TXL221: Yarn Manufacture I

Major Test

Maximum Marks : 50

Date: May 02, 2019, Thursday

Time: 8:00 am to 10:00 am

Venue: LH108

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.

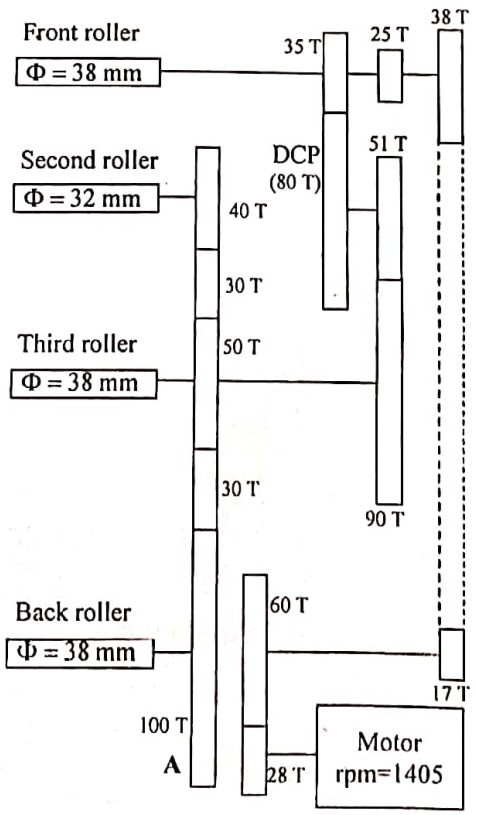
(i) A multimixer has 10 compartments (10×10 cells). Time required to fill a single cell is 3 s. Calculate the stabilized blending delay time (in s) of the multimixer.

(ii) Suppose a sliver consists of continuous filaments such that 50 % of the filaments are inclined at an angle of 20° from the sliver axis and the rest are parallel to it. If this sliver is tested for fiber orientation by using Lindsley's apparatus then determine the index of orientation of this sliver.

(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. Eight 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 10 then what should be the individual drafts in the back, middle, and front zones?

(v) The gearing diagram of a miniature drawframe is shown here. Calculate the wavelength (in m) of the periodic fault, assuming gear A (100 T) is faulty.

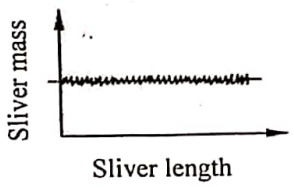


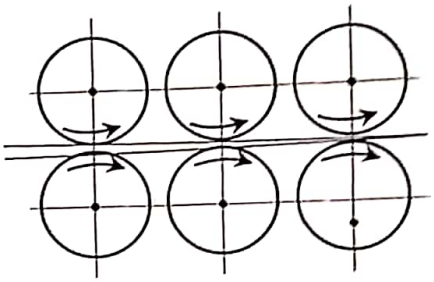
Question No. 2: The following three questions are of theoretical problem type. For each question, you will get five marks if you answer it correctly or partial marks for answering a part of the question correctly or zero mark for wrong or no answer. There is no negative marking for these questions.

(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) What are the two types of mass variation that are not suppressed by doubling? 1+3+1

(ii) (a) Draw the block diagram of a closed-loop drawframe autoleveller. (b) State two advantages of this autoleveller. (c) Illustrate the profile of correction length of this autoleveller. 3+1+1

(iii) The profile of mass variation along the length of a card sliver, which is fed to a 3-over-3 drafting system with an eccentric front bottom roller, is shown here.





(a) Draw the profile of mass variation along the length of the resulting drawn sliver. (b) Justify your drawing with proper reasons. (c) What would have happened to the mass variation of the drawn sliver, if the top roller instead of the bottom one, was eccentric? 1+3+1