Fabric Construction Methods Part 1

Woven

1) Explain the difference between the selvage and the raw edge of a woven fabric. (2)
2) Using sketches, explain the three main weaves, Plain, Twill and Satin. (6)
3) Describe two features which each of the weaves give to a fabric. (6)
4) A) Explain the term directional pile as applied to fabric. (2)
    B) Name two fabrics which have a directional pile. (2)
5) Describe the Back strap looms used in South America. (4)
6) Explain how tartan fabric is formed. (2)
7) What is madras and what is it used for? (2)

Knitted

1) Identify the types of knits in the picture below and explain the difference between them. (3)

2) Give examples of products that are made using the two different types of knitting. (2)
3) How are ‘ribbed’ fabrics made and what are they used for? (2)
4) Describe the construction of Polyester Fleece fabric. (3)
5) Explain the reasons for using a knitted towelling construction for a pair of socks. (5)
6) Explain the term directional pile as applied to fabric. (2)
7) Name two fabrics which have a directional pile. (2)
8) Explain the terms:
    A) Fully-fashioned knitting (1)
    B) Garment length knitting (1)
    C) Cut and sew blanket knitting (1)
    D) 3D knitting (1)

Non-Woven

1) Giving examples, explain the difference between felted and bonded fabrics. (6)
2) List three properties of non-woven fabrics. (3)
3) Non woven fabrics are important for many different applications. Describe how a needle felted fabric is produced. You must use annotated diagrams. (3)
4) Describe how handmade felt is produced. You must use annotated diagrams. (3)
5) Justify the use of non woven fabrics in a range of medical textiles. (5)
6) Explain how laminated fabrics are manufactured and give some examples of laminated fabrics. (4)
Fabric Construction Methods Part 2

Open-Work

1) Describe how lace is made and what it is used for. (3)
2) How are crochet fabrics made? (2)

New Technologies

1) Modern fabrics can be used to give special effects. Giving examples, explain how these fabrics allow the design and manufacture of interesting and exciting textile products. (6)
2) What are microfibers and what can they be used for? (3)
3) What are the advantages of using microfibers? (3)
4) Explain how breathable fabrics work. (3)
5) What are hydrophilic membranes? Give an example along with its properties. (3)

Technical terms related to yarns

1) What is the Tex system and how is it calculated? (1)
2) What is a Denier and how is it calculated? (1)

Fabric Construction Methods Part 2

Open-Work

1) Describe how lace is made and what it is used for. (3)
2) How are crochet fabrics made? (2)

New Technologies

1) Modern fabrics can be used to give special effects. Giving examples, explain how these fabrics allow the design and manufacture of interesting and exciting textile products. (6)
2) What are microfibers and what can they be used for? (3)
3) What are the advantages of using microfibers? (3)
4) Explain how breathable fabrics work. (3)
5) What are hydrophilic membranes? Give an example along with its properties. (3)

Technical terms related to yarns

1) What is the Tex system and how is it calculated? (1)
2) What is a Denier and how is it calculated? (1)
Fabric Construction Methods Part 1

Woven

1) Explain the difference between the selvage and the raw edge of a woven fabric. (2) Selvage is finished off/does not fray / weft wraps round warp yarns (1 mark). Raw edge is cut / will fray (1 mark)

2) Using sketches, explain the three main weaves, Plain, Twill and Satin. (6) Plain weave – Is the simplest and tightest method of weaving. Both sides of the fabric are the same. The warp yarn goes over and under each weft thread. Twill weaves – Warp and weft threads are interlaced causing diagonal lines to appear on the fabric. Satin weave – The interlacing of the threads are never adjacent to one another, the repeat is usually over atleast 4 threads but the warp end interlaces over the 1 weft thread per each pattern repeat. The back of the fabric looks very different. Satins and sateens have a shiny or lustrous surface.

3) Describe two features which each of the weaves give to a fabric. (6) Plain weave – strong, firm and hard wearing, e.g calico, ripstop nylon. Twill weave – Drapes well, strong, dense, durable and hard wearing e.g. denim, drill. Satin weave – soft and supple handle and drape, smooth shiny surface, e.g. crepe satin, jacquard, curtain lining.

4) A) Explain the term directional pile as applied to fabric. (2) Pile fabrics are made using the third yarn system to form a cut pile on the face of the fabric. They have an additional warp of weft thread of loops that are cut to give the stand up pile of the fabric.

