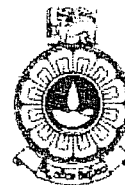


THE OPEN UNIVERSITY OF SRI LANKA

DIPLOMA IN INDUSTRIAL STUDIES /

DIPLOMA IN TECHNOLOGY

FINAL EXAMINATION - 2006/2007



TTI3236 / TTD1236 / TTD1211 FABRIC STRUCTURE AND ANALYSIS

DURATION - THREE HOURS

DATE: 07 March 2007

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. Briefly explain what you understand by point-paper representation of a weave. (02 marks)
- b. Show the difference between a warp faced Z twill weave and a weft faced S twill weave by giving at least one example each for these two types of weave designs. (03 marks)
- c. Briefly explain how plain weave fabrics are classified according to their cover. (03 marks)
- d. What are the features that facilitate the appearance of smooth surface in sateen fabrics? (02 marks)
- e. When designing motifs for extra warp figuring certain considerations must be taken into account. What are these considerations? (03 marks)
- f. State the difference between negative warp pile fabrics (terry) and positive warp pile fabrics (velvet) (03 marks)
- g. Briefly explain how pile fabrics are produced using the face to face principle. (03 marks)
- h. State the difference between rib gating and interlock gating. (02 marks)
- i. State the difference between Raschel knitting and Tricot knitting. (02 marks)
- j. What length of fabric can be woven from 1200 metres of warp if the warp crimp is 12%. (02 marks)

02. a. Construct a horizontal waved twill design using the following base twill and give its drawing-in plan and lifting plan.

2	3	2	1
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1	2	3	2

(10 marks)

- b. Construct the herringbone twill of the above base twill. (05 marks)

03. a. Construct an extended 5 end sateen weave. (05 marks)

- b. Construct a weave combining sateen and satin weaves. (05 marks)

- c. With a suitable example, explain how variations in plain weave could be introduced to obtain various types of commercial fabrics. (05 marks)

04. a. Construct a 2/2 twilled hopsack weave on a 12 end sateen base. (05 marks)

- b. Construct a 10 end- huckaback weave and give its drawing-in plan and lifting plan. (06 marks)

- c. Using the motif you have used in 04.b to develop the huckaback weave construct a mock leno weave. (04 marks)

05. a. Construct a crepe weave by using the technique of reversing a small motif. You may select your own motif for this purpose. You should show the steps involved in the construction. (06 marks)

- b. Briefly explain how Wadded Bedford Cord weaves are constructed. (05 marks)

- c. Give two advantages each of extra warp figuring and of extra weft figuring. (04 marks)

06. a. Explain how a centre stitched double fabric could be constructed. You should give a suitable example to explain the construction steps. (09 marks)

- b. Briefly explain how a plush (warp) structure is constructed. (06 marks)

7. a. It is required to produce a fabric with alternate red and black vertical stripes of 4 yarns width. Briefly explain how this could be achieved. (05 marks)
- b. Explain the steps involved in the development of the Crow's foot design and give the point paper diagram of this weave design. (05 marks)
- c. Draw the crepe weave design and introduce the following colouring order and obtain the final design: Green, Blue, Blue, Green in both the warp and weft directions. (05 marks)

a. Explain the difference between a rib structure and interlock structure with reference to their designs and properties.

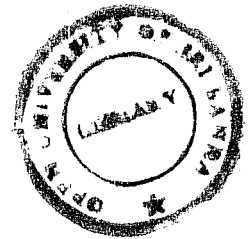
b. Draw the lapping diagram of the following knitting notations:

i. Front Bar: 1-0/2-3      Back Bar: 1-2/1-0

ii. Front Bar: 1-0/4-5      Back Bar: 1-0/1-2

iii. Front Bar: 1-0/0-1      Back Bar: 3-4/1-0

iv. Front Bar: 2-0/0-2      Back bar: 6-6/0-0



(12 marks)

a. With the help of suitable diagrams explain how closed loops and open loops are realised in warp knitting machines. (04 marks)

b. With reference to fabric structure how are purl fabrics different to other type of knitted fabrics? (04 marks)

c. The following table gives the area density in  $\text{g/m}^2$  of a set of plain weft knitted fabrics, together with the stitch length in mm. The linear density of the yarn used was 75 tex.

Area density	237.5	269.6	296.7	330.6	389.9
Stitch length	6.27	5.61	5.08	4.52	3.86

Show that these figures indicate that the relation between stitch density,  $S$ , and stitch length,  $\ell$ , is of the form  $S = k_s/\ell^2$ . Calculate the value of  $k_s$ . (07 marks)

