



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF ENGINEERING

DEPARTMENT OF FIBRE AND POLYMER MATERIALS ENGINEERING

TECHNOLOGY OF FABRIC MANUFACTURE I

TFE 2203

Second Semester Examination Paper

March 2025

This examination paper consists of 4 pages

Time Allowed: 3 hours  
Total Marks: 100  
Special Requirements: N/A  
Examiner's Name: Mr. L.K. Ncube

**INSTRUCTIONS**

1. Answer **ALL** Questions in Section A and **ANY THREE** Questions in Section B.
2. The first fifteen minutes should be spent reading the question paper and making notes.
3. **Do not** open your answer sheet until told to do so.
4. Marks will be awarded for skill in appreciating the scope of questions, clarity of argument and conciseness of presentation as well as for the knowledge displayed by the candidate.

**MARK ALLOCATION**

QUESTION	MARKS
1	40
2	20
3	20
4	20
5	20

## SECTION A

(Answer ALL Questions- TOTAL 40 Marks)

### QUESTION 1

- a. Define the following terms
- |                             |           |
|-----------------------------|-----------|
| (i) Knitting                | [2 Marks] |
| (ii) Loop                   | [2 Marks] |
| (iii) Course                | [2 Marks] |
| (iv) Wale                   | [2 Marks] |
| (v) Stitch density          | [2 Marks] |
| (vi) Knitting machine gauge | [2 Marks] |
- b. Name any two knitted products and state whether they are warp or weft knitted structures. [4 Marks]
- c. List the four characteristics of a good knitting yarn in order of their relative importance. [4 Marks]
- d. Explain the difference between single jersey and double jersey knitting machines [6 Marks]
- e. With the help of neat sketches explain the movement of yarn guides in warp knitting. [14 Marks]

## SECTION B

(Answer ANY THREE Questions- TOTAL 60 Marks)

### QUESTION 2

A single jersey sinker top circular knitting machine knitting a plain fabric with a stitch length of 4 mm has the following parameters:

- Needle bed diameter of 0.7m
- 2640 latch needles
- 25 weft yarn feeders supplying 30tex cotton yarn
- Running speed of 20revs/min
- Production efficiency of 92%

Calculate:

- a. The machine gauge of the circular knitting machine. [5 Marks]
- b. The pitch of the machine. [2 Marks]

- c. The production, in metres of yarn knitted and in kilograms of the produced weft knitted fabric, for an 8 hour shift working time. **[13 Marks]**

### **QUESTION 3**

Describe how you would produce a  $2 \times 2$  rib fabric and use neat sketches to show the machine needle gaiting, the cam tracks, yarn path notation and graphical presentation of the rib knitted structure. **[20 Marks]**

### **QUESTION 4**

- a. Define the following terms;

- |                 |                  |
|-----------------|------------------|
| (i.) Warp beam  | <b>[2 Marks]</b> |
| (ii.) Guide bar | <b>[2 Marks]</b> |
| (iii.) Guides   | <b>[2 Marks]</b> |
| (iv.) Overlap   | <b>[2 Marks]</b> |
| (v.) Underlap   | <b>[2 Marks]</b> |

- b. Identify the overlaps and the underlaps, and sketch the yarn path notation and actual guide bar movement for the chain link notation: 0-1/2-1/3-2/4-3/5-4/3-4/2-3/1-2. **[10 Marks]**

### **QUESTION 5**

- a. With the help of diagrams explain the five basic overlap/underlap variations used in warp knitting **[20 Marks]**

**END OF EXAMINATION QUESTION PAPER**