UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the October/November 2011 question paper for the guidance of teachers

9631 DESIGN AND TEXTILES

9631/01 Paper 1, maximum raw mark 75

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UNIVERSITY of CAMBRIDGE
International Examinations

Section A

Answer **both** questions.

1 There is a wide range of fibres available for textile use.

(a) (i) Name two protein fibres and state their origin.

Answer could include:
wool from sheep; camel hair from camels; silk from silkworms (wild and cultivated); hair fibres e.g. mohair from mohair goats; or any other protein fibre.
1 mark for each fibre/origin. [2]

(ii) Name two synthetic fibres and state their origin.

Answer could include:
Polyamide (e.g. nylon 6, 6) from hexamethylene diamine and adipic acid (chemicals from petroleum);
Polyester from terephthalic acid and ethylene glycol;
Acrylic from 85% acrylonitrile (from petroleum) (with other additives);
Or any other synthetic fibre (e.g. modacrylic, aramid, elastane, chlorofibre).
1 mark for each fibre/origin. [2]

(b) Compare the following performance characteristics for one protein and one synthetic fibre from those listed in (a):

(i) moisture absorption

one protein:

e.g. **silk** can absorb up to 11% of its weight in moisture so it is a comfortable fibre to wear;

e.g. **wool** tends to be water repellent but it can also absorb 13–18% of its own weight in moisture without feeling wet so making for comfortable fibres to wear.

one synthetic:

e.g. **polyamide (nylon)**, not a very absorbent fibre (4%) so feels uncomfortable, although it dries quickly;

e.g. **polyester** is one of the least absorbent fibres, absorbing less than 1% of its own weight in moisture; polyester will therefore dry rapidly, will not stain easily, and will also be more uncomfortable to wear.

Comparison of one fibre from each group with up to 2 marks awarded. [2]

(ii) elastic recovery

one protein:

e.g. **silk** is an elastic fibre and can stretch up to one fifth of its length before breaking;

e.g. **wool** is very elastic and can be stretched by 25–30% of its natural length before breaking, allowing for free body movements and reduces the tendency of fabric tearing.

one synthetic:

e.g. **polyamide (nylon)** is very elastic and will return to its original shape easily;

e.g. **polyester** has a high degree of stretch resistance so it is not likely to stretch out of shape too easily, so is suitable for knitted fabrics where shape is retained.

Comparison of one fibre from each group with up to 2 marks awarded. [2]

(iii) flammability:

one protein:

e.g. **silk** is sensitive to heat and will sizzle and burn and then self extinguish; it will have a strong smell of burning feathers;

e.g. **wool** does not burn easily – it smoulders and is self extinguishing, leaving a black ash and strong smell of hair.

one synthetic:

e.g. **polyamide (nylon)** will burn then melt if in a flame, and it may smell of celery;

e.g. **polyester** will catch fire (flame) and melt but will self extinguish when heat or flame is removed; flame retardant polyesters are available;

e.g. **acrylic** – gets sticky, melts, shrinks, decomposes.

Comparison of one fibre from each group with up to 2 marks awarded. [2]

(c) Discuss how the performance characteristics listed in (b) can be affected by different fabric structures.

Answer could include:

Fabric structures:

Woven structures such as plain, twill and satin weaves are firm and so do not allow much moisture to be trapped between the fibres.

If fibres are not very absorbent e.g. polyester, the fabric made from polyester e.g. polyester twill, will not be very comfortable to wear.

If absorbent fibres such as wool are used to make a woven fabric, the fabric e.g. wool twill will be much more comfortable to wear.

Flame retardant finishes added to an open weave fabric.

Knitted fabric such as weft knitted e.g. polyester jersey, will be able to trap moisture between the loops of each stitch, so allowing moisture to be moved away from the body; a knitted polyester therefore will be more comfortable to wear compared with a woven polyester.

Other structures such as lace (open structure) and **non-wovens** will allow moisture to evaporate easily even though the fibres themselves may not absorb much. However, with non-wovens, this will depend on the denseness and thickness of the fabric structure.

Examples of different fabric structures could be included e.g. polyester satin, wool tweed, nylon tricot, etc.

Sketches may be included and should be given credit, particularly if labelled.

Moisture absorption:

Moisture absorption will depend on which fibre is being used and whether blends or fibres have been included.

Elastic recovery:

Elasticity of fabrics will depend on the type of fibres and yarns used. If synthetic fibres are used, it is possible to change the texture of these by heat setting; heat setting can make more crimps in the length of the fibres, which will make the yarn even more elastic; if fabrics are made from these textured fibres/yarns, the fabric structure will become more flexible.

