**Organic Materials Engineering**

**3rd exam**

#1

20 pt

## (a) Block Copolymer **(10)**

Chapter 5 PPT

pp. 3-6.

POINT

1) definition **(4)**

2) Step copolymerization **(2)**

3) Anionic polymerization **(2)**

4) Living radical polymerization

(copolymerization via ATRP) **(2)**

## (b) Dendrimer **(10)**

Chapter 5 PPT

pp. 65, 68-71.

POINT

1) definition **(4)**

2) divergent approach **(3)**

3) convergent approach **(3)**

#2

20 pt

## (a) Low Molecular Weight Surfactant **(7)**

Chapter 5 PPT

pp. 7-15.

POINT

CMC **(2)**

hydrophilic head/hydrophobic tail **(2)**

HLB method **(1)**

Geometric Factors(CPP) **(2)**

## (b) Block Copolymers **(7)**

Chapter 5 PPT

p. 9, 16

POINT

similar to low Mw surfactant **(5)**

length and ratio of polymer segments **(2)**

## (c) Dendrimers **(6)**

Chapter 5 PPT

pp. 79-80.

POINT

unimolecular micelle
(Not to require micellization condition) **(4)**

braching unit – aliphatic chain

(hydrophobic) **(1)**

terminal groups – carboxylic acid

(hydrophilic) **(1)**

#3

30 pt

## (a) water/oil ratio **(10)**

Chapter 5 PPT

pp. 47-49.

POINT

phase diagram **(3)**

the different nature of the PEO-water and PPO-xylene interactions **(3)**

Micelle Micellar-cubic Hexagonal Gyroid Lamellar Reverse-G Reverse-H Reverse-C Reverse-M **(4)**

## (b) Mw of block copolymer **(10)**

Chapter 5 PPT

pp. 50-51.

POINT

increase the block segregation and the tendency for organization **(5)**

the dependence of the lamellar characteristic spacing on the polymer MW

d ~ N1/2 **(5)**

## (c) block copolymer composition **(10)**

Chapter 5 PPT

p. 52

POINT

affects their hydrophile/lipophile ratio and self-assembly properties **(10)**

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#4

30 pt

## (a) Differences in Flory parameter **(10)**

Chapter- 5 PPT

pp. 18-20.

POINT

written in terms of solubility parameter(δ) **(4)**



aggregation of the rigid segments into (liquid-)crystalline domains **(4)**

(δA’-δB)2> (δA –δB)2 **(2)**



## (b) Differences in self-assembly behavior **(20)**

Chapter 5 PPT

pp. 21-23.

POINT

i) TLC🡪i > Tg for polymer melt **(7)**

ii) TLC🡪i < Tg for polymer melt **(7)**

ii) polymer solution **(6)**



#5

30 pt

Challenge

#6

10 pt

Bonus

If you wrote **(10)**