

THE OPEN UNIVERSITY OF SRI LANKA

BACHELOR OF INDUSTRIAL STUDIES /

BACHELOR OF TECHNOLOGY

FINAL EXAMINATION - 2005/2006

TX6233 TECHNICAL TEXTILES

DURATION - THREE HOURS



049

DATE: 17 March 2006

TIME: 0930 - 1230 Hours

Total Number of Questions = 10

Number of Questions to be answered = 06

Answer Question 1, which is compulsory and additional five (05) questions.

Question 1 carries twenty-five (25) marks and Questions 2 to 10 carry fifteen (15) marks each.

- a. State three applications of biomedical textiles. (03 marks)
- b. State two applications of textile materials in the packaging industry. (02 marks)
- c. Explain what a textile composite perform is. (02 marks)
- d. State the properties that are required of a resin system that is used in a textile composite. (03 marks)
- e. Give four advantages of using fabric reinforcements over traditional materials. (02 marks)
- f. Give one advantage and disadvantage of using coir as a geotextile. (02 marks)
- g. Briefly explain what you understand by a spacer fabric. (03 marks)
- h. Name three properties that are required of fabrics used as tarpaulins. (03 marks)
- i. Name three properties that are expected from a fabric used for thermal protective clothing. (03 marks)
- j. Briefly explain the theory behind the production of super strong fibre from a polymer such as polyethylene. (03 marks)

02. a. With the help of suitable diagrams explain the process of resin transfer moulding. (07 marks)
- b. What are the advantages of resin transfer moulding? (04 marks)
- c. State the advantages and disadvantages of the spray lay-up process. (04 marks)
03. a. Laminated fabrics are produced by adhesive lamination, heat lamination, flame lamination and thermo bonding methods. Briefly explain the principles of each of these processes. (12 marks)
- b. Briefly explain the process of vacuum bagging. (03 marks)
04. a. Explain how geotextiles overcome the undesirable properties of conventional drainage systems and how they could be used to achieve a combined filtration and drainage function. (07 marks)
- b. Briefly explain the advantages of using geotextiles for wind erosion control. (04 marks)
- c. Briefly explain how a geotextile functions as a separator, when placed between two different soils. (04 marks)
05. a. Explain the mechanism of erosion by rainfall runoff and how geotextiles help to prevent this type of erosion on exposed soils. (03 marks)
- b. The preventive measures that are taken to control erosion due to rainfall runoff include, sediment traps, vegetation stabilisation and sub soil drainage. Explain how geotextiles could be effectively used in each of these applications. (12 marks)
06. a. Explain the principle behind the functioning of cabin air filters and how textile fabrics play their role in these functions. (05 marks)
- b. Explain the principle behind the manufacture of cut resistant fibres. (05 marks)
- c. Explain the reasons for traditional materials being replaced by textile materials in airline industry. (05 marks)

07. a. What are the properties that are expected from a fabric used as a seat belt in an automobile? (04 marks)
- b. Polyester fibres are widely used in the manufacture of vehicle tyres owing to the reason that they are the least expensive fibres. However, there are certain inherent properties of polyester that are disadvantageous for this application. What are these properties? (03 marks)
- c. Explain the reason for using multiple layers of laminate in the construction of modern headliners. (04 marks)
- d. Briefly explain the multi-functions performed by a carpet used in a vehicle. (04 marks)
08. a. Explain the different ways by which the function of heat protective clothing can be tested. (05 marks)
- b. In clothing design, protection and comfort go hand in hand. Explain how chemical resistance in fabrics could be built-in without sacrificing human comfort. (06 marks)
- c. Explain how textile materials could be used to reduce hazards due to pesticides. (04 marks)
09. a. Explain the mechanism of heat transfer from the body through a clothing system to the environment. (06 marks)
- b. Discuss how clothing could be effectively used as protection against nuclear hazards. (03 marks)
- c. Explain the principle behind the construction of antimicrobial fabrics. (06 marks)
10. Write short notes on any three of the following: (05 x 3 = 15 marks)
- Spinning of Aramid fibres
 - Applications and characteristics of carbon fibres
 - Manufacturing of continuous filament glass
 - Gel spinning