Que 1. Answer the following questions   (4x3= 12)

(a) To avoid the problem of fog marking the current needed to dissipate the static charge in weaving, carding and warping are 0.003 µA , 0.07 µA and 5 µA respectively. What can be the reason? How can the problem be eliminated?

(b) Explain the variation of dielectric property (permittivity 'ξ') of fibers-

     (i)   As a function of frequency (0.1 to 1000 KHz) at 65% RH for cotton fiber
     (ii)   Solvent extracted   and unextracted Polyester fiber

(c) Textile grade PET fiber has a birefringence of 0.170, while PP Fiber is only 0.030 and acrylic fiber has 0.00. Explain the reason for it. How can you compare their molecular orientation ?

Que 2. A fiber 25 microns in diameter requires 8 minutes for water to reach the center and equilibriate. How long will it take water to reach the center of a-

         (i)   very closely packed yarn of 7 of the same fibers
         (ii)   tightly packed yarn of 1000 fibers
         (iii)   loose yarn of 1000 fibers   (6)

Que 3. Show the variation of surface charge developed on slivers after carding for following fibers as a function of Moisture regain. Explain the difference in susceptibility of different fibers to static at 65% RH under same atmospheric conditions.

     Wool, Nylon, Cotton & Viscose   (6)

Que 4. Describe all the thermal transitions expected in an idealized fiber using modulus $(E' \, \& \, E'')$ vs temperature plot and discuss it with reference to Nylon, Polyester, Polyethylene and Polypropylene.   (8)

Que 5. Explain the role of fiber friction in influencing the handle, feel and wear resistance of fabrics, the behaviour of fiber during stitching of fabrics and the process of wool felting.

     How do you measure interfiber friction? Explain the principle involved.
                                                   (8)