BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: BE **SEMESTER: III**
BRANCH: CHEMICAL ENGG.(Plastics & Polymer) **SESSION : MO/2019**

SUBJECT : CL213 MACROMOLECULAR SCIENCE

TIME: 2.00 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates may attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.

Q1 (a) What is gel point? How can we predict gel point in condensation polymerization? [2]

Q1 (b) Derive: $2c_0^2 kt = \frac{1}{(1-p)^2} - constant$ [3]

Q2 (a) For a bifunctional system if molecular weight of repeat unit is M_0 how much is the average molecular weight of the polymer in terms of extent of reaction p? [2]

Q2 (b) Derive $\left(\frac{[M1]}{[M2]}\right)_{copolymer} = \left(\frac{[M1]}{[M2]}\right)_{Feed} \times \frac{r_1[M1]+[M2]}{[M2]r2+[M1]}$ [3]

Q3 (a) Elaborate the effect of cage upon rate of radical polymerization. [2]

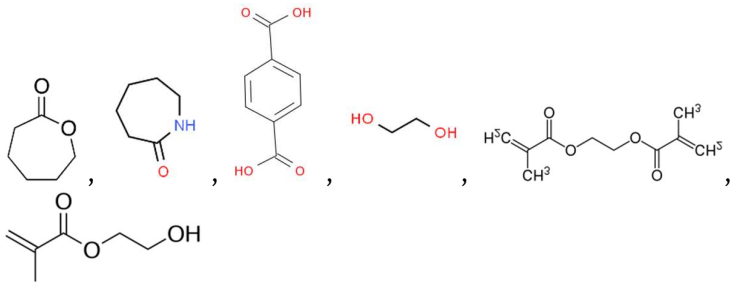
Q3 (b) Derive $R_p = \frac{K_p}{k_t^{1/2}} \times \sqrt{\frac{1}{2}R_i} \times [M]$ [3]

Q4 (a) What are the disadvantages of self -catalyzed condensation polymerization? [2]

Q4 (b) Derive $F_1 = \frac{(r_1 f_1^2 + f_1 f_2)}{(r_1 f_1^2 + 2 f_1 f_2 + r_2 f_2^2)}$ [3]

Q5 (a) Define initiator efficiency. Explain its importance. [2]

Q5 (b) How many polymers may be formed of the following monomers at the most? Write down the repeat unit structure and name of the possible homopolymers formed of the following monomers: [3]



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