NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF ENGINEERING

DEPARTMENT OF FIBRE AND POLYMER MATERIALS ENGINEERING

YARN TECHNOLOGY I

TFE 2102

First Semester Examination Paper

December 2024

This examination paper consists of 3 pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements: N/A

Examiner's Name: Prof. L. N. Ndlovu

INSTRUCTIONS

1. Answer **QUESTION ONE AND ANY OTHER THREE** questions. Each question carries a total of **25 marks**. This paper contains **five** questions.
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 a candidate.

MARK ALLOCATION

QUESTION	MARKS
1.	**25**
2.	**25**
3.	**25**
4.	**25**
5.	**25**

QUESTION 1

a. Convert Nm 90 in to
   (i) Tex **[2 Marks]**
   (ii) Denier **[1 Mark]**
   (iii) English count (Ne) **[2 Marks]**

b. Evaluate production rate, given that 10 Reiter drawframes produce cotton slivers with the following parameters

Front roller speed	120 rpm
Front roller diameter	6 cm
Linear density of sliver delivered	6 ktex
Deliveries per frame	2
Efficiency	87 %
Shift hours	40

[10 Marks]

c. Calculate flyer frame production if these 10 drawframes feed a group of flyer frames processing with following particulars

Spindle speed	900 rpm
Twist factor αtex	10
Roving linear density	600 tex
Spindle per frame	124
Efficiency	90 %
Shift hours	40

[10 Marks]

QUESTION 2

a. Define the following terms:
   (i) Opening. **[2 Marks]**
   (ii) Lap. **[2 Marks]**
   (iii) Drafting. **[2 Marks]**
   (iv) Sliver. **[2 Marks]**
   (v) Roving. **[2 Marks]**

b. Describe the cleaning action of air currents in the blowroom. **[15 Marks]**

QUESTION 3

Explain using diagrams, the principle of operation of the following carding machines:
   (i) Revolving flat cards. **[13 Marks]**
   (ii) Roller cards. **[12 Marks]**

QUESTION 4

Figure 1 shows a diagram of a sliver processing machine.

(i) Name and label the machine and its components represented by 1, 2, 3 and 4. **[5 Marks]**

(ii) State its objectives. **[4 Marks]**

(iii) Explain in detail how the machine functions in processing the slivers. **[16 Marks]**

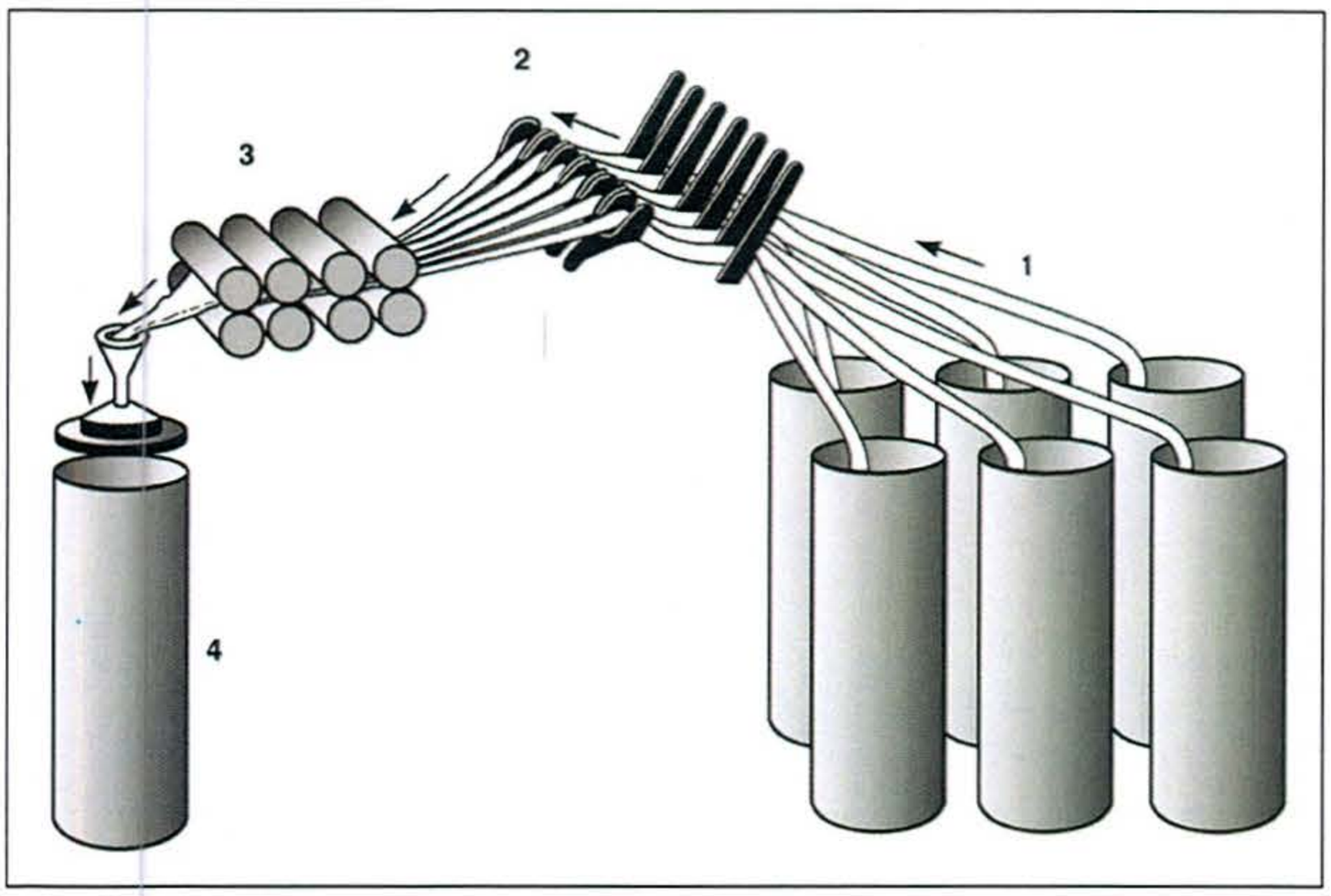

Figure 1

QUESTION 5

A 'bobbin lead' roving frame is used to produce short staple fibre rovings. Give a detailed description on how the roving is produced. **[25 Marks]**

END OF EXAMINATION QUESTION PAPER