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

059

Study Programme	: Bachelor of Technology Honours in Engineering Bachelor of Industrial Studies Honours
Name of the Examination	: Final Examination
Course Code and Title	**: TAX4361- Knitting Technology**
Academic Year	: 2021/2022
Date	: 19th February 2023
Time	: 09:30-12:30
Duration	: 3 hours

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of Eight (08) questions in Five (05) pages.
3. Write down your Index Number in all the pages of the answer script.
4. **Answer compulsory question one (Q1) and additional five (05) questions.**
5. Question one (Q1) is compulsory and carries thirty (30) marks.
6. Question two (Q2) to eight (Q8) carry fourteen (14) marks each.
7. Answer for each question should commence on 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 space given in the answer book.
9. Answers should be in clear hand writing.
10. Do not use red colour pen.

Compulsory question

Q1.

a) Explain briefly how "Float" and "Tuck" stitches are produced on weft knitting machines. (04 marks)

b) State three (03) objectives of yarn feeding systems occupying in knitting machines. (03 marks)

c) What do you understand by "Synchronized timing" and "Delayed timing" in circular knitting machines. Explain advantages and disadvantages of these two (02) methods. (06 marks)

d) Explain why the guide bars of the Tricot warp knitting machine are numbered from the back to the front of the machine. (04 marks)

e) Explain briefly why large-diameter circular knitting machines require a **creel** while flat knitting machines do not. (03 marks)

f) Distinguish the operating mechanisms of "Retractable raising cams" and "Swing cams" employed in Flat bed knitting machines. (04 marks)

g) With the use of suitable diagrams briefly explain the basic principle of plating technique. (03 marks)

h) State three (03) advantages of the weft knitting process compared to the weaving process. (03 marks)

----------End of the compulsory question----------

Answer any five (05) questions from the following seven (07) questions.

Q2. (a) Explain the effect of following yarn properties and characteristics on the knitting process and the final product. (04 marks)

i. Yarn twist

ii. Yarn hairiness

(b) The Figure 1 below illustrates the yarn delivery system on a Flat-bed knitting machine. Identify the components labelled A - F in the Figure 2 and explain how this yarn delivery system functions. (05 marks)

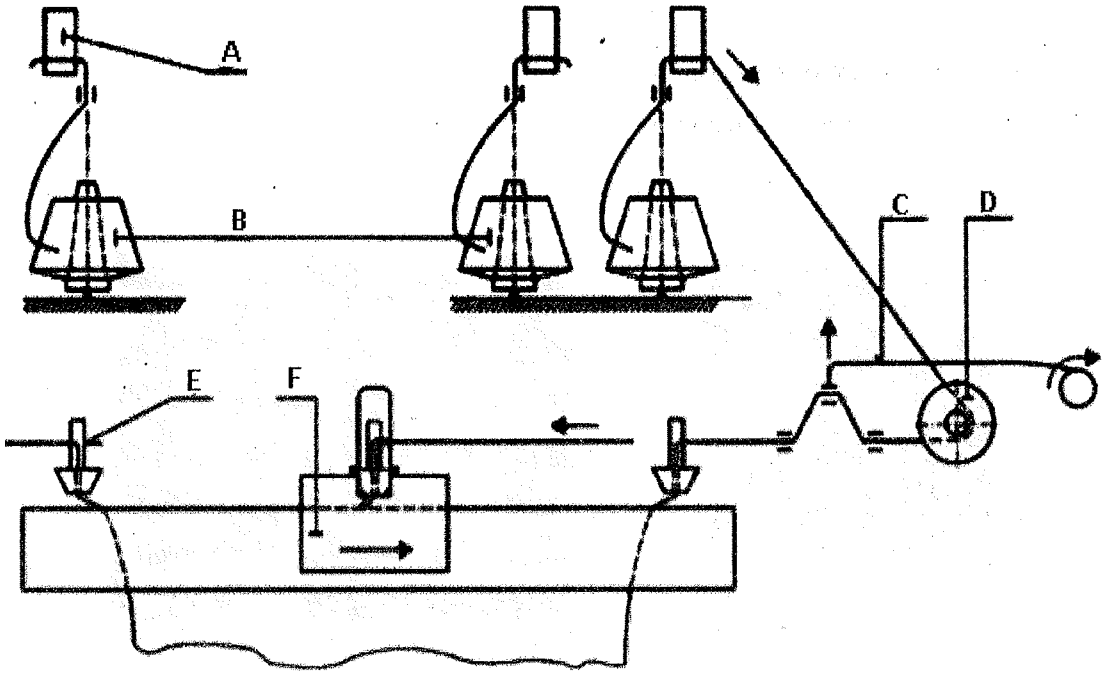


Figure 1

(c) Explain the working principle, advantages and disadvantages of the **Tape Feed system** employed in circular knitting machines. (05 marks)

Q3. (a) Discuss the similarities and differences of Circular rib knitting machine and Circular Interlock knitting machine considering the needle arrangement, knitting actions and functions. (06 marks)

