

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF TEXTILE TECHNOLOGY

END OF SEMESTER EXAMINATIONS DECEMBER 2005

TEXTILE MATERIALS TXT 1104

TIME: 3 HOURS

INSTRUCTIONS

Answer **ALL** questions from Section A and **ANY 4** from section B. Section A carries 40 marks and each question in section B carries 15 marks. Allocate 60 minutes to section A and 120 minutes to section B.

Total marks: 100

SECTION A

Answer **ALL** questions in this section.

QUESTION 1

(a) Define a fibre. (1 marks)

(b) What characterises fibre forming polymers? (2 marks)

QUESTION 2

(a) List the main natural and organic fibres according to their classes and subclasses. (5 marks)

QUESTION 3

(a) Microscopy is an important tool in fibre identification. Discuss briefly. (4 marks)

(b) Fibres can also be identified according to their behaviour towards chemical agents. Explain, giving two examples. (4 marks)

QUESTION 4

Explain or define the following terms:-

(a) staple fibre.

(b) filament fibre.

(c) denier.

(d) tenacity.

(e) moisture regain. (5 marks)

QUESTION 5

What is meant by each of the following:

(a) homopolymer.

(b) block copolymer.

(c) random polymer.

(d) chain branching.

(e) cross-linking.

(5 marks)

QUESTION 6

- (a) Name two types of worms which produce silk and briefly explain their differences. (4 marks)

QUESTION 7

- (a) Wool's moisture absorption is one of its most important characteristics. Explain. (4 marks)

QUESTION 8

- (a) What are high performance fibres? Where do they find applicable. (3 marks)
- (b) Define aramid fibres and give two examples of such fibres. (3 marks)

SECTION B

Answer any **FOUR** questions in this Section.

QUESTION 9

- (a) In the manufacture of both regenerated and synthetic fibres, what are the general steps followed? (10 marks)
- (b) Discuss the properties of Nomex and state its uses. (5 marks)

QUESTION 10

- (a) Write down the equations for the production of polymers from which the polyester fibres are produced. (10 marks)
- (b) What are the end uses of fibres from flax and ramie? (5 marks)

QUESTION 11

It is important to understand the properties of fibres since their processibility is dependent on the inherent fibre characteristics. Give a detailed explanation in support of this statement. (15 marks)

QUESTION 12

Explain, with the aid equations, the difference in the preparation of nylon 6.6 and nylon 6 fibres from raw materials. (15marks)

QUESTION 13

- (a) Write down the acetylation reaction which leads to the production of triacetate. (10marks)
- (b) Describe a procedure for preparing fibre cross-sections for microscopic examination. (5 marks)

QUESTION 14

- (a) Write an essay on elastomeric fibres. Your discussion must include definitions, properties which make this group of fibres useful in different areas of application and those properties which result in end-use problems.
(15 marks)

END OF QUESTION PAPER