MANIPAL
ACADEMY of HIGHER EDUCATION
(Deemed to be University under Section 3 of the UGC Act, 1956)

DEPARTMENT OF SCIENCES, IV SEMESTER M. Sc (CHEMISTRY)
END SEMESTER EXAMINATIONS, July 2020

POLYMER CHEMISTRY [CHM 5009]
(REVISED CREDIT SYSTEM-2017)

Time: 2 Hours | Date: 08-07-2020 | MAX. MARKS: 25

Note: (i) Answer **ALL** questions

(ii) Draw diagrams, and write equations wherever necessary

1. i) Explain the mechanism of action of a photo stabilizer in polymers with an example.
   ii) Write the structures of
   a) Cis and Trans form of polybutadiene
   b) Syndiotactic and Atactic polypropylene
   iii) Polystyrene is a tougher and stronger polymer than polyethylene. (2+2+1) M

2. i) Explain the reaction with conditions for the photo degradation of polyethylene.
   ii) Write the reactions with conditions for the interaction of polystyrene with
   a) Cyclohexene b) Fluorine
   iii) Nylon 6 showed higher T_g value than polyethylene. Explain why?
   (2+2+1) M

3. i) Write the gas phase polymerization reaction for the preparation of Poly p-xylene.
   ii) Give the industrial applications (Two each) of the following polymers:
   Polytertrafluro ethylene, Polyisobutylene, Polysulphides, Melamine formaldehyde resin
   iii) Give suitable reasons: Thermosetting polymers show poor plasticity compared to thermoplastics. (2+2+1) M

4. i) Explain the factors influencing the thermal degradation of polymers.
   ii) Write two each advantages and limitations of emulsion polymerization technique.
   iii) Write the reaction with conditions for the conversion of polyacrylamide into polyvinyl amine. (2+2+1) M

5. i) Discuss the synthesis of polycarbonates.
   ii) Write the reactions with the conditions for the interaction of polyvinylalcohol with
   a) Formaldehyde b) Ethylene oxide
   iii) As the crystallinity of a polymer increases its tensile strength increases but the permeability decreases. Explain why?
   (2+2+1) M