

The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Textile and Apparel Technology



Study Programme : Bachelor of Industrial Studies Honours
Name of the Examination : Final Examination
Course Code and Title : TAX6455 Fabric Technology
Academic Year : 2024/25
Date : 09th March 2026
Time : 0930 – 1230 hours
Duration : 3 hours

General instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **Six (06)** questions in **Four (04)** pages.
3. Answer **only five (05)** questions.
4. All questions carry equal marks.
5. The answer for each question should commence on a new page.
6. This is a Closed Book Test (CBT).

Question 1

- a. Briefly explain why normal woven textile fabrics are considered “Planar structures” whereas Knitted spacer fabrics are not planar structures. (02 marks)
- b. Briefly explain how woven, knitted and non-woven fabrics get the required strength for various applications in which they are used? (02 marks)
- c. Briefly explain the importance of laminated fabrics and quilted fabrics in various applications. (04 marks)
- d. Four major categories of fabric characteristics that are of interest to the apparel manufacturer can be identified. State what these four characteristics are and briefly explain their purposes. (08 marks)
- e. Visual characteristics of a fabric are dependent on the changes in colour values, when either the fabric or the light is moved. Briefly explain any two (02) colour quality problems considered under the visual characteristics of fabrics, mentioning their defective appearances. (04 marks)

Question 2

- a. Briefly explain why the water permeability and the thermal conductivity properties of textile fabrics are considered transmission characteristics. (04 marks)
- b. Briefly explain how the two transmission characteristics mentioned in Question 2a. affect the comfort properties of garments. (06 marks)
- c. Briefly explain the functions and requirements of using the following household textiles and name any two (02) fibre types that are suitable for making each of these textiles.
 - (i) Blankets
 - (ii) Tablecloths
 - (iii) Curtains(06 marks)
- d. State the purpose of tyre cords and airbags in an automobile. List, for each of these automobile components, two properties that are expected to fulfil their intended purpose. Name two (02) fibres each for the manufacture of tyre cords and airbags under high-performance textiles. (04 marks)

Question 3

- a. Briefly explain how one can identify the warp and weft direction of a given woven fabric sample, whether it has selvages or not. (04 marks)
- b. During the tensile test, a woven fabric sample changes shape at its vertical edges. Draw a diagram to illustrate the changed shape of the fabric sample and give the possible reason/s for this change. (04 marks).
- c. Briefly explain why it is easier to unravel the yarns from a woven fabric in the following two scenarios. You may use relevant mathematical formulas to derive your answers to this question.
 - i. Warp and weft yarns with smooth surface finishes (04 marks)
 - ii. Lower warp and weft densities (fabric sett) (04 marks)
- d. Using a suitable diagram, explain how the construction of leno weave fabric differs from the normal plain weave fabric. (04 marks)

Question 4

- a. Briefly explain why plain fabrics demonstrate the following properties, in comparison to twill fabrics having the same fabric parameters.
 - i. Higher tensile strength (03 marks)
 - ii. Lesser absorbency and wicking properties (03 marks)
- b. Briefly explain why twill fabrics display the following properties in comparison to plain fabrics having the same fabric parameters.
 - i. Better smooth and soft fabric surface (03 marks)
 - ii. Moderate wind resistance (03 marks)

- c. Differentiate between Satin and Sateen fabric structures. (02 marks)
- d. Satin and sateen fabrics give a very lustrous appearance with their smooth surface compared to normal woven fabrics. Justify this statement, giving reasons for such an appearance. (06 marks)

Question 5

- a. Using a suitable diagram, differentiate between Rib gating and Interlock gating needle bed arrangement in weft knitting. (02 marks)
- b. Using suitable point paper diagrams and yarn path diagrams, illustrate how Weft lock knit, and Mock rib distorted knitted stitches designs look. (04 marks)
- c. Briefly explain the structural differences between full cardigan and half cardigan rib structures using yarn path diagrams and give the fabric properties of **each** structure. (06 marks)
- d. (i) Using point paper diagrams, differentiate Full Milano and Half Milano knitted structures. (06 marks)
- (ii) Draw the yarn path diagram for the Swiss double pique structure. (02 marks)

Question 6

- a. Using suitable yarn path diagrams, differentiate 8-lock and 12-lock interlock structures. (04 marks)
- b. Draw a yarn path diagram and explain how Punto-Di-Roma structure is designed and manufactured based on the interlock structure. (04 marks)
- c. Draw the yarn path diagram and calculate the stitch length of a double jersey knitted structure given by the following point paper diagram. The number of wales counted between two points on the face side of the following structure (visible wales) is 16, and the length of unravelled, uncrimped yarn is 20 cm. (04 marks)

X	X	•	•	0	0	•	X	X	•
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- d. A knitter needs to produce 1000 square metres of fully finished relaxed, plain knitted worsted fabric with a stitch density of 220 stitches/cm²

Calculate the,

- The required length of yarn, considering the wastage of 5% of yarn, during manufacture
- Course and wale density of the produced knitted fabric.

The following table gives the Relaxation constants (for metric units).

Fabric State	Parameter			
	k_s	k_c	k_w	$k_c/k_w = R.$
Dry relaxed	1900	50	38	1.31
Wet relaxed	2160	53	41	1.29
Finished relaxed	2360	56	42.2	1.32

(08 marks)

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