TXL221: Yarn Manufacture I

Major Test

Maximum Marks : 40

Date: May 09, 2018, Wednesday *Time: 10:30 am to 12:30 pm* *Venue: LH325*

Section B (Maximum Marks : 30)

Question No. 1: The following five questions are of numerical problem type. For each question, you will get three marks if you solve it correctly or zero mark if no solution or incorrect solution is shown. There is no negative or partial marking for these questions.

(i) A blowroom line consists of five machines. The total cleaning efficiency of the first four machines is 40 % and the cleaning efficiency of the last machine is 20 %. Calculate the overall cleaning efficiency (in %) of the blowroom line.

(ii) A carding machine produces a card sliver of 5 ktex count at a production rate of 20 kg/h. This carding machine has a doffer with 760 mm diameter whose wire points are locally damaged. The rotational speed of the doffer is 50 m/min. Calculate the wave length (in m) of the periodic mass variation in the card sliver as produced by the doffer.

(iii) A card sliver of 5.905 ktex count is produced by using cotton fibers of 0.16 tex mean fineness and 35.16 % coefficient of variation of fineness. Six such card slivers are fed to a drawframe where the draft is kept at 8. The drawframe machine produces a sliver with 2.5 % coefficient of variation of count. Calculate how much mass irregularity (CV in %) is generated by the drawframe.

(iv) Consider a drawframe with 4 over 4 drafting arrangement. If the total draft applied to the drawframe is 8, then what should be the individual drafts in the back, middle, and front zones?

(v) Cotton fibers of 28 mm length and 0.16 tex fineness are processed in two drawframe machines (A & B) separately. The parameters of the drawframe machines are given below.

Parameters	Drawframe A	Drawframe B
Feed sliver count	5 ktex	6 ktex
Drafting system	3 over 3	3 over 3
Draft (Back zone draft & Front zone draft)	6 (1.71 & 3.5)	8 (1.77 & 4.5)
Doubling	6	6
Roller setting	32 mm	32 mm

If X_A & X_B denote the drafting forces at the front zones of drawframe machines A & B, respectively, then calculate the ratio of X_A/X_B.

Question No. 2: The following three questions are of theoretical problem type. For each question, you will get five marks if you answer it correctly or partial marks for answering a part of the question correctly or zero mark for wrong or no answer. There is no negative marking for these questions.

(i) (a) Show graphically the behavior of coefficient of variation of sliver linear density against number of doubling. (b) Give mathematical justifications to this behavior. (c) Which types of mass variation are not suppressed by doubling? 1+3+1

(ii) (a) What is drafting force? (b) Show graphically how the drafting force would behave with the increase of draft. (c) State the reasons for this behavior. 1+1+3

(iii) (a) Why drawframe has been the preferred location for autoleveller? (b) Draw the block diagram of an open loop system of autoleveller. (c) Which type of mass variation is controlled by this autoleveller? 2+2+1