

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF TEXTILE TECHNOLOGY
END OF SEMESTER EXAMINATIONS JANUARY 2008
TXT 4124 NON WOVEN
TIME: 3 HOURS

INSTRUCTIONS

1. Answer **any five** questions. Each full question 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 presentations as well as for the knowledge displayed by you.

1. (a) Explain how the fabric strength of a nonwoven is achieved when the fibre web has been:
 - (i) Needle-punched
 - (ii) Hydro-entangled and
 - (iii) Chemical bonded
(b) What do the following terms mean?
 - nonwoven
 - lace
 - braid
 - spunbond(20 marks)
2. Sketch and label a schematic diagram of a needle-punching machine. Describe the needle punching process and explain the process variables. (20 marks)
3. Explain how thermal bonding is achieved and describe the following thermal bonding techniques.
 - (i) Direct metal contact/calendaring
 - (ii) Air-flow through the fabric
 - (iii) Ultrasonic vibration(20 marks)
4. (a) What role do the following additives play in the production of polyurethane foam.
 - antistats
 - blowing agents
 - catalyst
 - fire retardants
 - mould release agent
 - nucleating agent
 - surfactant
 - reinforcement(10 marks)
(b) Explain how rigid and flexible polyurethane is formed. (10 marks)

5. (a) Needles are the most important components of a needle punching machine. Discuss the effect on the needle punched fabric of varying the
- number of barbs
 - length of needles
 - shape of needles
 - needle barb angle
 - barb spacing
- (b) Why is spunbonding an important nonwoven production technique? Briefly describe the spun bonding process. (20 marks)
6. (a) Describe the tanning process and identify the uses of leather.
- (b) Explain how artificial fur is made? (20 marks)
7. Explain how braiding is achieved. Identify some applications of braided products. (20 marks)

END OF QUESTION PAPER