

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	: TAX4361 Knitting Technology
Academic Year	: 2020/2021
Date	: 20 th February 2022
Time	: 0930-1230 Hours
Duration	: 3 hours

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of Eight (8) questions in Five (5) 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 twenty five (25) marks.
6. Question two (Q2) to eight (Q8) carry fifteen (15) marks each.
7. 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.
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) State three (03) structural differences between woven and weft knitted fabrics in general. (03 Marks)
- (b) Briefly explain the lateral and sliding movements of latch needles on a flat-bed knitting machine. (02 Marks)
- (c) Calculate the decitex and denier equivalent of a skein of 15000 meters of polyester filament yarn that weighs 25.15 grams. (02 Marks)
- (d) Distinguish between sinker wheel machine and other circular knitting machines. (04 Marks)
- (e) State two (02) knitting machines that employ sinkers to assist in the knitting process. (02 Marks)
- (f) Specify the type of stitch formed during knitting, if the cam block of a V-bed knitting machine meets each of the following cam setting conditions.
- i. Retractable raising cam put out of action
 - ii. Retractable raising cam and tuck cam in action
 - iii. Retractable raising cam in action and tuck cam put out in action
- (03 Marks)
- (g) Explain briefly how inactive needles during knitting, have no effect on the passage of the cam box. (03 Marks)
- (h) Briefly explain how to make an interlock fabric with two-color vertical stripes. (02 Marks)
- (i) Draw the lapping diagrams for the front and back guide bars, which are denoted by the loop diagram of the warp knit fabric structure in the Figure 1.

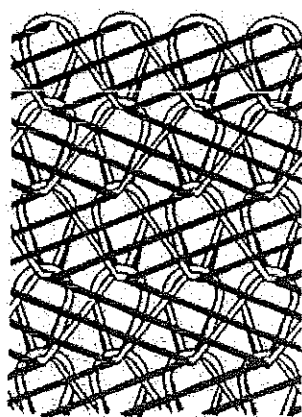


Figure 1

(02 Marks)

- (j) Draw the yarn path diagram and the square notation of the loop diagram shown in the Figure 2.

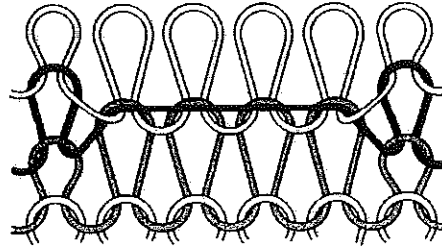


Figure 2

(02 Marks)

-----End of The Compulsory Question-----

- (Q2) (a) Weft knitting machines are classified in various ways. Some factors are contributed to classify them. Explain four (04) key factors taken into account when categorizing weft knitting machines. (06 Marks)
- (b) Explain how the following properties of cotton yarns affect the performance of circular knitting process.
- Yarn twist
 - Yarn hairiness
- (04 Marks)
- (c) Briefly explain what you understand by “Negative yarn feeding” and “Positive yarn feeding” in weft knitting. (05 Marks)
- (Q3) (a) Explain why weft knit fabrics with float stitches have less extensibility and higher stability than their equivalent all knit fabrics. Use diagrams where necessary. (05 Marks)
- (b) If the knitter receives packages of ring spun yarn, how does he prepare them for knitting? Explain each preparatory stage clearly. (05 Marks)
- (c) Explain how the hooks on each bearded and latch needle open and close during the knitting process. Use diagrams where necessary. (05 Marks)
- (Q4) (a) Discuss the similarities and differences of V-bed knitting machine and circular knitting machine considering the needle arrangement, knitting actions and functions. (06 Marks)
- (b) i. Draw the yarn path diagram and the square notation of the one repeat of Full-Milano fabric structure. (04 Marks)

- ii. Draw the suitable cam and needle configurations to knit Full-Milano fabric on the circular rib knitting machine. (05 Marks)

- (Q5) (a) Compare "1 x 1 Purl" and "1x1 Rib" knitted fabrics considering the following.
- Appearance of Technical face and back
 - Stretchability in wale direction and course direction
 - Ability to unravel a yarn from the structure
 - Tendency to curl at cut edges

(07 Marks)

- (b) A knitter wishes to make a fabric on a circular knitting machine, so that it has a specific width after wet treatment. The fabric specifications are as below. Plain knitted fabric to be wet finished at 38 cm (tubular). The diameter of the machine is 42 cm and the number of needles per cm is 9.

