THE OPEN UNIVERSITY OF SRI LANKA

BACHELOR OF INDUSTRIAL STUDIES /

BACHELOR OF TECHNOLOGY

FINAL EXAMINATION - 2013/2014

TTX5235–FABRIC TECHNOLOGY

DURATION – THREE HOURS

Date: 17th August 2014   Time: 0930-1230 hours

Total number of questions in this paper is 09. Total number of questions to be answered is 06. Question number one is compulsory and carries 25 marks. All the other questions carry fifteen (15) marks each.

01. Compulsory question

1. What do you understand by the term 'fabric'? (02 Marks)

2. Give three (03) types of composite fabrics. (03 Marks)

3. What are the two (02) major categories of **utility characteristics** of fabrics? State two (02) examples for the each category. (02 Marks)

4. List four (04) fabric properties and characteristics which influence the **comfort properties** of clothing fabrics. (02 Marks)

5. Briefly explain the following woven fabric structures. (02 Marks)

     a. Leno fabric

     b. Tri-axial fabric

6. Explain the term 'nesting' related to twill woven fabric structures. (02 Marks)

7. List four (04) **constructional particulars** that must be included in a specification sheet for a woven shirt material. (02 Marks)

8. Give an outline classification of weft knitted fabric structures according to the arrangement of the knitting needles during the knitting process. (02 Marks)

9. State one (01) difference between appearance of normal knitted fabrics and fabrics knitted with drop stitches. (01 Marks)

10. Briefly explain three (03) relaxation stages of knitted fabrics. (02 Marks)

11. Draw the lapping notation for the warp knitted fabric structures given below by chain notations. (04 Marks)
    a. 1-0/0-1
    b. 3-2/3-4/2-1/3-4

12. List two (02) different types of warp knitted special structures. (01 Marks)

--------------------------------End of the compulsory question--------------------------

02. (a). Distinguish the terms 'physical properties of fabrics' and 'physical characteristics of fabrics'. (06 Marks)

(b). Explain in detail two (02) durability characteristics, which must be possessed by the fabrics to be selected for the following application.

(09 Marks)

   a. Fabric of a parachute

   b. Fabric for a fire fighters suit

   c. Fabric for a towel

03. (a). Briefly explain three (03) functions of clothing materials. (06 Marks)

(b). Discuss the specific properties and characteristics expected from the fabrics selected for the following technical applications. Also explain how a fabric is designed to meet the stated requirements. (09 Marks)

   a. Geo-textiles

   b. Safety belts used for cars and air crafts

   c. Air bags of automobiles

04. With the **aid of suitable sketches** explain the following phenomenon related to woven fabrics. (15 Marks)

   a. Low tearing strength of plain woven fabrics compared to twill and satin/sateen woven fabrics

   b. Crimp inter-change

   c. High force requirement for pulling out of weft or warp yarn from a plain woven fabric than that of satin woven fabric.

05. Draw detailed classification charts for the **each** following criteria, according to which woven fabrics can be classified. (15 Marks)

   a. Classification of woven fabrics according to end use

      b. Classification of woven fabrics according to raw material

      c. Classification of woven fabrics according to colour design

06. (a) Distinguish between 'balanced' and 'unbalanced' plain woven fabrics.   (06 Marks)

(b) Explain why production of weft faced plain weave fabrics are difficult and expensive than production of warp face plain weave fabrics.   (09 Marks)

07. (a) 'To determine the strength of knitted fabrics, bursting strength test is performed instead of tensile strength test'. Critically discuss.   (06 Marks)

(b) Briefly explain **with suitable sketches** the following knitting techniques.

                                 (09 Marks)

      a. Racking technique

      b. Cable design

08. (a) Calculate the stitch density, yarn length in one square meter and the required length of yarn to produce 1000 square meters of wet relaxed plain knitted fabric with an average stitch length of 6mm. Assume wastage of 2% of yarn, during the production. (Wet relaxed $k_s = 2160$, $k_c = 53$ and $k_w = 41$).   (10 Marks)

(b) Differentiate between the **appearance, properties and characteristics** of 1x1 rib fabric with that of interlock fabric.   (05 Marks)

09. (a) Define 'Warp knitted plated fabric'.   (05Marks)

(b) Define the following terms of warp knitted fabrics.   (04Marks)

      a. Rack

      b. Run-in

(c) With the aid of suitable diagrams, explain how fall plate knitted structure is produced.   (06 marks)