

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



Study Programme	: Bachelor of Technology Honours in Engineering/ Bachelor of Industrial Studies Honours
Name of the Examination	: Final Examination
<b>Course Code and Title</b>	<b>: TAX3458 Fibre-Science and Technology</b>
Academic Year	: 2020/21
Date	: 13 <sup>th</sup> February 2022
Time	: 1400-1700hrs
Duration	: <b>3 hours</b>

#### 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. **Answer Question 01, which is compulsory** and additional **Five(5)** questions only. Question 01 carries 25 marks and questions 2 to 8 carries fifteen (15) marks each.
4. Answer for each question should commence from a new page.
5. Answers should be in clear hand writing.

**(01) Compulsory Question**

- (i) State the category to which the following fibres belong:
- |                  |                |            |            |
|------------------|----------------|------------|------------|
| (a) Asbestos     | (b) Corn fibre | (c) Aramid |            |
| (d) Polyethylene | (e) Flax       | (f) Sisal  | (03 marks) |
- (ii) Differentiate "Condensation polymerisation" and "Addition polymerization"? (03 marks)
- (iii) Explain why high melting point is desirable for textile fibres? (03 marks)
- (iv) Differentiate "**regenerated fibres**" and "**synthetic fibres**"? (03 marks)
- (v) Describe the term "**thermoplastic**". (03 marks)
- (vi) What are the factors that contribute towards very good tenacity of cotton fibres? (03 marks)
- (vii) What are the raw materials (**monomers**) used for polyethylene terephthalate (PET) (02 marks)
- (viii) Wool fibre is considered as a relatively easy fibre to dye. Briefly explain why? (03 marks)
- (ix) Briefly Explain the reasons behind the high tenacity of acrylic fibres. (02 marks)

(02) (a) One student argue that inclusion of the course "Fibre Science & Technology" in the curriculum of Textile & Apparel Technology Programme is unfair. Critically discuss this statement. (05 Marks)

(b) Describe the following terms.

(i) Monomer (ii) polymer (iii) Co- polymer

(iv) Degree of polymerization

(04 Marks)

(c) Briefly explain the requirements of monomers to be polymerized into polymers. (06 Marks)

(03) (a) Describe any four (04) factors which influence the quality of cotton fibres.

(08 Marks)

(b) Discuss the effects of acids on cotton fibres.

(04 Marks)

(c) Describe the "mercerizing process " and it's benefits.

(03 Marks)

(04) (a) Describe the polymer system and intermolecular forces of attraction present in wool fibre. (08 marks)

(b) Explain as to why wool has good elasticity and excellent resiliency.

(04 marks)

(c) Draw sketches to show cross-sectional and longitudinal microscopic views of wool fibres. (03 marks)

- (05) (a) Compare and contrast Nylon 6 and Nylon 6.6 with respect to monomers, repeating units, degree of polymerization and polymer length. (08 Marks)
- (b) Explain wash and colour fastness properties of nylon dyed with acid dyes. (07 marks)
- (06) (a) (a) Describe the important features of polymer system of "Spandex fibres" (05 marks)
- (b) Discuss how this polymer system contribute on excellent elastic properties of "Spandex fibres" (06 marks)
- (c) Describe four (04) important characteristics and various applications of Spandex. (04 marks)
- (07) (a) Describe the "wet spinning process" used to produce man made fibres. (09 marks)
- (b) Briefly describe three (03) sub groups of wet spinning classified on the state of dope. (06 marks)
- (08) (a) Discuss the importance of identification of textile fibres. (03 marks)
- (b) You are given four (04) fibre samples and their labels are missing. The fibre types are cotton, wool, nylon and viscose.
- Describe how would you identify them using simple identification techniques available in the laboratory and write a report.
- (Use your experience in the practical work) (12 marks)

End of the paper