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

048

Study Programme	: Bachelor of Technology Honours in Engineering Bachelor of Industrial Studies Honours
Name of the Examination	: Final Examination
Course Code and Title	**: TAX4560 Woven Fabric Technology**
Academic Year	: 2021/22
Date	: 02nd February 2023
Time	: 1330-1630hrs

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 in all the pages of answer scripts.
4. This paper consists of two sections in 06 pages. Part A Consists of nine (09) questions, where short answers are expected. This section is compulsory and the maximum marks attainable for Part A is 25.
5. Part B consists of Six (06) questions. Answer only five (05) questions. Each question carries 15 marks . Maximum marks attainable for Part B is 75.
6. Do not answer more than five questions from the part B.
7. Answers 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.
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-colored pens to write the answers.

Part (A)

(Q1). State two (02) reasons that cause uneven thread tension during warping.

(02 marks)

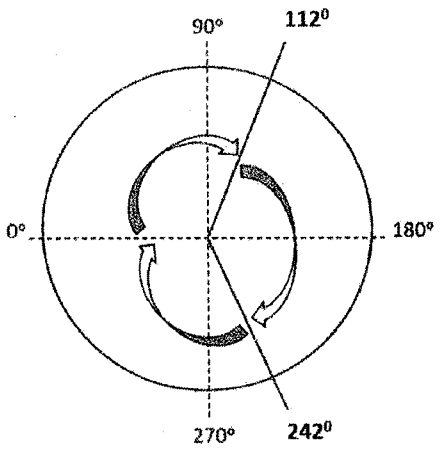
(Q2). List two (02) reasons that cause crossed warp yarns during weaving.

(02 marks)

(Q3). Briefly state two (02) properties that should be possessed by the yarn packages which will be subjected to dyeing (Or intended for dyeing) in high temperature and high-pressure dyeing machines.

(04 marks)

(Q4.) Given below is a circular timing diagram of the primary motions of a conventional loom. Consider that the beat-up and heald levelling take place at 0°.



State the time duration in which the following events/actions takes place.

(a) shed dwelling -

(b)shed opening -

(c)shed closing -

(03 marks)

(Q5). Briefly explain the main difference between "Negative Take-up" and "Positive Take-up" Mechanisms.

(02 marks)

(Q6). List two (02) objectives of yarn clearing.

(02 marks)

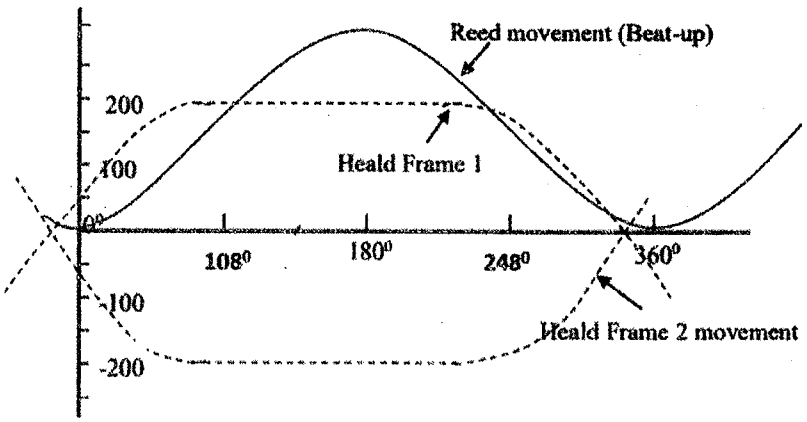
(Q7). Name two (02) main types of weft stop motions used in shuttle looms?

(02 marks)

(Q8). Briefly explain what "shuttle box changing mechanisms" are and list two (02) ways in which such mechanisms can be designed.

(03 marks)

(Q9). Given below is a linear timing diagram of a loom.



Using your knowledge of the timing cycle of a shuttle loom,

(a) State the beat-up time.

(01 mark)

(b) Are the heald frames crossing earlier than the beat-up time? State Yes/No.

(01 mark)

(c) State a type of fabric construction that this setting is suitable for, briefly explaining why.

(02 marks)

(d) State the dwell period of the heald frames.