Heat-setting is only possible with synthetic fibres so protein fibres cannot be modified in the same way.

Flammability of fabrics will be affected if the fabric structure is very open and yarns have space between them e.g. nylon organza has an open weave and this may flare/melt more readily because of the looser weave than a fabric such as polyester twill, which has a more dense structure.

High band:

The answer will contain well informed discussion of how performance characteristics can be affected by fabric structure and a number of detailed examples of fabric structures will be included. Reference will be made to all three performance characteristics. [7–9]

Middle band:

The answer will include some discussion of how performance characteristics can be affected by fabric structure and a number of detailed examples of fabric structures will be included. Some reference will be made to two or three performance characteristics. [3–6]

Low band:

The answer may include limited discussion of how some of the performance characteristics can be affected by fabric structure although some points may be presented as a list with no discussion. Few if any examples of fabric structures may be included. Reference to the three performance characteristics may be limited or omitted. [0–2]

(d) Name and assess two new developments in fibre technology and comment on how they can improve fabric performance characteristics.

Answer could include:

Microencapsulation e.g. fibres which contain small amounts of additives such as perfume, creams etc. which are released when the fabric is touched or rubbed together. For example, moisturising cream added to nylon/polyester tights; lavender oil added to sleep pillows, etc.

Wider range of performance characteristics means that the consumers may decide to buy the fabric, but it will depend on costs.

Hollow polyester (e.g. for absorbency in sportswear).

Nanotechnology can be incorporated into parts of fabrics/garments e.g. electronic products (light/heat sensors) which can be used as safety features in e.g. sports clothing. Medical uses: electronic uses of textiles where e.g. heart rate can be monitored. Medical advances are often viewed as beneficial.

Smart fabrics can react to their surroundings e.g. logos on children's T shirts which can change colour if the temperature/UV light exceeds safety levels. This is an improvement in fabric performance characteristics.

Any other appropriate point.

1 mark for each well discussed point. [6]

Other examples:
Polartec – from recycled plastic bottles
Elastane – stretches up to 8x
Lyocell – environmentally friendly
Mircrofibres
Modal

[Total: 25]

2 Knitted fabrics are popular choices for garment construction.

(a) Using labelled diagrams, describe the structure of a plain knitted fabric.

Answer could include:
Loop structure of fabric to be shown;
Correct use of terms to describe each part of the knitted structure:
Wale (vertical loops);
Course (horizontal loops);
Loops need to be interlocked correctly;
Edges curl;
One set of needles;
Plain or purl stitch to be shown.
1 mark for each correct section of the structure. [4]

(b) Explain how the following fabrics are different from a plain weft knitted fabric:

(i) 1 × 1 rib

include a sketch to show structure (give credit for labelled sketches);
the surface of the fabric has alternate rows (vertical) of one purl stitch and one plain stitch; diagram of this needs to be accurate for full marks;
right and wrong side look the same unlike weft knits which are different on each side;
fabric is more stretchy than plain weft knits; retains its shape better than plain knit;
fabric curl at the edges tends to be much reduced compared with plain weft knit;
circular or flat bed machine;
2 sets of needles.
1 mark for each correct point, up to 4. [4]

(ii) interlock

variation of the 1×1 rib;
appearance is like two separate knitted fabrics which are interknitted;
right and wrong side look the same, unlike weft knits;
fabric is firmer with a closer structure than 1×1 rib and weft knit;
less stretchy than weft knit or 1×1 rib;
two needle beds are used opposite each other, unlike weft knits.
1 mark for each correct point, up to 4. [4]

(c) (i) Name one weft knitted fabric and one warp knitted fabric.

Answer could include:

Named fabrics:

weft knitted: cotton jersey; viscose jersey; cotton interlock; cotton jacquard; cotton plush; viscose velour; acrylic fake fur (sliver knit);

warp knitted: nylon tricot; polyester locknit; cotton warp knitted terry; polyester warp knitted plush; nylon raschel lace; or any other suitable fabric names.