If the relaxation constants, K_s , K_c and K_w of wet relaxed fabrics are 2160, 53 and 41 respectively in metric units, calculate the following.

- i. The stitch length and stitch density of the fabric (04 Marks)

- ii. If 25000m of the yarn weigh 400g, calculate the tex count of the yarn

(02 Marks)

- iii. The areal density of the fabric in grams per square meter (g/m^2)

(02 Marks)

- (Q6) (a) Explain the following terms with reference to warp knitting. Use diagrams where necessary.

- i. Swing motion

- iii. Overlap

- ii. Shog motion

- iv. Underlap

(04 Marks)

- (b) Differentiate between "Pattern chain mechanism" and "Solid metal cam mechanism" in reference to warp knitting machines. (06 Marks)

- (c) Give the chain notations of the front guide bar and the back guide bar for the warp knit structure shown in the Figure 3.

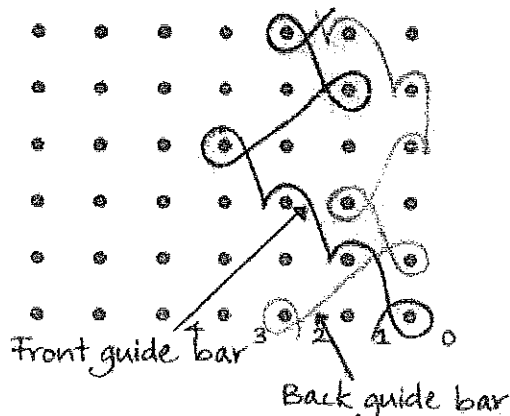


Figure 3

(05 Marks)

- (Q7) (a) Briefly explain "Fall plate" technique use in warp knitting. (04 Marks)
- (b) With the use of suitable diagrams briefly explain the basic principle of plating technique in relevant to weft knitting. (05 Marks)
- (c) State five (05) common weft knit fabric defects. Briefly explain why such defects occur in weft knit fabrics. (06 Marks)
- (Q8) (a) A fully fashioned garment component with the following specification is required to be knitted.

Courses per inch = 28
Wales per inch = 22

The specifications are shown in the Figure 4.
Do the calculations and write the knitting statements. Clearly show all the calculation steps.

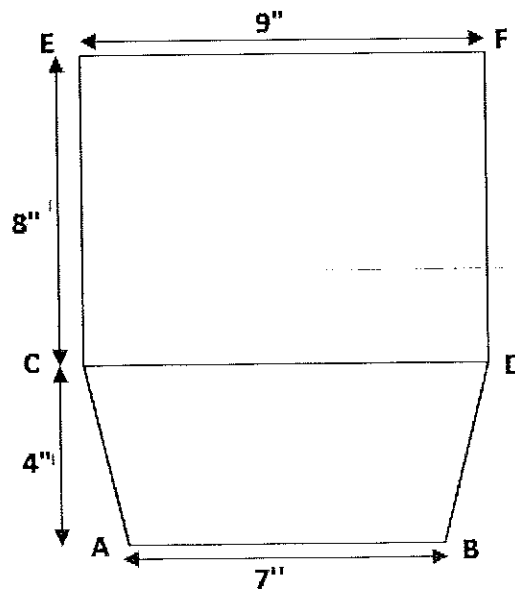


Figure 4

(09 Marks)

- (b) With the use of suitable diagram, explain how spacer fabrics are produced on warp knitting machines. (06 Marks)

