

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

CLASS: BE
BRANCH: CHEMICAL ENGG. (PLASTICS & POLYMER)

SEMESTER : III
SESSION : MO/19

SUBJECT: CL213 MACROMOLECULAR SCIENCE

TIME: 3.00Hrs.

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Explain the principle of equal reactivity of functional groups with suitable examples. Analyze the deviation from linearity in the plot showing $1/(1-p)]^2$ vs t. [2+3]
- Q.1(b) Derive the kinetic expression of alternating copolymerization. Define the parameters used in the derivation clearly. [5]
- Q.2(a) How can you predict gel point using Carother's equation? Illustrate the limitations of this equation. [3+2]
- Q.2(b) Compare between Emulsion, bulk and suspension polymerization methods in respect of at least five important parameters. [5]
- Q.3(a) Describe the steps of anionic polymerization of styrene. [5]
- Q.3(b) Natural rubber, though has molecular weight >1lakh, is considered as crystalline---Justify the statement. [5]
- Q.4(a) Demonstrate the importance of solubility parameter of polymers while solution casting of it. [5]
- Q.4(b) Illustrate stereoregular polymerization of polypropylene mentioning the typical example of catalyst used. [5]
- Q.5(a) Recall the principle used in gel permeation chromatography. How do we determine MWD by using this? [2+3]
- Q.5(b) Calculate PDI for the polymer system given below: [5]
Mi=20000 to 170000 with an interval of 50000, Ni=1200 to 2800 at the interval of 800.

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