

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**DEPARTMENT OF TEXTILE TECHNOLOGY**

**END OF SECOND SEMESTER EXAMINATIONS AUGUST 2009**

**TXT 2221 - CHEMICAL ANALYTICAL AND TESTING TECHNIQUES**

**TIME: 3 HOURS**

**INSTRUCTIONS**

Answer **ANY FIVE** questions. Each question carries **20 marks**.

**QUESTION 1**

There are a number of methods available for the identification and characterisation of textile and polymeric materials. Discuss. **(20)**

**QUESTION 2**

Outline the principles of an optical microscope.

- i. Explain the procedure for preparing samples for microscopic examination.
- ii. Explain four important textile product properties that depend on fibre gross morphology. **(20)**

**QUESTION 3**

A Scanning Electron Microscope (SEM) is a versatile instrument that can be used in textiles and forensic investigations. Explain its versatility and give examples where it is used to solve forensic problems. **(20)**

**QUESTION 4**

Explain how you would identify four (4) fibres of your choice. (Your answers must be supported by clear diagrams). **(20)**

**QUESTION 5**

Discuss the principles of Infrared Spectroscopy and Nuclear Magnetic Resonance Spectroscopy. Briefly outline how these tools are used in textile materials structure elucidation. (20)

**QUESTION 6**

Write short notes on the following:

- i. Gel Permeation Chromatography
- ii. Viscometry
- iii. Thermal Gravitational Analysis
- iv. X-ray diffraction (20)

**END OF QUESTION PAPER**

