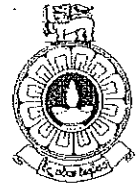


The Open University of Sri Lanka  
Faculty of Engineering Technology  
Department of Textile and Apparel Technology



Study Programme	: Bachelor of Technology Honours in Engineering/ Bachelor of Industrial Studies Honours
Name of the Examination	: Final Examination
Course Code and Title	: <b>TAX3458-Fibre-Science and Technology</b>
Academic Year	: 2019/2020
Date	: 18th 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.
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**(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) State four criteria on which, fibre forming polymer structures can be classified. (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) What is the difference between thermoset and thermoplastic polymers. (03 Marks )

(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) Describe the morphological structure and microscopic appearance of Flax Fibre. (03 marks)
- (b) What are the factors deciding colour and luster of flax fibres. (03 Marks)
- (c) Compare Flax fibre with Cotton with respect to degree of polymerisation, polymer dimensions and degree of crystallization. (09 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) Briefly describe following .
  - (i) Electron microscopy (ii) X-ray diffraction. (06 marks)

- (08) Write short-notes on any three of the following.
  - (i) Measurements of fibre densities.
  - (ii) Inter-molecular forces of attraction present in wool
  - (iii) The environmental factors that affect on textile fibres
  - (iv) Manufacturing process of Viscose Rayon.
  - (v) Properties of Nano-fibres. (15 marks)