

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**DEPARTEMNT OF TEXTILE TECHNOLOGY**

**END OF SEMESTER EXAMINATIONS DECEMBER 2004**

**TEXTILE MATERIALS : TXT 1104**

**TIME : 3 HOURS**

**INSTRUCTIONS:**

Answer **FIVE** questions. Each question carries 20 Marks.

**TOTAL MARKS : 100**

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1. (a) What is the difference between regenerated fibres and synthetic fibres?  
(2 Marks)
- (b) Draw the chemical structure of viscose.  
(2 Marks)
- (c) Describe the manufacturing process of viscose rayon. (Chemical equations are not required).  
(13 Marks)
- (d) What is the effect of heat on viscose fibres?  
(3Marks)
  
2. (a) Describe the production of Tencel fibres?  
(10 Marks)
- (b) What is fibrillation?  
(2 Marks)
- (c) What are the unique characteristics of Tencel that distinguish it from other fibres?  
(5 Marks)
- (d) What are the uses of Kevlar fibres?  
(3 Marks)
  
3. (a) What are aramid fibres? How do they differ from polyamide fibres?  
(4 Marks)
- (b) Give names and sources of protein based fibres?  
(4 Marks)
- (c) Why is it that 100% polyacrylonitrile is not useful as a fibre?  
(2 Marks)
- (d) Write chemical reactions for the effect of heat on PAN (polyacrylonitrile).  
(10 Marks)

4. (a) Synthesise Nylon 6,6 and Nylon 6 from appropriate starting materials.  
(10 Marks)
- (b) Which natural fibre is mostly used in the manufacture of sacks and why?  
(2 Marks)
- (c) Draw the structure of poly ( 1,4- $\beta$ -D-anhydroglucopyranose). What is the common name for this polymer?  
(5 Marks)
- (d) What is the chemical name for Spandex? What is the special property of this fibre?  
(3 Marks)
5. (a) Write the chemical reaction between cellulose and acetic anhydride.  
(4 Marks)
- (b) Why is triacetate used as a fibre rather than diacetate?  
(3 Marks)
- (c) Indicate the change of physical properties (approximately five) that take place when cotton is mercerised?  
(5 Marks)
- (d) How is silk formed and what is its chemical composition?  
(8 Marks)
6. (a) What is the botanical name of the plant from which flax is produced.  
Describe the process of producing flax.  
What is the main use of flax? Give reasons for it?  
( 1 + 4 + 3 Marks)
- (b) What is a bave?  
(2 Marks)
- (c) With the aid of the chemical equation, show the action of dilute acids on cellulose?  
(5 Marks)
- (d) Write the chemical reaction between dimethyl terephthalate (DMT) and ethylene glycol.  
(4 Marks)
- (e) Write the chemical structure of polyethylene terephthalate (PET).  
(1 mark)

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