(01 mark)

Part (B)

(Q10).

(a) Briefly discuss five (05) features of a good sizing agent.

(05 marks)

(b) Briefly explain what "Leasing is" and the purpose and functionality of leasing during sizing.

(04 marks)

(c) Compare and Contrast "Beam Sizing" from "Single End Sizing", considering the supply and delivery yarn packages and the method of size application.

(06 marks)

(Q11).

(a) Briefly explain three (03) common problems that arise during the warping process.

(06 marks)

(b) Briefly explain the differences between "Sectional warping" and "Direct warping" processes.

(06 marks)

(c) During the weaving process, the warp yarns are subjected to different forces. Mention one (01) instance or action during weaving in which the following forces are applied to the warp yarns.

i. Frictional forces:
ii. Tensional forces:
iii. Bending forces:

(03 marks)

(Q12).

A weaving mill received an order to weave the fabric with the following specifications.

$$\frac{\text{Cotton } 21^s \text{ x Cotton } 21^s \text{ X 48 inches}}{\text{108 EPI x 56 PPI}}$$

Warp crimp is 8% and weft crimp is 10%. Assume that there is no warp or weft waste.

(a) Calculate the total number of ends in the fabric.

(02 marks)

(b) Calculate the total weight of the warp yarns that are required to weave 1000 yards of the fabric.

(04 marks)

(c) Consider that the weaver has an order for 50,000m of a loom state plain woven fabric having the above construction. If the creel capacity of the warping creel is 600, calculate the minimum number of back beams required and the number of warp ends that has to be wrapped on each back beam.

(05 marks)

(d) State any two (02) main end uses of yarn packages.

(04 marks)

(Q13).

Fig. 1 given below, is an illustration of a component used in one of the primary motions of a conventional shuttle loom.

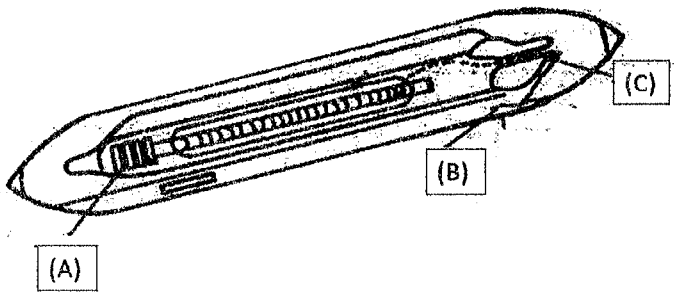


Fig. 1

(a) Identify the component in Fig. 1 and the primary motion of the shuttle loom that is associated with this component.

(01 mark)

(b) Name the parts in Fig. 1, indicated by the letters A, B and C. Figure is not clear enough to identify the parts such as spring clamp and the weft thread.

(03 marks)

(c) Briefly state a function that can be achieved by this primary motion.

(02 marks)

(d) List two (02) advantages and two (02) disadvantages of this mechanism over the other mechanisms available for the same function.

(04 marks)

(e) Briefly compare and contrast the projectiles used in Rosmann (Sulzer), Novostov (Investa) and Neumann (Textima) projectile weft insertion methods with respect to their size, weight etc..

(05 marks)

(Q14).

(a) With aid of a suitable diagram, briefly explain what you understand by the term "formation of a semi-clear shed".

(05 marks)

(b) List two (02) advantages and two (02) disadvantages of cam shedding.

(04 marks)

(c) Briefly discuss the statement "Jacquard shedding offers a higher design flexibility".

(06 marks)

(Q15).

(a) State three (03) factors that affect the flight time of a shuttle.

(03 marks)

(b) With the help of a suitable diagram, explain the "split drum yarn traverse method" employed in winding of yarn packages.

(05 marks)

(c) A cheese package of 20cm of height is wound on a split drum winder. The drum makes 2.5 revolutions per one complete traverse. The drum rotates at 2500 rpm and has a surface speed of 600m/min. Determine the angle of wind.

(04 marks)

(d) Briefly explain three (03) advantages of "grooved roller yarn traverse" method over the "split drum traverse" method.

(03 marks)

- The End -