B) Name two fabrics which have a directional pile. (2) Velvet, Corduroy, Needlecord, Towelling

5) Describe the Back strap looms used in South America. (4)

6) Explain how tartan fabric is formed. (2) Large squares of colour overlaid by warp and weft stripes, form coloured warp and weft. A traditional Scottish fabric.

7) What is madras and what is it used for? (2) Lightweight cotton check, used for blouses, shirts and dresses.

Knitted

1) Identify the types of knits in the picture below and explain the difference between them. (3)

Left picture = Weft knitting, made from continuous lengths of yarn, fed across the width of the fabric by a series of needles, can be unravelled and if a stitch is dropped it will run down the length of the fabric. Produces soft, comfortable fabric that has variable stretch.

Right picture = Warp knitting, fabrics are made on straight or circular CAD/CAM knitting machines. Each loop is fed by its own separate yarn, fed into the knitting zone parallel to the fabric selvedge. The loops interlock vertically along the length of the fabric. Warp knits have some elasticity and do not ladder or become unravelled.

2) Give examples of products that are made using the two different types of knitting. (2)

Weft knitting can be used to make one-off designer products such as jumpers or cushions. Single jersey used for t-shirts, jumpers and underwear. Double jersey used for t-shirts, underwear, polo shirts, sportswear, skirts and leggings.

Warp knitting is used for swimwear, leisure and underwear, linings, laces, ribbons and trimmings, net curtains, furnishing and bed linens.

3) How are ‘ribbed’ fabrics made and what are they used for? (2)

Made on two sets of needles, which are staggered. Alternate loops are knitted in opposite directions, to form vertical lines in the fabric. The fabric is very elastic width ways, making it suitable for jumpers, waistcoats, underwear and socks.

4) Describe the construction of Polyester Fleece fabric. (3)

Weft knitted construction, brushed/nap/fluffed, brushed on both sides, very soft. Has bulk and is able to trap air, trapped air is an insulator.
5) Explain the reasons for using a knitted towelling construction for a pair of socks. (5)

The loops trap air so make the socks warmer to wear, the fabric will appear softer against skin and cushion feet, and loops aid transportation of moisture away from skin. The knitted structure adds to the stretch qualities allowing socks to be put on easily and to mould to the shape and size of the foot. The knitted construction allows for seamless construction of the socks.

6) Explain the term directional pile as applied to fabric. (2)

A raised fabric surface, which lies in one direction/looks different colours when viewed from different angles, feels smooth/rough when brushed.

7) Name two fabrics which have a directional pile. (2)

Velvet, corduroy, needlecord, fur fabrics, velour, fleece, suede, suedette, velveteen.

8) Explain the terms:

A) Fully-fashioned knitting (1)

Individual components are knitted to shape so they can be sewn together to make a product.

B) Garment length knitting (1)

Fabric is knitted in individual panels of a width to suit the end product, this produces some waste.

C) Cut and sew blanket knitting (1)

Long lengths of knitted fabrics are produced in the form of a tube on a circular knitting machine. It is then cut to shape and sewn to make the product. This produces a lot of waste, which is cut down through the use of CAD lay planning.

D) 3D knitting (1) The product is knitted in one piece, incorporating the garment shaping. There is minimal sewing and no fabric wasted.

Non-Woven

1) Giving examples, explain the difference between felted and bonded fabrics. (6) Bonded fabrics – made from a web of fibres that are bonded together in one of three ways, adhesive bonded fibre (web of fibres bonded together with adhesive, either sprayed or applied by dipping then pressed together), thermally bonded (fibres are melted to stick together), Solvent bonded (a solvent is added to soften the fibres so they stick together). Felted fabrics – Mechanically bonded by entangling staple fibres with high pressure water jets, scales on the surface of the wool fibres lock together and tangle, Felting gives thick, matted appearance.

2) List three properties of non-woven fabrics. (3) Do not drape well, fibre arrangement is random, they do not stretch, and if pulled out of shape they will not recover. Produced easily and cheaply. It has no grain, does not fray.

3) Non woven fabrics are important for many different applications. Describe how a needle felted fabric is produced. You must use annotated diagrams. (3) The fibres are repeatedly punched with hot, barbed needles which drag the fibres to the lower side of the web until they get tangled. The fibres are then bonded. It is used for interlinings, wadding, mattress covers, floor covering and filters.