1 mark each fabric. [2]

(ii) Compare the two fabrics in terms of:

stretch characteristics;

weft knits have stretchy quality, whereas warp knits are firm and stretch very little unless the yarn has been textured;

warp knits have limited stretch due to firmness of the structure. [2]

fibre composition;

weft knits can use any combination of fibres and yarns; if hand knitted, any texture/thickness can be knitted and used in combination to produce variation in finished fabric/item; most machine knitting is done with smooth fine threads, using any fibre composition, even yarns made from staple fibres e.g. wool, which have a 'hairy' appearance;

warp knits are more limited due to the equipment used; fine smooth threads are normally used. Speed of production is increased if there are no variations on the thickness/texture of yarns, which might cause machinery to break down/stop. [2]

end use.

weft knits can be used for any type of garment/item where stretch is required. If surface/texture is required without stretch qualities, the back of the fabric can have another layer fused so that the fabric becomes more stable. For example, jumpers, gloves, tights, sportswear, T shirts, underwear, blouses, dresses, etc.

warp knits are used less for garments than other household/industrial uses. For example, it is used for leisure/swimwear, linings, lingerie, ribbons/trimmings, curtains, bed furnishings, industrial fabrics etc. [1]

(d) Discuss how different yarns can change the appearance of weft knitted fabrics used for garments and accessories.

Answer could include:

Variety of yarns could include:

thickness (e.g. denier);

fibres used e.g. 100% fibre or a blend of different fibres;

colour: either one colour or a blend of colours in one yarn; space dyed yarns etc.

use of coloured stripes to produce patterns:

different texture: e.g. fluffy mohair yarns could be used in contrast with a smooth shiny viscose in the same fabric; boucle, slub, plisse yarn, looped yarn etc.;

include sketches to illustrate how the colour combinations can be used to good effect.

1 mark for each well discussed point. [6]

[Total: 25]

Section B

Answer **one** question.

3 Design principles are important when producing original design work.

(a) Sketch and label four different initial design ideas which are from architectural features/ buildings. Indicate fabric(s), colours and textile technique(s) on the sketches.
Answer could include:
Buildings e.g. temples, monuments, houses, hotels, historical buildings e.g. museum buildings, etc.
Details e.g. windows, door handles, arches, floor patterns e.g. mosaics, roof tiles, stained glass cut into sections, etc.
Any other suitable ideas from architectural features/buildings.
1 mark for labelled sketch showing details of the design idea. [4]

(b) (i) Using the initial ideas in (a) develop three textile designs for the hemlines of three different dresses.
Answer could include:
Development of the design idea in **(a)** to show how the ideas could be used on hemlines:
Pattern of mosaic floor design could be block printed to produce a symmetrical repeat next to the fold of hem;
Design based on doors and door handles together which could be used on the raw edge of a hemline, and the door handle design could be cut out, to make an uneven curved shaped (scallop) hemline;
Roof stripe design could be made into a square block print and rotated a quarter turn to produce an abstract striped design in 4 rows along the hem edge; the hem edge could be overlocked and folded/stitched towards the inside of the dress.
Any other ideas for designs, which have been developed from architectural features/ buildings.
3 marks for each well labelled/sketched design. [6]

(ii) For one of the dress designs in (b)(i), explain:
Your choice of colour;
Could relate to the pattern from mosaics e.g. red tiles with blue squares;
Colour study from an unrelated natural item e.g. roof stripes could be blue or pink with idea taken from a different source e.g. flowers;
Colour could relate to current trends in fashion, which need not relate to natural forms at all.
Any other relevant point. [2]

Your choice of fabric(s);
Choice of fabrics could relate to technique chosen e.g. applique by machine could use a shiny fabric such as polyester satin for the mosaics and a matt fabric e.g. polyester twill for the roof tiles;
Printing could be silk screen printing on a silk dupion fabric to give strong colours and some texture;
Fabric choice could also relate to cost of garment production/final item; ease of availability of fabric; season e.g. spring/summer fabric may be lighter than autumn/ winter fabric which may be heavier.
Any other relevant point. [2]

How your designs fits in with current trends.
Choice of colour/fabric/textiles technique could relate to current trends;
Could be completely original, and not fit in with trends;
Some aspects could reflect current trends e.g. colour, whereas others could not relate and be original.
Any other appropriate point.
1 mark for each well justified point. Give credit for well labelled illustrations. [2]

(c) Assess whether changes in women's skirt shapes and hemlines have been due to fashion revivals or original ideas from fashion designers. Illustrate your answer with specific examples of fashion designers you have studied.

Answer could include:
Hemlines for daywear – 1920 (UK) knee length designs; similar for evening.
1930 (UK) longer hemlines – calf length; evening could be fluted/uneven/scalloped; (e.g. fashion designer Coco Chanel).
1940 – (UK) knee length; similar for evening; original design due to use of less fabric due to World War 2 shortages.
1950 – calf length dresses, evening skirts wide or narrow; (e.g. fashion designer Christian Dior – French).
1960 – knee length and getting shorter by end of decade; same for evening wear (revival from 1920 style when skirts were knee length); original designs due to 'space-age' influence.
1970 – fitted styles and longer lengths, below knee length (revival from previous longer styles e.g. 1930).
1980–2009 – examples of fashions worn by specific designers could be included.
Examples of styles which are related to different cultures, e.g. Indian saris, and hemline styles were long but with the use of different ornamentation and embellishment along the hemline.
Examples of different types of hems e.g. plain, scalloped, handkerchief, embroidered/ beaded, etc.
Examples of different types of skirts e.g. balloon, A line, straight, flared, gathered, asymmetric, etc.

