

The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Textile and Apparel Technology



Study Programme	: Bachelor of Science Honours in Engineering /Bachelor of Industrial Studies Honours
Name of the Examination	: Final Examination
Course Code and Title	: TAX5349 Nonwoven Textiles
Academic Year	: 2024/25
Date	: 23 rd January 2026
Time	: 0930-1230 hours
Duration	: 3 hours

General instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of Six (06) questions in Three (03) pages.
3. Answer **Five (05) questions only**.
4. All questions carry equal marks.
5. The answer for each question should commence on a new page.
6. This is a Closed Book Test (CBT).

Question 01

- a). Differentiate the construction methods of manufacturing woven, knitted and non-woven fabrics. (2 marks)
- b). (i). Briefly explain the main tasks involved in the 'Web formation' and 'Web consolidation' stages of nonwoven manufacturing. (4 marks)
- (ii) Briefly explain the difference between 'Dry laid' and 'Wet laid' techniques used in web formation of nonwoven manufacturing. (4 marks)
- c). (i) Nonwoven interlinings are used in garments to provide bulk. Explain the tasks to be fulfilled by these nonwoven interlinings that are applied on garments. (4 marks)
- (ii) Briefly explain any two (02) applications of nonwovens used in cars, describing the type of nonwoven. Identify suitable raw materials those can be used in making the nonwovens for **each** of the applications you have selected. (6 marks)

Question 02

- a). Briefly explain two(02) types of nonwovens structures and raw materials that you would recommend for sound insulation (Acoustic nonwovens) in a building. (2 marks)

- b). (i)** Briefly explain two (02) types of 'Sewage filtration' under liquid filtration. (4 marks)
- (ii)** Using a suitable diagram, briefly explain a filter design used in 'Cake filtration' that is employed for high solid contents in suspension. (4 marks)
- c). (i)** Briefly explain how you would use a nonwoven material as a 'Trench filter' in a drainage system for roads. (4 marks)
- (ii)** Using a suitable diagram, explain in brief, how nonwovens are used in making an upholstery product. Describe the purpose of using nonwovens in making this upholstery product. What are the recommended raw materials for manufacturing of such nonwovens? (6 marks)

Question 03

- a).** Briefly explain the tasks involved in Bale opening machine, Blending feeder machine, Opening roll machine and Fine opening machine used in web formation of nonwovens. (4 marks)
- b). (i)** Using a suitable diagram, briefly explain the principle of Aerodynamic/Air laid web formation method used in nonwoven manufacturing. (4 marks)
- (ii)** Using a suitable diagram, briefly explain how textile fibres can be made using Wet laid technique. (4 marks)
- c). (i)** Briefly explain any two (02) special treatments done in the industry on Wet laid nonwovens. (4 marks)
- (ii)** State any four (04) applications of Wet laid nonwovens. (4 marks)

Question 04

- a). (i)** Distinguish the Spun lay/Extruded nonwoven manufacturing with Dry laid and Wet laid nonwoven manufacturing methods. (4 marks)
- (ii)** Draw a labelled diagram to illustrate the principle of Spun bond process under extruded nonwoven manufacturing method. (4 marks)
- b).** Using a suitable diagram, briefly explain the Melt blown process of web formation. (4 marks)
- c). (i)** Draw a schematic diagram of a setup to produce Nano fibres using Electrostatic spinning technique. (4 marks)
- (ii)** Briefly explain any two (02) applications of Nano fibre nonwovens. (4 marks)

Question 05

- a). (i) Briefly explain the principle of Needle punching technology. (4 marks)
- (ii) Explain the function of Needle punching machine using a diagram. (4 marks)
- b) (i) Classify the Stitch bonding methods developed today in the industry. (3 marks)
- (ii) Select any one (01) type of stitch bonding method mentioned by you in part b)(i) of this question, and explain how stitch bonding web consolidation is done using **the** technology developed under the selected type. (5 marks)
- c). Draw diagrams to illustrate the differences in the appearances of Kunit and Multikunit nonwoven fabrics. (4 marks)

Question 06

- a). Using a diagram, briefly explain how web consolidation is done using Hydroentanglement technology in nonwoven manufacturing. (4 marks)
- b). (i) Why thermoplastic component is required in the nonwoven web for Thermal bonding web consolidation? (2 marks)
- (ii) Using suitable diagrams, explain the differences in the technologies of Area bonding and Point bonding web consolidation of nonwovens. (4 marks)
- c). (i) Give one (01) example **each for** Dry finishing and Chemical finishing technologies used in nonwoven manufacturing and state the purposes of **each** of these finishing techniques. (4 marks)
- (ii) Briefly explain the purposes of Lubricating, Rewetting and Flocking finishings in nonwoven manufacturing. (6 marks)

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