MUEO

MOI UNIVERSITY

OFFICE OF THE DEPUTY VICE CHANCELLOR
(ACADEMICS, RESEARCH & EXTENSION)

UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER EXAMINATION

FOR THE DEGREE OF

BACHELOR OF ENGINEERING
IN
INDUSTRIAL & TEXTILE ENGINEERING

COURSE CODE: MIT 323

COURSE TITLE: YARN FORMATION II

DATE: 27TH FEBRUARY, 2018 **TIME:** 2.00 P.M. – 5.00 P.M.

INSTRUCTIONS TO CANDIDATES

- SEE INSIDE.

THIS PAPER CONSISTS OF (3) PRINTED PAGES

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MIT 323: YARN FORMATION II *2017/2018*

Instructions:

1. This paper contains seven questions, all carrying equal marks.
2. Attempt any five questions.
3. Do not write anything on the question paper.
4. Unauthorized electronic gadgets e.g. mobile phones are not allowed in the exam room
5. Examination duration is 3 hours.

Question 1

(a) Discuss the operating principle of the conventional ring spinning especially between the lappet guide and the bobbin. *7 marks*

(b) Explain the traveller as a limitation for further development in ring spinning. *3 marks*

(c) Define spinning triangle. *2 marks*

(d) Under what conditions does false twister essentially replace the apron drafting system. *2marks*

Question 2

(a) With the help of a diagram, explain a 3 over 3 roller drafting system. *4 marks*

(b) Discuss the influence of balloon height for long spindles in ring spinning. *5 marks*

(c) With regards to ring spun yarn:

(i) Elaborate the properties. *3 marks*

(ii) List the end uses. *2 marks*

Question 3

(a) The productivity of the ring spinning machine has increased by 40% since the late nineteen-seventies. Explain how this has been achieved. *4 marks*

(b) A ring frame produces a yarn of average count of 25/1. The twist multiple is 3.5 and the spindle speed is 20,000 r/min with a spinning efficiency of 0.95. (the count is in Ne)

(i) What is the output for the given ring frame? *2 marks*

(ii) If the count were reduced to 36/1, what would be the output? *2 marks*

(c) A 20 tex yarn has a TM direct of 36 ($\alpha = 36$); what is the twist level? *2 marks*

(d) The front rollers of a drafting roller system have a 1 inch diameter and the back rolls are 1.25 inch in diameter. The front rollers rotate at 90 r/min and the back rollers at 3r/min. The system is fed with 2 hank roving (Ne = 2 cotton hanks/lb).

(i) What is the yarn count if twist contraction is ignored *3 marks*

(ii) If the yarn delivered in Q3.d (i) contracts by 3% before it is wound, what is the actual draft ratio? *1 mark*

Question 4

(a) State the objectives of yarn doubling *4 marks*

(b) Explain twisting operation in the yarn doubling process *4 marks*

(c) Discuss any two types of twisted yarns *6 marks*

Question 5

(a) With respect to Open End (OE) spinning:

(i) Outline the essential phases in spinning operation using a diagram *4 marks*

(ii) State the theoretical advantages *4 marks*

(b) Using a diagram discuss the essential features of Dref-2 friction spinning *6 marks*

Question 6

(a) Discuss any 4 economic factors considered while comparing spinning processes — *8 marks*

(b) Describe any three classifications of rotor spun yarn structure — *6 marks*

Question 7

(a) Compare rotor spinning and ring spinning in terms of process and product quality — *8 marks*

(b) Describe woollen spinning system — *3 marks*

(c) Descibe scouring of wool — *3 marks*