

M.Sc. DEGREE EXAMINATION NOVEMBER 2008
BRANCH IV - CHEMISTRY
THIRD SEMESTER

COURSE : SPECIALISATION
PAPER : POLYMER CHEMISTRY
TIME : 30 MINUTES MAX. MARKS : 20

SECTION – A

TO BE ANSWERED ON THE QUESTION PAPER ITSELF.

Answer all questions: (20 x 1 = 20)
Choose the correct answer:

1. A polymer containing two identical configurational units and one which is enantiomeric to these units in the main chain is called
a) Isotactic b) Syndiotactic c) Atactic d) Heterotactic
2. Oligomers are chain like molecules with
a) only one repeating unit b) large member of repeating units
c) A few repeating units d) none
3. Inhibitors are chemical substances capable of inhibiting the chain growth by
a) degrading the growing chain b) adsorption on the growing chain
c) combining with the active free radicals d) none of the above
4. The insoluble and infusible polymer formed by polymerization of a bifunctional and a monofunctional monomer is called
a) branched polymer b) stereospecific polymer c) gel d) none
5. Almost all the active sites of the catalyst are utilized during polymerisation in the case of
a) Heterogeneous catalysts b) Zeolites
c) Homogeneous catalysts d) Autocatalysts.
6. A polymer sample with 60 moles of molecules with M equal to 40,000 and 40 moles of molecules with M equal to 1,00,000 will have \bar{M}_n
a) 6,400 b) 64,000 c) 51,000 d) 60,400
7. In the Ostwald viscometer
a) the density b) viscosity c) flow time d) colour
8. A ductile plastic such as polyethylene
a) exhibits yielding b) does not yield much
c) Breaks at high elongation d) None

9. The liquid crystalline polymers which have only longitudinal orientation are called
a) Smectic b) Nematic c) Cholestric d) discotic
10. Vulcanization of natural rubber by sulphur makes it
a) water solute b) Soft c) Hard d) less elastic

Fill in the Blanks:

11. The polymerization involving exchange reaction where the alkylidene moieties of the reactant molecules are redistributed through the cleavage and re-forming of olefinic double bonds is called _____ polymerization.
12. In the GPC technique for the determination of MW of a polymer, the _____ polymer gets eluted from the column first.
13. Crystalline polymers usually form solutions above their melting point because _____ only at high temperatures.
14. _____ of a polymer is obtained by determining its degree of swelling in various solvents.
15. Polybutadiene has _____ chain, whereas polystyrene has _____ chain.

Write the answer in one or two line :

16. What are coordination polymers?
17. What is the major advantage of suspension polymerization?
18. What is the relation between the MW of a polymer and its impact strength?
19. What do you mean by upper and lower critical solution temperatures?
20. What is curing?



STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2006-07 & 2007-08)

SUBJECT CODE : CH/PS/PL34

M.Sc. DEGREE EXAMINATION NOVEMBER 2008

BRANCH IV - CHEMISTRY

THIRD SEMESTER

COURSE : SPECIALISATION
PAPER : POLYMER CHEMISTRY
TIME : 2½ HOURS MAX. MARKS : 80

SECTION - B

ANSWER ANY FIVE QUESTIONS: (5 x 8 = 40)

1. What are branched high polymers? Explain using suitable examples.
2. Give a brief account of group transfer polymerization.
3. Explain the weight average concept of MW of a polymer using suitable example and derive the general expression for the weight average molecular weight of a polymer.
4. Illustrate how the number average molecular weight of CTPB can be determined by end group analysis.
5. Discuss briefly about the Flory-Huggins theory of the thermodynamics of polymer solutions.
6. Explain how the crystallinity behaviour of polymers is explained by Fringed Micelle model.
7. Show how the Maxwell and Voigt-Kelvin models explain the viscoelastic deformation of polymers.

SECTION – C

ANSWER ANY TWO QUESTIONS (2X20=40)

8. Derive an expression for the
 - i) rate of polymerization of a free radical chain polymerization
 - ii) the kinetic chain length
9.
 - i) Give an account of the functionality of monomers and show how it influences the nature of the polymer. (5)
 - ii) The intrinsic viscosity of polymethylacrylate is 2.49 dl/g as determined in its benzene solution at 30°C. The 'K' and 'a' value are 8.630×10^{-5} dl/g and 0.725 respectively. Determine the viscosity average molecular weight of this polymers. (5)
 - iii) Describe the concept involved in the determination of \bar{M}_n of a polymer by membrane osmometry. (10)
10. Discuss briefly about the glass transition temperature (T_g) of a polymer. Describe the procedure involved in the determination of T_g by dilatometric technique and discuss the data obtained for amorphous, partially crystalline and crystalline polymers.

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