AAC-2114   Seat No. _____

M. Sc. (Sem. IV) Examination

March - 2019

Physical Chemistry : CHN - 703(P)

Time : 3 Hours]   [Total Marks : 70

Instructions : (1) Attempt all questions.

(2) All questions carry equal marks.

1 **(a)** Write a note on any two of the following :   10

(1) Mechanism of step polymerization considering examples.

(2) Derive copolymerization equation in terms of mole fraction.

(3) Write a note on kinetics of free radical copolymerization.

(4) Explain Q.C. scheme of Alfey and price for determination of Reactivity Ratio.

(b) Do any one of the following :   4

(1) Calculate r_1 and r_2 for a copolymer for which Q is 1.15, 1.00 and e is 0.77, -0.80.

(2) Calculate reactivity ratios for the copolymerization reaction between following pair of monomers :

Monomer	Q	e
1,3 Butadiene	2.39	-1.05
Methyl Methacrylate	0.79	0.40

2 **(a)** Attempt any **two** of the following :   10

(1) Explain interfacial polymerization as a technique for polymer synthesis.

(2) Explain various weight distribution methods used in polymer fractionalization.

(3) Use light scattering technique and determine the average molecular weight polymer.

(4) Determine Mn and Mw using Gel permeation chromatography.

(b) Do any **one** of the following :   4

(1) Calculate Mv for polymethyl, Methacrylate from the following data.

(where $t_0 = 216,00$, K = 8.5×10^{-5} and a = 0.75)

Concin g/kg	0.2715	0.1940	0.1509	0.1235	0.1405
Flow time in Sec.	460	378	338	312	296

(2) A protein sample consists of an equimolar mixture of haemoglobin (M = 15.5 kg/mole), ribonuclease (M = 13.7 Kg/mole) and Myoglobin (M = 17.2 kg/mol). Calculate the number average and mass average masses. Which is greater ?

3 (a) Attempt any **two** of the following : **10**

(1) Define Rheology and discuss its importance in polymer studies.

(2) Discuss deformation behaviour and classify polymeric materials using Burger model and Brownian movement concept.

(3) Write a note in all methods of fiber forming.

(4) Explain deformation behaviour in polymer using any model.

(b) Write any **one** of the following : **4**

(1) Compounding and casting.

(2) Vogoit's model.

4 (a) Attempt any **two** of the following : **10**

(1) Discuss various methods involved in chemical testing of polymers.

(2) What information can be obtained from interpretation of IR spectra of polymers ?

(3) Explain microscopy as one of essential tools for characterization of polymer.

(b) Do any **one** of the following : **4**

(1) Elasticity Testing in polymer.

(2) Role of Microscopy in polymer characterization.

5 Give the answer : (any **seven**) **14**

(1) What is σ values ?

(2) Define the LFER.

(3) IBM and EBM in Elastomers.

(4) Role of Polarimetry in polymer characterization.

(5) Purification of Monomers.

(6) Newtonian equation.

(7) Colligative property.

(8) Effect of crystallinity on the properties of polymer.

(9) Hook's model.

(10) Blow casting.

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