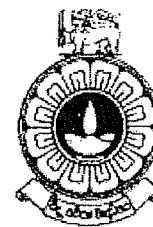


THE OPEN UNIVERSITY OF SRI LANKA
 DEPARTMENT OF TEXTILE AND APPAREL TECHNOLOGY
 BACHELOR OF TECHNOLOGY HONOURS IN ENGINEERING/
 BACHELOR OF INDUSTRIAL STUDIES HONOURS
 FINAL EXAMINATION- 2015/2016
 TTX3231-FIBRE SCIENCE AND TECHNOLOGY
 DURATION: 3 HOURS



Date: 18th November 2016

Time:0930-1630hrs

Answer Question 01, which is compulsory and additional five (05) questions.
 Question 1 carries twenty-five marks and Questions 2 to 9 carry fifteen (15) marks each.

(01) Compulsory Question

- (i) State the categories to which the following fibres belong:
- | | | | |
|--------------|-----------|-------------------|-------------------|
| (i) Cotton | (ii) Jute | (iii) Pineapple | |
| (iv) Viscose | (v) Nylon | (vi) Polyethylene | (03 Marks) |
- (ii) Define the following terms:
- | | | |
|-------------------|---------------------|-------------------|
| (i) Monomer | (ii) Polymer | |
| (iii) Co- polymer | (iv) Linear polymer | (03 Marks) |
- (iii) What is the difference between "Regenerated man-made fibres" and "Synthetic man-made fibres"? **(03 Marks)**
- (iv) Differentiate "Condensation polymerisation" and "Addition polymerization"? **(03 Marks)**
- (v) Explain why a high melting point is more desirable for textile fibres. **(02 Marks)**
- (vi) Describe the term "Thermoplastic". **(02 Marks)**
- (vii) What are the raw materials used to manufacture Viscose rayon? **(02 Marks)**
- (viii) What are the types of bonds present in the polymer system of Cotton? **(02 Marks)**
- (ix) Describe how the following fibres behave under a flame: **(03 Marks)**
- | | | |
|---------------|-----------|--------------|
| (i) Polyester | (ii) Wool | (iii) Cotton |
|---------------|-----------|--------------|
- (x) Write the two advantages of having convolutions in a cotton fibre? **(02 Marks)**

Select any five (05) questions from Q02 to Q08

(02) (a) Fibres are made out from "Polymers". What is meant by a polymer? **(03 Marks)**

(b) Describe three (03) properties of polymers necessary to form fibres. **(06 Marks)**

(c) Explain how crystallinity affects on the "Moisture absorbency",
"Thermal properties" and "Dye ability" of fibres. **(06 Marks)**

(03) (a) Describe the salient features in micro, and macro structures of cotton fibre. **(06 Marks)**

(b) Briefly discuss three (03) good properties of cotton to be used in apparels
and show how the structure of cotton fibre contribute to the above properties. **(09 Marks)**

(04) (a) Describe how the structure of wool contribute to the following properties of wool textile materials.

(i) warmth

(ii) elasticity

(iii) flexibility **(09 Marks)**

(b) Describe the intermolecular forces of attraction in Wool fibres. **(06 Marks)**

(05) (a) Write a short description about the polymer system of polyester fibre, and it's inter-molecular forces available. **(06 Marks)**

(b) Explain reasons for the following with respect to the polyester fibre.

(i) very good tenacity

(ii) Completely hydrophobic.

(iii) Difficulty to dyeing. **(09 Marks)**

(06) (a) Differentiate "Dry spinning" and "Wet spinning" techniques. (06 Marks)

(b) Explain "wet spinning" process with aid of a diagram. (09 Marks)

(07) (a) Discuss the importance of Identification of fibres. (03 Marks)

(b) Describe four (04) simple techniques used to identify textile fibres. (12 Marks)

(08) Describe the following properties with respect to the textile fibres and explain the relevance of these properties to the requirements of the end product.

(i) Strength

(ii) Elasticity

(iii) Fibre density

(iv) Affinity to dyes

(v) Resistance to deterioration by light and heat

(15 Marks)