

The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Textile and Apparel Technology



Study Programme	: Bachelor of Technology Honours in Engineering / Bachelor of Industrial Studies Honours
Name of the Examination	: Final Examination
Course Code and Title	: TAX4560/TTX4260 Woven Fabric Technology
Academic Year	: 2019/20
Date	: 19 th January 2021
Time	: 1330-1630hrs
Duration	: 3 hours

General Instructions

1. Read all instructions carefully before answering the questions.
2. This is a Closed Book Test (CBT).
3. Write down your index number on all the papers of the answer script.
4. This question paper consists of **Eight (8)** questions in **Four (4)** pages.
5. Answer question **One (01)**, which is compulsory, and **Five (05)** additional questions.
6. Total number of questions to be answered is **Six (6)**.
7. Question One (01) carries thirty (30) marks and questions Two (02) to Eight (08) carry fourteen (14) marks each.
8. Answer for each question should commence from a new page. If a question has many parts, all the parts should be answered in the chronological order under the same question.
9. Write down the answered question numbers on the front page of the answer book.
10. Answers should be in clear handwriting.
11. Do not use red colour pens to write answers.

01. Compulsory Question

- (a) List four (04) structural parameters of a woven fabric. (02 Marks)
- (b) Distinguish between 'over-end withdrawal' and 'side withdrawal' of yarn from packages providing examples for each type. (03 Marks)
- (c) Illustrate a 'super cone' package. (02 Marks)
- (d) State two (02) objectives of yarn clearing. (02 Marks)
- (e) Explain why 'softeners' are used in a size mixture. (03 Marks)
- (f) Illustrate a radial cam with a radial (reciprocating) roller follower. (02 Marks)
- (g) Distinguish between 'Jacquard' and 'Cam' shedding. (04 Marks)
- (h) List four (04) water quality parameters that should be considered when feeding water for water-jet looms. (02 Marks)
- (i) State two (02) advantages of 'Telescopic' Rapiers over 'Flexible' Rapiers used for weft insertion. (02 Marks)
- (j) Show classification of sley mechanisms used in different looms through an inverted tree diagram (flow chart). (03 Marks)
- (k) Briefly explain the importance of cloth 'take-up'. (03 Marks)
- (l) Briefly explain the simplest way to produce woven fabrics with colored "Checked" designs. (02 Marks)

End of the compulsory question.

- 02. a)** The construction details of a finished fabric are given in standard notation as follows;

Cotton 40^s/2 x Cotton 40^s/2 x 54 inches
120 x 88 per inch

- i. Interpret the above construction details in your own words. (03 Marks)
- ii. Assuming warp and weft crimps of this fabric as 6% and 10% respectively, calculate the weft yarn requirement (in kgs) to produce 1000 yards of this fabric. Also, assume that there is a wastage of 2% of weft yarns when this fabric is produced. (08 Marks)
- b) Derive an equation to calculate the 'cover factor' of woven fabrics. (03 Marks)

03. a) State four (04) requirements of a pirn package to ensure the production of a quality fabric in an economical manner. (04 Marks)
- b) Describe the following structural features of a pirn package stating the reason for each such feature. (07 Marks)
- i. Layering
 - ii. Near parallel winding
 - iii. Winding of a bunch
- c) Explain why 'creeling' of pirn winding machines is not usually automated. (03 Marks)
04. a) State and briefly explain four (04) common problems of 'warping'. (04 Marks)
- b) Discuss the advantages of 'Swiveling Creel' over 'Truck Creel'. (05 Marks)
- c) A weaver has an order for 50,000 meters of a loom state plain woven fabric having the following construction.
- $$\frac{\text{Cotton } 30^s \times \text{Cotton } 30^s}{96 \times 72 \text{ per inch}} \quad \times 54 \text{ inches}$$
- Assume warp and weft crimp to be 6% and 8% respectively and waste percentage of 3% for warp yarn.
- i. If the creel capacity is 600 cones, calculate the number of back beams required and number of warp ends on each back beam. (03 Marks)
 - ii. What should be the length of yarn on a single package to carry out warping uninterrupted? (02 Marks)
05. a) Illustrate a 'Clear Shed'. (02 Marks)
- b) With the help of suitable illustrations, distinguish between 'Center-Closed' and 'Bottom-Closed' sheds. (06 Marks)
- c) Discuss the advantages and disadvantages of 'CAM' shedding. (06 Marks)

06. a) State two (02) advantages of shuttle picking mechanisms. (02 Marks)
- b) Explain why the picking force must be optimized in conventional looms. (04 Marks)
- c) Compare and contrast 'Air-jet' and 'Water-jet' weft insertion methods. (08 Marks)
07. a) State two (02) requirements that has to be fulfilled by the sley mechanism employed in a conventional loom. (02 Marks)
- b) With the help of a suitable illustration, describe the operational principle of a four-link beat up mechanism employed in a typical conventional loom. (06 Marks)
- c) Describe the characteristic design features of a sley used in a typical conventional loom. (06 Marks)
08. Write short notes on the following.
- i. Slasher sizing. (05 Marks)
- ii. Intermittent take-up mechanism (04 Marks)
- iii. Photo-electronic weft feeler (05 Marks)

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