

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**DEPARTMENT OF TEXTILE TECHNOLOGY**

**END OF SECOND SEMESTER EXAMINATIONS – MAY 2011**

**TXT 2216 - TEXTILE PRINTING AND COLOUR SCIENCE**

**TIME: 3 HOURS**

**TOTAL MARKS: 100**

**INSTRUCTIONS**

1. Answer **THREE** questions from Section A and **ANY OTHER TWO** questions from Section B. Each of the other questions carries **20 marks**.
2. The first fifteen minutes should be spent reading the question paper and making notes.
3. Do not open your answer sheet until told to do so.
4. Marks will be awarded for skill in appreciating the scope of questions, clarity of argument and conciseness of presentation as well as for the knowledge displayed by the candidate.

**SECTION A (PRINTING)**

**QUESTION 1**

Give a detailed account of the procedures and process steps that are carried out in order to transfer a design from paper and fabric sample onto the screen. (Your discussion must focus on flatbed screen and rotary screen printing). Also give a brief account of technological advances that have led to the speeding up of this/these procedures. **(20)**

**QUESTION 2**

Give a detailed explanation why pigment printing has become increasingly important in recent years. **(20)**

**QUESTION 3**

Write notes on **any two** (2) of the following:

- (a). Methods of transfer printing. **(10)**
- (b). Resist printing. **(10)**
- (c). Fixation methods in printing. **(10)**

(d). Thickeners. (10)

(e). Printing of polyester/cotton blends. (10)

**QUESTION 4**

Give a detailed account of improvements that have taken place in studio/engraving room and in print colour kitchens in the early 1980s. (20)

**SECTION B (COLOUR SCIENCE)**

**QUESTION 5**

(a). Explain why colour measurement is important in the colouration industry. (5)

(b). What is metamerism and how does it affect colour measurement results? (5)

(c). State Beer-Lambert Law. Applying Beer-Lambert's Law, calculate the molar coefficient of extinction ( $\epsilon$ ) of a dye whose solution at a concentration of  $10^{-5}M$  gives an absorbance of 1.8 at  $\lambda_{max}(\lambda)$  in a cell of pathlength of 2cm. (10)

**QUESTION 6**

Demonstrate your understanding of colour by explaining ALL of the following, using specific examples and diagrams where appropriate:

(a). Spectral distribution curves. (7)

(b). Colour specification. (7)

(c). Metamerism. (6)

**QUESTION 7**

(a). With the aid of a clearly labelled diagram describe the function of the major features of the human eye in the visual process. (10)

(b). Give the Kubelka-Munk equation relating the percentage of light reflected to dye concentration. Explain the usefulness and limitations of this equation in colour measurement. (10)

**END OF EXAMINATION QUESTION PAPER**