DEPARTMENT OF TEXTILE TECHNOLOGY
MAJOR TEST. TTL711
POLYMER AND FIBRE CHEMISTRY

Date 2.12.06

TOTAL MARKS 40
TIME   2 HOURS

ANSWER ALL THE QUESTIONS

Q1 Account for the following (Do any five)   (2 X 5=10)

a) The catalysts used for PET polycondensation show different reactivity from beginning to the end of reaction.

b) For caprolactum polymerization the use of two tubes in series is advantageous compared to a single VK tube.

c) In general increasing the polymerization rate decreases the molecular weight in bulk polymerization, where as the reverse is true in emulsion polymerization

d) Polymerization rate and stereochemistry are more sensitive to solvent effects in ionic polymerization than in free radical polymerization.

e) The molecular weight distribution of polymer prepared from free radical is different than that obtained by anionic polymerization.

f) For determining the reactivity ratios the polymer conversion is limited to very low conversions (Typically 10-15%)

Q2 With the help of a neat diagram discuss the polymerization of nylon 6 in VK tube. (4)

Q3 Show by chemical equations the polymerization of Acrylonitrile by redox polymerization.
How is the above polymerization quenched in an industrial CSTR reactor?
Suggest a suitable approach to produce acid dyeable acrylic fibre polymer without using the dyeable comonomer.   (4+1+2=7)

Q4 What actions will you take to (Attempt any two)

   a) Manufacture Tyre grade PET polymer
   b) Differentiate between Radical and ionic polymerization
   c) Produce completely white PET   (2X2=4)

Q5. Explain how the structure of metallocene catalysts can determine the taeticity of the polypropylene.
                                                                                         (5)

Q6. Differentiate between the following:
   a) Inhibitors and retarders
   b) Design of DMT dissolution kettle and melting kettle

                                                                                         (2X3=6)

Q7.Derive the appropriate expression for Rp for thermal and redox initiated free radical polymerization
And explain how the rate is different in two cases.   (4)