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

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Study Programme	: Bachelor of Science Honours in Engineering/ Bachelor of Technology Honours in Engineering/ Bachelor of Industrial Studies Honours
Name of the Examination	: Final Examination
Course Code and Title	**: TAX5349 Nonwoven Textiles**
Academic Year	: 2022/23
Date	: 01st February 2024
Time	: 1330-1630hrs
Duration	: **3 hours**

General Instructions

1. Read all instructions carefully before answering the questions.
2. This is a Closed Book Test (CBT).
3. Write down your Index Number in all the pages of answer scripts.
4. This question paper consists of Six (06) questions in four (04) pages.
5. Answer five (05) questions only. Each question carries 20 marks
6. Do not write answers to the additional questions.
7. Answers for each question should commence from a new page. If a question has many parts, all the parts should be answered in the chronological order under the same question.
8. Write down the answered question numbers in the cover page of the answer book.
9. Answers should be in clear handwriting.
10. Do not use red colour pens to write the answers.

(Q1) (a) Briefly explain the main two stages of the non-woven fabric manufacturing. (04 marks)

(b) (i) Briefly explain why nonwoven interlining is used for shaping and support function of garments. (06 marks)

(ii)Briefly explain where nonwovens are used inside cars for acoustic & thermal insulation and suggest what types of fibre can be used for this application. (06 marks)

(c) Give two (02) suitable fibre types for each of the following insulation requirements of the nonwovens.

(i) Insulation against fire/radiant heat
(ii) For higher temperature thermal insulation

(04 marks)

(Q2) (a) i. Differentiate dry filtration and liquid filtration used in nonwoven applications
ii. Draw suitable diagrams to illustrate the difference between surface filtration and depth filtration types available with liquid filtration. (06 marks)

(b) Briefly explain how would you use geo synthetic non-wovens for following functions and requirements in the geo technology and building industry. You may use suitable diagrams in explaining.

(i) Separation (ii) Reinforcement

(06 marks)

(c) (i) Briefly explain why baboo fiber based nonwovens are used today in baby diapers and feminine hygiene product as a new development. (04 marks)

(ii) Give the suitable fibre types in making two types of wet and damp cleaning nonwoven used in household products. (04 marks)

(Q3) (a) Briefly explain the tasks involved with following two processes in fibre preparation line for mechanical web formation of nonwoven manufacturing.

(i) Bale opening (ii) Blending feeder

(04 marks)

(b) Draw a suitable diagram and explain the principle of air laid process in web formation of nonwoven manufacturing. (06 marks)

(c) (i) Using a suitable diagram, briefly explain the principle of wet laid process in nonwoven manufacturing (06 marks)

(ii) Briefly explain the suitable types of textile fibres for wet laid web formation of nonwoven manufacturing. (04 marks)

(Q4) (a) Differentiate the Spun bond technique and Melt blown technique used in extruded nonwoven manufacturing. (04 marks)

(b) (i) What is meant by "Needle punched nonwovens"? (04 marks)

(ii) Briefly explain three (03) types of looms that are used for nonwoven web consolidation and give the application areas of each of them. (06 marks)

(c) Compare the principle involved with Maliwatt and Malivlies techniques in web consolidation of nonwoven manufacturing. (06 marks)

(Q5) (a) Briefly explain how nonwovens are consolidated using hydro entangling by water jets in spun laced technology. You may use suitable diagrams to explain this. (04 marks)

(b) (i) Briefly explain the principles involved with three types of hot calendaring method of thermal bonding nonwoven web. (06 marks)

(ii) Compare the principles of Ultra sound bonding and Radiant heat bonding of thermal bonding the nonwoven web. (06 marks)

(c) Differentiate saturation bonding and foam bonding used in thermal bonding of nonwovens. (04 marks)

(Q6) (a) Briefly describe the purpose and method of doing following dry finishing treatments on nonwovens.

(i) Wrenching (ii) Creeping by Micrex micro creeper (06 marks)

(b) (i) Briefly explain why perforating and slitting are done on nonwovens as finishing treatments. (04 marks)

(ii) Briefly explain the purposes of using following dry finishing treatments in the nonwoven manufacturing industry.

(i) Singeing (ii) Shearing

(04 marks)

(c) Briefly explain the purpose of using following chemical finishes on nonwoven textiles.

(i)Lubricants (ii)Softeners (iii) Rewetters

(06 marks)