

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
Course Code and Title	: <b>TAX3531/TTX3231-Fibre Science and Technology</b>
Academic Year	:2019/2020
Date	:18 <sup>th</sup> January 2021
Time	:1330-1630 hrs
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)Viscose | (b)Sisal       | (c)Jute    |            |
| (d)Mohair  | (e)Corn Fibres | (f) Casein | (03 marks) |

(ii) Briefly describe the following terms.

- |                          |                   |            |
|--------------------------|-------------------|------------|
| (a) Continuous filaments | (b) Staple fibres | (04 marks) |
|--------------------------|-------------------|------------|

(iii) What is "regenerated fibres" ? (02 marks)

(iv) Explain why a high melting point is more desirable for textile fibres

(02 marks)

(v) State four types of inter-molecular forces present in textile fibres.

(03 marks)

(vi) What is the notations of Nylon 6 and Nylon6.6?

(02 marks)

(vii) Describe the following terms.

(03 Marks)

(a) First order transition temperature

(b) Second order transition temperature

(viii) What are the important chemical groups present in the Polyester polymers?

(03 marks)

(ix) Differentiate the terms " % moisture content " and "% moisture regain " of a fibre sample.

(03 marks)

(02) (a) What is a textile fibre? (03 marks)

(b) Give a brief description about the classification of fibres and its importance.. (06 Marks)

(c) Briefly discuss the properties of polymers which are necessary to form fibres. .. (06 Marks)

(03) (a) Describe the polymer system of cotton fibre elaborating Important chemical groups, Inter molecular forces and crystalline nature. (06 marks)

(b) Discuss how the features describe in the above (a) contribute to following properties of cotton fibres.

(I) Water Absorbency

(II) Effect of alkalis

(III) Dye ability

(09 marks)

(04)(a) Briefly explain why silk is considered as a good textile fibres. (06 marks)

(b) Discuss the following properties of silk

(i) Tenacity

(ii) Effect of acids

(iii) Effect of alkalis

(09 marks)

(05)(a) Describe the polymer system of Nylon 6 and Nylon 6.6? (06 marks)

(b) Considering the polymer system and the structure of nylon, discuss the following properties of Nylon.

(i) Elasticity

(ii) Hygroscopic nature

(iii) effect of acids

(09 marks)

- (06) (a) Compare and contrast "melt spinning" and "dry spinning". (03 marks)
- (b) Explain why all the polymers cannot be melt spun. (03 marks)
- (c) Illustrate the "Dry spinning" process with the principles involved. (09 marks)
- (07) (a) Discuss the importance of fibre Identification. (03 marks)
- (b) Describe four simple techniques used in laboratory to identify fibres (06 marks)
- (c) Describe following properties with respect to textile fibres and its relevance to the final products made out of these fibres.
- (i) Strength (ii) Fibre extensibility (06 marks)
- (08) Write short-notes on any **three** of the following.
- (i) Measurements of fibre density
- (ii) Inter-polymer forces of attraction present in wool
- (iii) The environmental factors that affect on textile fibres
- (iv) Manufacturing process of Viscose Rayon.
- (v) Nomex fibre (15 marks)