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	**: TAX3530 Fibre to fabrics**
Academic Year	: 2021/2022
Date	: 19th February 2023
Time	: 1330-1630hrs
Duration	: **3 hours**

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **Eight (8)** questions in **Four (4)** pages.
3. Write down your Index Number in all the pages of answer scripts.
4. Answer the question one (Q1), which is compulsory and five (05) more questions from Q2 to Q8. Question one (Q1) carries 25 marks and questions two (Q2) to eight (Q8) carry fifteen (15) marks each.
5. Answers to each question should commence on a new page. If a question has many parts, all the parts should be answered in the chronological order under the same question.
6. Write down the answered question numbers in the answer book.
7. Answers should be in clear handwriting.
8. Do not use red colour pens to write the answers.

Compulsory Question

(Q1) (a) Write two (02) examples for each of the following textile fibre categories.

(i) Vegetable bast fibres

(ii) Regenerated cellulose fibres

(iii) Mineral fibres (06 marks)

(b) Explain the difference between "Regenerated man-made fibres" and "Synthetic man-made fibres". (02 marks)

(c) State four (04) inter molecular forces available in the wool fibre. (04 marks)

(d) State two (02) applications of folded yarns. (02 marks)

(e) The amount of twist that is inserted into a yarn depends on many factors. State two (02) of them. (02 marks)

(f) State the three (03) objectives of sizing. (03 marks)

(g) State the three (03) important structural parameters of a woven fabric. (03 marks)

(h) State the main three (03) types of needles used to manufacture knitted fabrics. (03 marks)

Answer any five (05) questions from the following seven (07) questions

(Q2) (a) With the aid of a suitable diagram, explain how textile fibres are made through polymer chains arranged with amorphous and crystalline structures. (06 marks)

(b) Explain how the degree of crystallization affects the moisture absorption and chemical resistance of fibres. (06 marks)

(c) State three (03) factors affecting the melting temperature of a fibre. (03 marks)

(Q3) (a) Describe the advantages of having convolutions and kidney shaped cross section in cotton fibres. (03 marks)

(b) Write short notes on the "Heat of wetting" and "Felting" of wool. (06 marks)

(c) Explain the effects of alkalis and acids on silk fibres. (06 marks)

(Q4) (a) Compare Nylon and Polyester fibres, considering with the following properties.

(i) Hygroscopic nature

(ii) Colouration and fastness of colour

(iii) Effects of acids (06 marks)

(b) Explain the polymer system of Nylon 6.6, including the arrangement of the Nylon polymer chains and their important chemical groups. (04 marks)

(c) Briefly explain the melt spinning process. (05 marks)

(Q5) (a) Briefly explain the six (06) basic steps of cotton spinning. (12 marks)

(b) The English cotton count of a yarn is 24 Ne. Convert this to tex, decitex and denier. (03 marks)

(Q6) (a) Explain three (03) categories of textured yarns according to the elastic properties and bulkiness. (06 marks)

(b) With the aid of a suitable diagram, explain the friction spinning process used in open end spinning. (06 marks)

(c) Briefly explain "Wool carbonizing". (03 marks)

(Q7) (a) Briefly explain the three (03) primary motions of a loom. (09 marks)

(b) Explain the method of jacquard shedding in all aspects. (06 marks)

(Q8) (a) Draw the yarn path diagram, point paper notation and needle bed arrangement for the following weft knitted structures.

(i) Single jersey (plain) structure

(ii) Purl structure (06 marks)

(b) Write any three (03) differences between warp knitting and weft knitting techniques. (03 marks)

(c) With the aid of a suitable diagram, explain the needle punching method used in the web consolidation of the non-woven manufacturing process. (06 marks)