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THE OPEN UNIVERSITY OF SRI LANKA

BACHELOR OF INDUSTRIAL STUDIES / BACHELOR OF TECHNOLOGY

FINAL EXAMINATION - 2009/2010

TTX6233 - TECHNICAL TEXTILES

DURATION - THREE HOURS

DATE: 08 March 2010

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.

01. a. How are technical textiles different to apparel textiles and home (household) textiles? (02 marks)
- b. Give three applications of textiles in sports, apart from performance clothing and footwear. (03 marks)
- c. What do you understand by the term "textile composite preform"? (02 marks)
- d. State the difference between thermoplastic and thermosetting resins. (04 marks)
- e. Give one application of geocomposites. (01 mark)
- f. Give two advantages of fabric reinforcements. (02 marks)
- g. Give three reasons for textiles replacing traditional materials in the airline industry? (03 marks)
- h. Spacer fabrics are widely being used in automotive textiles. Briefly state the structural arrangement of spacer fabrics. (03 marks)
- i. Discuss any one physical method of imparting biological hazard protection to textile materials used in hospital environments. (03 marks)
- j. Give two applications of ceramic fibres. (02 marks)

02. a. Biomedical textiles are products and constructions that are used for medical and biological applications. The design of such materials is dependent on certain factors. State and discuss these factors in detail. (08 marks)
- b. "Contrary to the belief that special raw materials are required for technical textiles, majority of all fibres used in the technical textiles industry are conventional type of fibres". Argue this statement with practical examples. (07 marks)
03. a. With the aid of diagrams explain the resin transfer moulding method of manufacturing textile composites. (08 marks)
- b. State the main advantages of "spray lay up" method of manufacturing textile composites. (04 marks)
- c. State the main disadvantages of "wet lay up" method of producing textile composites. (03 marks)
04. a. With the help of diagrams explain how laminated fabrics are produced, using the process of flame lamination. (08 marks)
- b. During the process of producing laminated fabrics by heat lamination, it is important to maintain relatively low temperature bonding for a wide range of substances. Give the reasons for this. (04 marks)
- c. Explain the importance of high degree of adhesion between resin and reinforcement fibres in the production of textile composites. (03 marks)
05. a. Discuss the intrinsic characteristics of geosynthetics that make them ideal for soil reinforcement applications. (08 marks)
- b. Discuss the three main requirements that have to be met by geosynthetics to be used in soil reinforcement applications. (04 marks)
- c. Discuss any three environments where a geotextile filter is required. (03 marks)

06. a. State the advantages provided by geotextiles as against conventional granular soil filters. (03 marks)
- b. Discuss the four basic criteria that need to be considered while selecting a geotextile fabric in hydraulic applications. (04 marks)
- c. Discuss the technical functions performed by jute geotextiles in erosion control applications. (08 marks)
07. a. Cabin air filters in vehicles work in three basic ways. Discuss how new generation automotive textiles can be used to perform these three tasks. (06 marks)
- b. Automotive carpet structures have three main elements performing three distinctive functions. Discuss how textile materials are utilised in the manufacture of automotive carpets. (06 marks)
- c. Explain the principle behind the manufacture of cut resistant fibres. (03 marks)
08. a. Discuss the tests that are used to evaluate the effectiveness of chemical protective clothing. (05 marks)
- b. Explain how textile materials are effectively used to reduce various mechanical hazards. (05 marks)
- c. Briefly explain the various methods that are used to impart thermal protection to textile materials. (05 marks)
09. a. Clothing provides a microclimate around the body by regulating heat and moisture interchange between body and the environment. With the help of a suitable diagram explain how clothing controls various physical quantities that are relevant to the human comfort. (08 marks)
- b. Explain the mechanism of how bacteria and viruses get adhered and contaminate the clothing. (07 marks)

10. a. Discuss the main steps involved in the manufacture of carbon fibres from acrylic fibres. (06 marks)
- b. Discuss the important properties of glass fibres that enable them to be used in technical applications. (04 marks)
- c. Discuss the main steps of the gel spinning process that is used to manufacture ultra high molecular weight polyethylene. (05 marks)

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