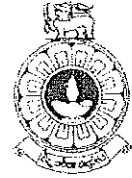


The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Textile and Apparel Technology



Study Programme	: Bachelor of Technology Honours in Engineering / Bachelor of Industrial Studies Honours
Name of the Examination	: Final Examination
Course Code and Title	: TAX3459/TAX3532/TTX3232 Yarn Manufacture I
Academic Year	: 2019/20
Date	: 20 th January 2021
Time	: 1330-1630hrs
Duration	: 3 hours

General Instructions

1. Read all instructions carefully before answering the questions.
2. This is a Closed Book Test (CBT).
3. Write down your index number on all the papers of the answer script.
4. This question paper consists of **Eight (8)** questions in **Four (4)** pages.
5. Answer question **One (01)**, which is compulsory, and **Five (05)** additional questions.
6. Total number of questions to be answered is **Six (6)**.
7. Question One (01) carries thirty (30) marks and questions Two (02) to Eight (08) carry fourteen (14) marks each.
8. 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.
9. Write down the answered question numbers on the front page of the answer book.
10. Answers should be in clear handwriting.
11. Do not use red colour pens to write answers.

01. Compulsory Question.

- (a) Find the English cotton count of a yarn, given that its tex count is 40 tex. (02 Marks)
- (b) Explain how 'neps' can be formed during the ginning process. (03 Marks)
- (c) State three (03) motives for using grid bars in blow room machinery. (03 Marks)
- (d) State four (04) advantages of automatic bale plucking and feeding over manual bale breaking and feeding. (04 Marks)
- (e) Illustrate the three (03) main patterns of arranging wire points on a card clothing. (06 Marks)
- (f) State the three (03) objectives of 'combing'. (03 Marks)
- (g) Briefly explain why is it required to impart a slight twist to roving strand. (02 Marks)
- (h) Briefly discuss the main characteristics of the 'traversing motion' employed in flyer frame. (02 Marks)
- (i) State three (03) functions of the traveler in ring spinning. (03 Marks)
- (j) Briefly explain the importance of knowing the 'Twist Factor' of a spun yarn. (02 Marks)

End of the compulsory question.

02. a) Describe the nature of raw cotton as it arrives the spinning mill. (04 Marks)
- b) State the importance of 'opening' and 'cleaning' actions in cotton spinning: (you may refer to your answer to 02.a) (03 Marks)
- c) With the help of a suitable diagram explain how the action of air currents is used in the 'Shirley Wheel' to open and clean cotton. (07 Marks)
03. a) Explain why 'bailing' is required after ginning of cotton fibres. (02 Marks)
- b) State the four (04) objectives of blending of different cotton fibres. (04 Marks)
- c) List four (04) fiber related properties considered when blending different cotton fibres. (02 Marks)
- d) Briefly explain the two (02) approaches used in feeder blending method. (06 Marks)

04. a) Illustrate the material path of a carding machine. Clearly label the key components. (05 Marks)
- b) State the four (04) objectives of a carding machine used in cotton spinning. (04 Marks)
- c) Using suitable illustrations explain how 'carding' action is realized between the cylinder and the flats. (05 Marks)
05. a) State the equations to calculate the 'Mechanical Draft' and 'Material Draft' of a carding machine. (02 Marks)
- b) Explain why the mechanical draft and material draft usually do not have the same value. (03 Marks)
- c) Details related to a carding operation are given below;
- Mechanical draft: 96
- Surface speed of the lap roller: 0.2 m/s
- Material draft: 100
- Lap count: 400 g per meter
- i. Calculate the percentage waste in the feed lap. (02 Marks)
- ii. Calculate the production of this card for an eight (08) hour shift. State all the assumptions you made when arriving at the answer. (07 Marks)
06. a) State the three (03) objectives of doubling. (03 Marks)
- b) List four (04) types of spinning machinery those employ the principal of drafting. (02 Marks)
- c) It is required to produce a 75/25 Cotton/Wool yarn. Explain how you would use the draw frame to facilitate this requirement. (03 Marks)
- d) Explain what is meant by a 'drafting wave' and how drafting waves are formed in cotton slivers. (06 Marks)
07. a) Explain why roving is introduced as an intermediary step in the spinning process as opposed to directly spinning the yarns from the sliver. (03 Marks)
- b) State three (03) differences between the drafting systems found on roving frames and draw frames. (03 Marks)

- c) With the help of a suitable diagram, explain why the twist take-up vary between the rovings produced on the front and rear rows of the same machine. (06 Marks)
- d) State four (04) possible functions of a roving operation that can be automated. (02 Marks)
08. a) State two (02) scenarios to show the influence of fibre properties on the twist given to yarns. (02 Marks)
- b) Discuss the importance of using a 'balloon control mechanism' in ring spinning. (04 Marks)
- c) State four (04) properties of a good traveler used in ring spinning. (02 Marks)
- d) Briefly describe the three (03) types of ring bobbin building motions. (06 Marks)

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