TTL 714 Physical Properties of Fibers
Major Exam

Max Marks 40 **29-04-08**
Time 1 hr

Que 1. (a) Draw the absorption and desorption isotherms (Moisture regain vs RH) Curves for the following (on the same plot)-

(i) Scoured cotton
(ii) Mercerised Cotton (5 % NaOH Solution)
(iii) Mercerised Cotton (15 % NaOH Solution)
(iv) Mercerised Cotton (15 % NaOH Solution under tension)

Explain the differences between the curves for the four cases. (6)

(b) Give the molecular basis of hysteresis in moisture absorption of textile fibers. (3)

Que 2. Justify the following statements: (6)

(i) Heats of wetting at a given moisture regain increases with increasing hygroscopicity of fibers and is greatest at dryness and decreases with increase in moisture regain.

(ii) Calculate the time taken for a single fiber of 10 microns diameter to reach 80% of its final uptake of moisture. How much time a yarn made of 7 such fibers held tightly would take? Experimentally the time taken is about one hour. Explain. ($D \sim 10^{-7}$ cm^2/sec)

Que 3 (a) How will the dielectric constant of cotton and wool change with RH At two different frequencies (1 kc/sec and 100 kc/sec) ? (4)

(b) What are the problems caused by static generation in textiles? Discuss the ways by which these problems are removed. (6)

Que 4 Define the two parameters based on optical properties of fibers, which is a measure of molecular orientation in fibers. Elaborate the measurement technique to measure one of the above parameters. (4)

Que 5. Discuss the structure- property correlation of wool, silk and nylon with reference to the following properties-

(a) Moisture Regain
(b) Lustre
(c) Tensile behavior
(d) Elastic Recovery (as a function of sp stress & extension) (8)

Que 6. Heat setting not only imparts the dimensional stability but also affects the dyeability of synthetic textile materials ? Why? (3)