(b) Compare 1x1 rib and interlock knitted fabrics considering the following. (05 marks)

a. Appearance of technical face and back of the fabric
b. Stretchability in wale direction
c: Stretchability in course direction
d. Ability to unravel a yarn from the structure.
e. Tendency to curl

(c) Briefly explain any three (03) disadvantages of plain knitted fabrics in comparison to interlock knitted fabrics. (03 marks)

Q4. (a) Compare Tricot and Raschel warp knitting machines considering at least 04 aspects. (04 marks)

(b) Write the chain notations for the front and back guide bars and draw the corresponding lapping diagrams for the warp knitted fabric structures denoted by loop diagrams in Figures 2 and 3. (06 marks)

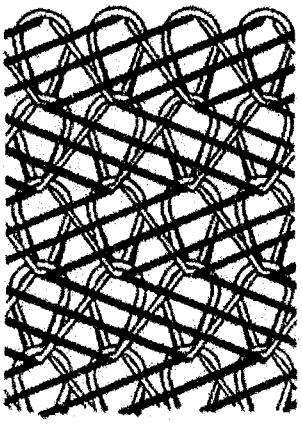


Figure 2

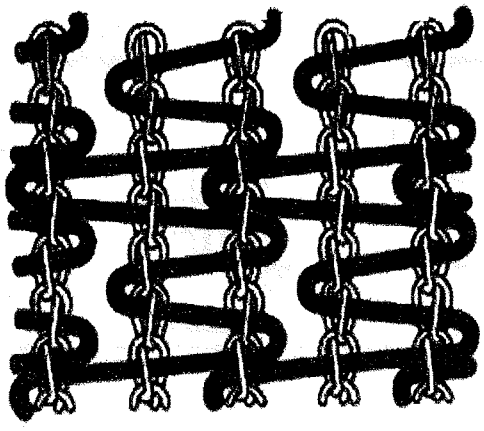


Figure 3

(c) With the aid of suitable diagrams compare the "Pattern chain mechanism" and "Solid metal cam mechanism" with reference to warp knitting machines. (04 marks)

Q5. (a) Describe the loop formation process of latch needles and compound needles. (08 marks)

(b) Discuss one (01) similarity and two (2) differences between the "Intarsia" and "Fair Isle" techniques. (06 marks)

Q6. (a) Draw the yarn path and the square notation of the loop diagram given below in the Figure 4. (04 marks)

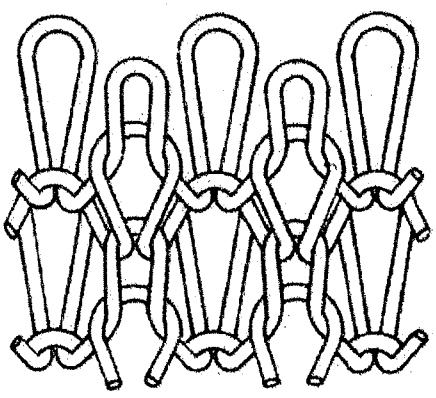


Figure 4

(b) Draw the yarn path diagram and square notation of one repeat of **Full cardigan structure**. (04 marks)

(c) Draw arrangements of cams and needles to knit one repeat of full cardigan structure on V-bed knitting machine.

In your diagram clearly show the cam units (the retractable raising cam, retractable tuck cam, guard cam, and adjustable stitch cam), whether each cam unit is in or out of action, the needle beds and needle arrangement, and the directions of needle and cam movement. (06 marks)

Q7. (a) The front bar of Locknit fabric "A" has a run-in length of 100.8 cm and the back bar has a run-in length of 72 cm. If the loop lengths of the front and back bars are 2.1 mm and 1.9 mm respectively, calculate the underlap lengths of the front and the back bars. (06 marks)

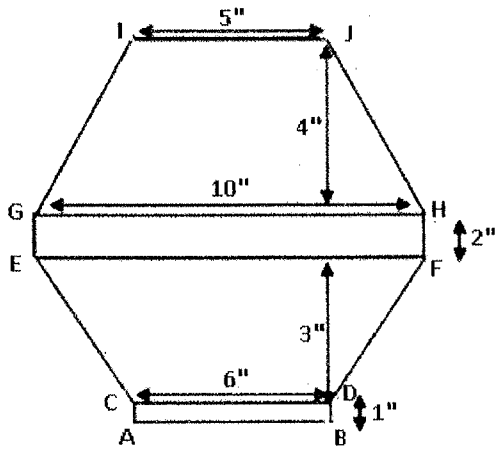
(b) State two (02) assumptions that are made when calculating the cover factor of weft knitted fabrics. (02 marks)

(c) There are two wet relaxed fabrics, Fabric "A "and "B" with 3.1 mm loop length but with two different yarn counts. Compare the area densities and the cover factors, if the counts of the yarns are 16 tex and 20 tex. The relaxation constants, K_s, K_c and K_w of wet relaxed fabrics are 2160, 53 and 41 respectively in metric units. (06 marks)

Q8. A fully fashioned garment component with the following specification is required to be knitted. The requirements are given in the diagram given below.

Courses per inch = 15

Wales per inch = 20



Calculate the necessary parameters/values and write the knitting statements. Clearly show all the calculation steps. (14 marks)