NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF TEXTILE TECHNOLOGY
FINAL EXAMINATIONS MAY 2005
TEXTILE DYEING TXT 2116
TIME: 3HOURS

INSTRUCTIONS

Answer all questions in section A and any 4 questions in section B .Each question in section B carries 15 marks

SECTION A – answer all questions in this section

1. (a) Write a brief account of the different modes of dye-fibre attachments. List specific examples of the effects on different dye classes on different fibres and the respective modes of attachments. (10 marks)

   (b) Dyes may be selected from a wide range of synthetic organic compounds. Commercially useful dye structures usually have certain attributes in their structures. Can you explain briefly, clearly indicating the role in the attributes you mentioned. 5marks

2. Write short accounts on the following, with special reference to the underlying science:

   - the use of caustic soda solutions in the preparation of natural cellulosic textiles subsequent to colouration. (5 marks)

   - the use of thermal treatments in the preparation of synthetic fibres for subsequent colouration. (5 marks)

   - Given the following:
     Weight of fabric 1000 kilograms
     Volume of liquor 30 000 litres
     Amount of dye used 20 kilograms
     Percentage of electrolyte used 20%
     Calculate:
     (i) percentage depth of shade
     (ii) the liquor ratio
     (iii) amount of electrolyte used (6 marks)

3. Explain or define the following terms used in dyeing and wet processing:
   i. metamerism
   ii. tailing
   iii. pad thermosol process
   iv. EDTA
   v. Liquid ammonia treatment
   vi. Rate of dyeing
   vii. Stripping
   viii. Reduction clearing
   ix. Colour fastness (9 marks)

SECTION B (answer any four questions)

1. (a) Explain the attributes of reactive dyes and give the advantages and disadvantages of their application. (10 marks)
   (b) Explain why bi-functional reactive dyes have become very important. 5marks

2. Write an account of the dyeing of polyester fibre/fabrics with disperse dyes. Include in your answer details of the dyeing mechanism and properties of the dyeing and explain the influence that fibre heat-treatments can have on disperse dye uptake. (15 marks)

3. Discuss in detail the bleaching of cellulose fibre/fabrics using hydrogen peroxide. Your discussion must give reasons for the various components (additives) used, the problems that may be encountered and how these problems can be eliminated. (15marks)

4. Compare and contrast direct and acid dyes. Your comparison must consider the following aspects: the dye chemistry, modes of dye fibre attachments, suitable substrates, dyeing methods and fastness properties. (15 marks)

5. With aid of drawings, outline the major features of two (2) machines available for dyeing woven fabrics. Your outline must show clearly the modes of circulation of either the liquor or the fabric or both. (15 marks)

END OF QUESTION PAPER