

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	: 2023/2024
Date	: 07 th March 2025
Time	: 0930-1230hrs
Duration	: 3 hours

General Instructions

1. Read all instructions carefully before answering the questions.
2. This is a Closed Book Test (CBT).
3. Write down your Index Number in all the pages of answer scripts.
4. This question paper consists of Six (06) questions in four (04) pages.
5. Answer five (05) questions only. Each question carries 20 marks
6. Do not write answers to the additional questions.
7. Answers for each question should commence from a new page. If a question has many parts, all the parts should be answered in the chronological order under the same question.
8. Write down the answered question numbers in the cover page of the answer book.
9. Answers should be in clear handwriting.
10. Do not use red colour pens to write the answers.

(Q1) (a) Briefly explain how the following textiles are made and the purpose is expected by **each** of them.

(i) Tufted fabrics (ii) Laminated fabrics (iii) Quilted fabrics (06 marks)

(b) Differentiate three basic categories of style characteristics of textile fabrics and give one (01) example for **each**.

(06 marks)

(c) (i) Briefly explain why,

(I) air permeability is considered as a Transmission characteristic

(II) pilling is considered as a Transformation characteristics

(04 marks)

(ii) Briefly explain why tearing strength and abrasive resistance of fabrics are considered as Durability characteristics. (04 marks)

(Q2) (a) Briefly explain how do you select suitable **woven fabric types** to obtain the good comfort in,

(I) **Summer climates** with concerning the **fabric area density/GSM** and **thermal conductivity characteristics**.

(II) **Winter climates** with concerning the **fabric area density/GSM** and **thermal conductivity** .

(08 marks)

(b) Briefly explain any two (02) requirements that you expect from **each** of the following house hold textiles and give two (02) suitable fibre types to make these fabrics.

(i) Bedlinen

(ii) Carpet

(04 marks)

(c) Give any two (02) requirements that you expect from textile materials used for **each** of the following applications in technical textiles and briefly explain why **each** of them are important for the function/s of the mentioned product.

(i) Car seat belt

(ii) Tyre cord

(08 marks)

(Q3) (a) Briefly explain the reasons for followings. (08 marks)

(i) Weft yarns in a plain weave fabric sample have higher crimp than warp yarns

(ii) Contact angle of two yarns at an interlacing point depends on the diameter of the two yarns. You may use a suitable diagram to explain this.

(b) When you are applying a tensile force to a yarn in a plain fabric having lower warp and weft setts, briefly explain why this yarn can be easily pullout.

(04 marks)

(c) (i) Briefly explain how warp and weft setts effect on the tensile strength of a plain fabric sample. (04 marks)

(ii) Differentiate the Balanced and Unbalanced square plain fabrics. (04 marks)

(Q4) (a) With giving reasons, explain why plain fabric sample shows lower tearing strength compared to twill or satin/sateen? (06 marks)

(b) Using suitable diagrams, briefly explain the differences in construction of triaxial fabrics and leno fabrics. (06 marks)

(c) (i) Briefly explain why twill fabrics have better wind resistance compared to plain fabrics. (04 marks)

(ii) Briefly explain why Satin and Sateen fabrics have higher shiny effect compared to normal plain fabrics. (04 marks)

(Q5) (a) (i) With giving yarn path diagrams and point paper diagrams, differentiate normal plain knitted structure with knitted structures having **distorted knitted stitches**.

(04 marks)

(ii) Draw the yarn path and point paper diagrams for Weft lock knit, Bird's eye and Mock rib knitted structures. (06 marks)

- (b) Briefly explain how Full Milano structure is made using knit and float stitches and draw the yarn path diagram and give the fabric properties of this structure. (04 marks)
- (c) (i) Using suitable diagrams, explain the difference between rib gating and interlock gating used in weft knitting machines. (02 marks)
- (ii) Draw yarn path diagram for Swiss double pique structure and give their Two (02) important properties (04 marks)
- (Q6) (a) Using suitable yarn path diagrams, differentiate 1x1 rib, interlock and eight-lock knitted structures used in the knitting industry. (04 marks)
- (b) Compare the knitted and woven fabrics considering their wrinkle recovery and insulation properties. (04 marks)
- (c) (i) Draw a yarn path diagram for 3x2 rib knitted structure **repeat** with a tuck stitch on a reverse wale and calculate the loop length, if the no. of visible wales on face side is 12 and the unraveled yarn length for this 12 wales is 32cm. (04 marks)
- (ii) A manufacturer needs to produce plain weft knitted fabric with **finished relax** width (tubular) as 42cm. The diameter of circular knitted machine is 46cm and the no. of needle /cm is 4. Calculate the stitch length, stitch density, course density and wale density of the knitted fabric.

Following dimensional constant table is given for you.

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)