

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



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Study Programme	: Bachelor of Science of Engineering Honours Bachelor of Industrial Studies Honours
Name of the Examination	: Final Examination
Course Code and Title	: TAX6265 – Advanced Weaving Preparation and Machinery
Academic year	: 2023/2024
Date	: 2 nd March 2025
Time	: 09:30-12:30 hours
Duration	: 3 hours

General Instructions:

1. Read all instruction carefully before answering the questions.
2. This is a close book test (CBT).
3. Write down your index number in all the pages of answer scripts.
4. This question paper consists of Eight (08) questions in Five (05) pages.
5. Answer the **question one (Q1), which is compulsory and any five (05) questions from Question 02 to 08**. Question one (Q1) carries 25 marks and questions two (Q2) to eight (Q8) carry 15 marks each.
6. Do not write answers to the additional questions.
7. Answers for each question should commence from a new page.
8. Write down the answered question numbers in the cover page of the answer book.
9. Answers should be in clear handwriting.
10. Do not use red colour pens to write the answers.

Compulsory question

(Q1)

- a) State SIX (06) different criteria for classification of winding machines?
(03 marks)
 - b) Why is splicing preferred over knotting in the case joining of spun yarns?
(03 marks)
 - c) Briefly explain, what is doubler winding?
(02 marks)
 - d) Why doubler winders, do not have any automatic knotters/splicers?
(02 marks)
 - e) Why pirn packages are, wound as a nearly parallel layer packages instead of fully parallel-wound or cross-wound packages?
(02 marks)
 - f) State THREE (03) stages of the drawing-in process in weaving preparation?
(03 marks)
 - g) What is the purpose of looming in the weaving process?
(02 marks)
 - h) Briefly explain the importance of Quick Style Changing (QSC) in modern weaving process?
(03 marks)
 - i) State the TWO main units of a dobby mechanism?
(02 marks)
 - j) How does the conveyor system of a Sulzer projectile loom contribute continuous weft insertion?
(03 marks)
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Answer any five (05) questions from Question 02 to 08

(Q2)

- (a) Figure 01. shows a two-sided doubler winding machine. Discuss the working principle and importance of a two-sided doubler winding machine in yarn processing, highlighting how uniform tension is achieved in two different components. (07 marks)

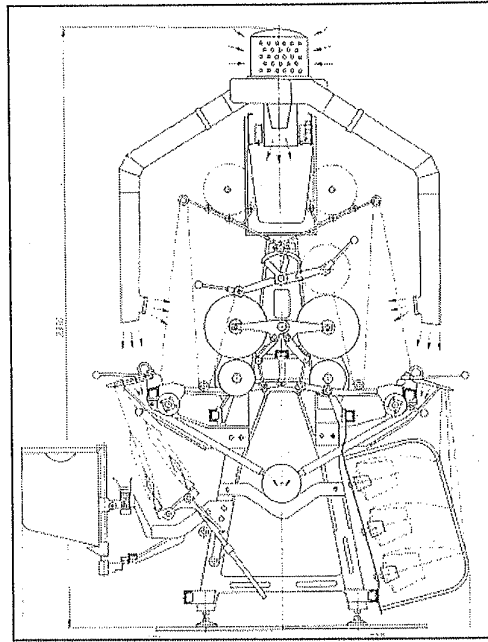


Figure 01.

- (b) Discuss the principle of pirn winding and its automation. Explain the role of the bunch in ensuring smooth pirn changes and how its length optimization affects fabric quality and waste management. (08 marks)

(Q3)

- (a) Discuss the major drawbacks of conventional style changing in weaving machines, and how do they impact production efficiency and cost? (06 marks)
- (b) Discuss the Dornier Quick Style Changing System and its working principles. (09 marks)

(Q4)

- (a) Figure 02. Shows a Rotary dobby mechanism. Discuss the working principle of the Rotary Dobby mechanism, explaining the roles of its key components in lifting the heald frames. Compare it with traditional dobby systems and highlight its advantages. (07 marks)

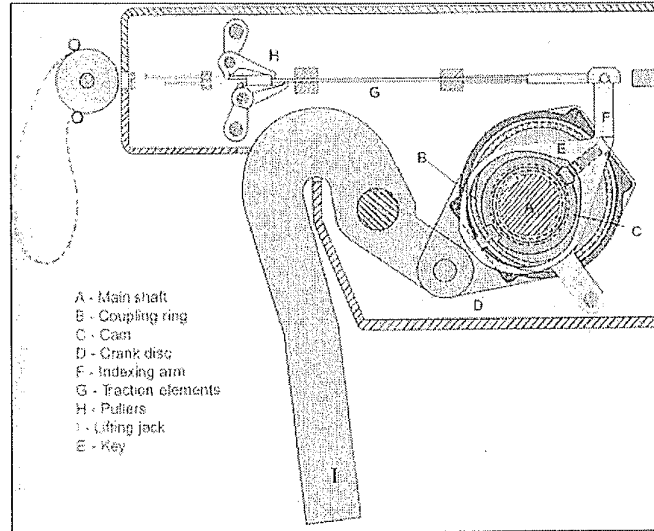


Figure 02.

- (b) Describe the working principle of an Electronic Negative Dobby, explaining its key components and functions. How does the electronic selection mechanism improve performance compared to conventional dobby? (08 marks)

(Q5)

- (a) Explain the working sequence of the Staubli Electronic Jacquard system. (08 marks)
- (b) Compare and contrast Electronic Jacquard machines with Mechanical Jacquard machines, highlighting their advantages in terms of functionality, efficiency, and flexibility. (07 marks)

(Q6)

- (a) Explain the key operations performed during one complete cycle of weft insertion in a projectile loom drive, and how do the different driving shafts contribute to these operations? (08 marks)
- (b) Explain the unique features of the Sulzer projectile loom, focusing on tuck-in selvedge formation, the beat-up mechanism, projectile guides, and the projectile monitoring system. (07 marks)

(Q7)

- (a) Compare the working principles of a crank and balance operated mechanism with the crank and rack operated mechanism available in rapier looms.

(07 marks)

- (b) How does the grooved cam operated mechanisms available in rapier looms differ from crank-operated mechanisms with respect to motion transmission and machine width optimization?

(08 marks)

(Q8)

- (a) Discuss the technical advantages and disadvantages of air-jet weaving compared to other weaving technologies.

(08 marks)

- (b) Discuss the condition (quality) of air required for air-jet weaving and its impact on machine performance and fabric quality.

(07 marks)