

THE OPEN UNIVERSITY OF SRI LANKA

DIPLOMA IN INDUSTRIAL STUDIES /

DIPLOMA IN TECHNOLOGY

FINAL EXAMINATION - 2005/2006



TTX4231 KNITTING AND NON-WOVEN TECHNOLOGY

DURATION - THREE HOURS

DATE: 19 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.

01. a. With the help of simple diagrams, briefly explain how opening and closing of the hook is realised in a compound needle. (04 marks)
- b. State the three possible functions performed by the sinker in knitting machines. (03 marks)
- c. With the help of simple diagrams, briefly explain a method to introduce a tuck stitch during knitting cycle. (03 marks)
- d. State what you understand by "Finished Relaxed State" with reference to knitted fabrics. (02 marks)
- e. Estimate the number of courses/cm and wales/cm in a knitted fabric having a stitch density of $90 / \text{cm}^2$, consider the fabric is wet relaxed and so the k_c/k_w is 1.29. (03 marks)
- f. Briefly explain the purpose of a guard cam in a flat bed knitting machine. (02 marks)
- g. State the unique properties of non-woven fabrics compared to woven and knitted fabrics. (02 marks)
- h. What do you understand by "bowing" with reference to warp knit fabrics. (02 marks)
- i. What factors affect the deformation of non-woven fabrics? (02 marks)

- j. State the factors that determine the strength of a mechanically bound non-woven fabric. (02 marks)
02. a. With suitable diagrams explain the steps involved in formation of knitted loops, when latch needles are used. (08 marks)
- b. Draw the diagram of a cam box used in flat knitting machine and indicate the various types of cams those perform different functions. (07 marks)
03. a. Explain the difference between a circular plain knit machine and a circular interlock machine with reference to needle arrangement and cams. (07marks)
- b. Explain the important steps that are involved in the formation of purl knitted structures, when double hook needles are used. (08marks)
04. a. With the help of a diagram illustrate how the cam arrangement for interlock fabric would look like. (07 marks)
- b. Briefly explain what you understand by laying-in in weft knitting. (04 marks)
- c. Briefly explain what you understand by plating in weft knitting. (04 marks)
05. a. What do you understand by racking with reference to V bed machines? (04 marks)
- b. Illustrate the cam arrangement and the needle path diagram for a full cardigan stitch. (06 marks)
- c. Explain the function of pattern wheel in a jacquard circular knitting machine. (05 marks)
06. a. Briefly explain the knitting stages of a sinker wheel machine. (06 marks)
- b. With suitable diagrams explain how a cup seaming machine joins the loops of two different knitted components of a garment. (09 marks)

07. a. A sharkskin warp knitted shirting in its grey state has 12 wales/cm and 32 courses/cm. The run-in is 185 cm for the back bar and 105cm for the front bar. Both bars are fed by 5Tex polyester yarn. Calculate the density of this fabric in g/m². (06 marks)
- b. A plain knit cotton fabric has a shrinkage value of 30%. If the wales per cm of this fabric are 10, what should be the probable machine gauge? (03 marks)
- c. With suitable diagrams (graphics) explain how panel narrowing and panel widening are achieved in fully fashioned knitted garments. (06 marks)
08. a. With suitable diagrams explain how warp knitting takes place with the use of bearded needles. (clearing, overlap, return swing, knocking over, under_lap) (05 marks)
- b. Draw the lapping diagram of the following warp knit structures. (06 marks)
- i. Front Bar = 1-0/1-2 Back Bar = 3-4/1-0
- ii. Front Bar = 1-0/1-0 Back bar = 2-3/1-0
- iii. Front bar 1-0/1-2/2-3/3-4/3-2/2-1
- c. Briefly explain the difference between a tricot machine and a Raschel machine. (04 marks)
09. a. Briefly explain the pneumatic method of web formation in the manufacture of non-woven fabric. (06 marks)
- b. Briefly explain what you understand by electrostatic method of web formation. (04 marks)
- c. Briefly explain two different methods to produce laminated fabrics. (05 marks)
10. a. Briefly explain how web consolidation takes place, when the needle punching technique is employed. (06 marks)
- b. With the help of a flow chart explain the steps involved in the manufacture of adhesive bonded fabrics. In each of the steps, what are the different techniques that are available to realise these steps? (09 marks)

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