: none"> <li>• Basic generalised comments based on limited information, e.g. ‘the washing and drying of clothes uses energy, use lower temperature wash’ (0 - 2 marks)</li> <li>• Accurate information about the care of textiles in relation to environmental issues but this will be across a narrow range of areas and may be generalised in parts. The candidate shows good awareness of a number of issues, especially at the top end of the mark range. (3 - 5 marks)</li> </ul> <p>Clear and detailed information, this candidate is aware of the many issues involved and is able to provide clear and accurate information about how environmental damage can be minimised. (6 - 7 marks)</p>	7 marks

**(28 marks)**

**Question 4**

4(a)	<p><b>Wool</b> contributes softness and warmth, is highly absorbent but, because the fibres are hairy, it may irritate skin when used alone. It is very expensive and not very hardwearing. Wool is difficult to care for because the presence of scales on the fibres cause it to shrink and its high absorbency means that it takes a long time to dry. Wool has a natural crimp which gives it elasticity. <b>Nylon</b> adds abrasion resistance, reduces absorbency of wool so quicker drying, may allow for garments to be heat-set into shape so shrinkage reduced, lightweight so counteracts weight of wool, and reduces overall cost.</p> <p><b>Marks awarded as follows:</b></p> <ul style="list-style-type: none"> <li>• Basic information will tend to concentrate on the properties of the individual fibres with evidence of only limited understanding of the effects of blending them. Qualities will be generalised rather than related specifically to socks/sweaters. There will be confused and inaccurate information. (0 - 2 marks)</li> <li>• Candidate shows sound knowledge of the properties of the individual fibres and is able to give limited explanation of their suitability for socks/sweaters and their overall contribution to the blend. There will be some understanding but some points may be general rather than specific. (3 - 5 marks)</li> </ul> <p>Candidate shows detailed knowledge and understanding of the properties of the individual fibres and is able to relate to their combined contribution to the blend and intended use. The overall qualities of the blend will be given detailed and accurate consideration with clear explanation of points made (6 - 7 marks)</p>	7 marks
------	---	---------

(b)	<p>Bamboo – like appearance of linen fibres give fabric attractive slub, fabrics have a firm, crisp handle and good drape. Linen is very strong and durable with reasonable resistance to abrasion. Smooth fibres make it an excellent conductor of heat so cool to wear. Highly absorbent and dries quickly making it fresh and cool for hot weather wear. Lacks elasticity and resilience so creases badly, but a resin treatment can be given to make it crease resistant. Smooth surface of linen does not soil easily but it stains easily. Stronger when wet so withstands harsh washing, can be washed at high temperatures without damage, ironed with a hot iron without burning/melting. Not affected by alkalis so does not need special detergents, but can easily be damaged by strong bleaches. Linen fabrics shrink badly unless given a finish. High moisture content makes it non-static, damaged by mildew but not attacked by moths.</p> <p><b>Marks awarded as follows:</b></p> <ul style="list-style-type: none"> <li>• Candidate has little understanding of the properties of linen and there will be little analysis of its suitability for summer clothing. There will be confused and inaccurate points. (0 - 2 marks)</li> <li>• Candidate shows knowledge of the properties of linen and attempts to analyse its suitability for summer wear. Although mostly accurate, points will be limited in range. (3 - 5 marks)</li> <li>• Candidate shows sophisticated understanding of the properties of linen and its appropriateness for summer wear. Information will be accurate with evidence of true evaluation. (6 - 7 marks)</li> </ul>	7 marks
(c)(i)	<p>e.g. (weft) knitted construction (1 mark), brushed/nap/fluffy (1 mark), brushed on both sides (1 mark), different weight available (1 mark), very soft (1 mark). <b>Any 3 points</b>, 1 mark each.</p>	3 marks
(c)(ii)	<p>e.g. Polyester fleece is lightweight, soft, fluid/flexible, is hardwearing and strong, not absorbent so dries quickly, easy care, warm without being bulky, cheaper than some alternatives, crease resistant, can have various built in properties, e.g. windproof, stain resistant.</p> <p><b>Marks awarded as follows:</b></p> <ul style="list-style-type: none"> <li>• There is little understanding of the properties of fleece beyond its warmth. Many confused, inaccurate points (0 - 2 marks)</li> <li>• Candidate shows knowledge of the properties of fleece and attempts to analyse its suitability for uses given. Although mostly accurate, points will be limited in range. (3 - 4 marks)</li> </ul> <p>Candidate shows sophisticated understanding of the properties of fleece and its appropriateness for uses given. Information will be accurate and relevant. (5 - 6 marks)</p>	6 marks

**(28 marks)**

(d)	<p>e.g. silk is luxurious, soft, has lustre, strong and drapes well. But it is expensive, very difficult to care for, damaged by perspiration. Herringbone weave adds texture and is flexible but may snag easily.</p> <p><b>Marks awarded as follows:</b></p> <ul style="list-style-type: none"> <li>• Little understanding, simplistic statements only, candidate typically concentrates on fibre qualities with little reference to fabric or suitability for ties. (0 - 2 marks)</li> <li>• Candidate shows understanding of the qualities of the silk fibre and the fabric, and there will be sound attempts to evaluate its suitability for ties. (3 - 5 marks)</li> </ul>	5 marks
-----	--	---------

Question 1:		40 marks	
Question 2:	28 marks		
Question 3:	28 marks		
Question 4:	28 marks		
2 questions 28 marks each		56 marks	
Quality of written communication		4 marks	
	Paper total:		100 marks