High band:
An informed assessment of whether changes in women's skirt shapes and hemlines have been due to fashion revivals or original ideas from fashion designers. Illustrated answer with a good number of specific detailed examples of fashion designers studied. [7–9]

Middle band:
An assessment of changes in women's skirt shapes and hemlines and whether this has been due to fashion revivals or original ideas from fashion designers. Some parts of the answer will contain illustrations with a few examples of fashion designers studied. [4–6]

Low band:
Limited assessment of whether changes in women's skirt shapes and hemlines have been due to fashion revivals or original ideas from fashion designers. Little if any illustration with few examples of fashion designers studied. There may be no reference to specific fashion designers. [0–3]

[Total: 25]

OR

4 Clothing manufacturing (production) methods vary according to the items being produced.

(a) State four factors which a clothing manufacturer would consider when deciding on which production method to use.

Answer could include:
Number of items to be produced e.g. one item – individual production may be most efficient; if low number (e.g. 100) – more efficient to make them using batch production; if thousands, may be better using mass production;
How long between placing of order and when items are needed;
Whether items are identical (mass production may be better for large number) or if there are slight variations e.g. colour (batch production may be better);
How complicated/simple the items of clothing are (e.g. number of pieces to be joined);
Cost of items/production; which machines required;
How much labour/skill.
1 mark for each point. [4]

(b) (i) Explain four benefits of using batch production for garment making.

Answer could include:
Identical products are made;
Items can be made to order;
Small variations to the item can be made easily;
Team of people who are flexible/multi-skilled; timescale, efficient use of resources (including cost), fashion trends (short runs), just-in-time (JIT) (save on warehousing/ storage resources). [4]

(ii) Discuss the main factors (for example, machinery, materials, labour etc.), which need to be considered by the manufacturer when making up a batch of sweatshirts with raglan sleeves.

Answer could include:
How to divide up the processes amongst the machinists available – need to make sure that everyone has appropriate work according to their skills;
Team work is more flexible as staff are able to do more than one job;
The timescale for making up the sweatshirts – if the timescale is short, more workers may be needed in order to finish the order on time;
Which machinery is available – most of the work for the sweatshirt could be done on the overlocker, e.g. with 4-thread safety stitch; cover stitches; overedge stitches; etc.
Which quality of fabric to buy – e.g. high quality or lower quality (costs);
Which components are needed – will these be bought in especially for the order;
Which thread to use (e.g. any special type/colour);
Any other relevant factor.
1 mark for each well discussed point. [6]

(c) Compare the range of joins/seams which are available for home-based and industrial clothing production.

Answer could include:

Home-based:

Wide range of types e.g. plain seams, with many variations; French seams; overlaid seams; double stitched seams;

Many of these seams have more than one stage which is more suited to one-off production i.e. they would be too time consuming to produce in industry;

Choice of seams depends on type of fabric e.g. lightweight fabrics can be joined with a French seam, which is strong and leaves no raw edges visible;

Type of fabric – thin fabrics or thick fabrics; slippery or matt fabrics; fabrics which fray badly or are firm and do not fray; patterned fabric or plain fabrics;

Position of join/seam – straight or curved or shaped seams – depends on position on garment;

Strength of seam e.g. some seams have more than one row of stitching;

Choice of stitch to be used for the join/seam; e.g. chain stitch.

Industrial based:

Which machine is available and can be used for stitching seams e.g. overlocker, lockstitch machine;

Skill of machinists – speed/accuracy of sewing;

Type of fabric to be used – easiest/most efficient/cost efficient way to stitch seams.

High band:

Comparison of the range of joins/seams which are available for home-based and industrial clothing production. A wide range of examples of joins/seams to be included with detailed discussion. [8–11]

Middle band:

Comparison of some of the range of joins/seams which are available for home-based and industrial clothing production. There may be some examples, but they may lack detail. A small range of seam types may be included. [5–7]

Low band:

Little of any comparison of some joins/seams, and the answer may have some examples of joins/seams for home-based and/or industrial clothing production. [0–4]

[Total: 25]