4) Describe how handmade felt is produced. You must use annotated diagrams. (3) Made by washing and rubbing the fibres in very hot, soapy water. It can be boiled in a hot wash in the washing machine to shrink and felt the wool. Surface effects can be added to it by scrubbing with wire wool or pan scourers to break down the surface and fray the edges.

5) Justify the use of non woven fabrics in a range of medical textiles. (5) They can be produced cheaply, Traditional products include bandages for covering wounds, sutures for stitching together the sides of open wounds to promote healing, substrates for plaster of Paris casts, and incontinence products. Bandages have themselves evolved into advanced dressings which enable antibiotic and other drugs to be delivered directly to the parts of the body where they are needed. Non-woven fabrics are absorbent, warm, resilient.

6) Explain how laminated fabrics are manufactured and give some examples of laminated fabrics. (4) Laminating fabrics combine two or more layers of different materials, which are bonded together by adhesive or by the thermoplastic quality of one or both of the materials. E.g. Vilene interfacing, Water proof membrane Gore-Tex, foam can be laminated to upholstery fabrics for added strength and softness.
Fabric Construction Methods Part 2

Open-Work

1) Describe how lace is made and what it is used for. (3) Lace is a fine, open fabric of mesh or net. Embroidery lace is made by hand or machine, by working an embroidered pattern onto a ground fabric. The ground is removed by cutting it away or burnt-out technique. Raschel lace is made on a warp-knitting machine. Lace is used for curtains, bedspreads and as decorative edgings on garments.

2) How are crochet fabrics made? (1) Crochet is a hand-made chain of loops, produced from a single thread using a hook. The chains of loops can be linked to make crochet fabric.

New Technologies

1) Modern fabrics can be used to give special effects. Giving examples, explain how these fabrics allow the design and manufacture of interesting and exciting textile products. (6) Different colour effects including fabrics which react to heat/light, fabrics with electronic components which can produce a range of different effects, use of metallic fibres, fabrics which give off a smell. Provides clear examples to illustrate points made.

2) What are microfibers and what can they be used for? (3) A microfiber combines a high number of very fine fibres into one yarn of one decitex or less. They are around 60 to 100 times finer than a human hair. They can be manufactured from polyester, polyamide or acrylic and can be blended with other synthetic fibres or with natural fibres. They are used in fabrics that have enormous variety of appearances and end-uses, they are used in smart and technical fabrics for active wear, all weather wear and for a range of industrial uses.

3) What are the advantages of using microfibers? (3) They can be fine and closely woven, breathable and comfortable, manufactured to have good drape and a soft handle, manufactured to have a velvety, brushed or crepe surface, given a hydrophobic (water hating) finish to enhance water resistance.

4) Explain how breathable fabrics work. (3) Breathability is the ability for a fibre to transfer moisture along its surface. Silk and cotton have natural wicking ability. New synthetic microfibers have been developed so they wick moisture away from the body. The capillaries running through the fibres transport water droplets and perspiration through the fabric. This property makes fabrics feel comfortable because sweat and water can disperse and evaporate because it does not get chilly through contact with damp fabric. Wicking action only works one way so it does not allow the water droplets back through the fabric. Breathable fabrics allow the body to adapt to a variety of strenuous activities.

5) What are hydrophilic membranes? Give an example along with its properties. (3) A hydrophilic membrane has a solid structure which forms a barrier to wind and rain. It allows perspiration in the form of moisture vapour to escape through a molecular chain of polyester blocks. Hydrophilic means water loving. The moisture loving polyester bocks in Sympatex take up perspiration rapidly and transport the vapour through the continuous film to the outside. Sympatex is extremely breathable and is totally waterproof, windproof, lightweight and flexible. As it has no pores it cannot be clogged up with dirt or detergent.

Technical terms related to yarns

1) What is the Tex system and how is it calculated? (1) The Tex system is the most common method of yarn numbering. This is the unit of measurement for the linear density of a fibre. Tex = mass in grammes of 1km of fibre (Tex = g/km)

2) What is a Denier and how is it calculated? (1) This method of yarn numbering is used for all filament yarns. Td (Denier) = mass in grammes of 9km of fibre. The finer the yarn the smaller the number.