THE OPEN UNIVERSITY OF SRI LANKA

B Sc Degree/ Stand Alone courses in Science

LEVEL 5 - ASSIGNMENT TEST III 2013/2014

CMU 3233– POLYMER CHEMISTRY

DURATION : One Hour

DATE : 24th September 2014 TIME : 14.30 p.m. to 15.30 p.m.

This Assignment test paper consists of two parts, A and B. Part A consists of 10 MCQ and part B consists of two structured type questions. You need to hand over only part B with the MCQ answer sheet.

- The use of a non – programmable electronic calculator is permitted.
- Logarithm tables will be provided.

Avogadro constant, (L)	$= 6.022\times10^{23}$ mol^{-1}
Plank constant, (h)	$= 6.63 \times 10^{-34}$ Js
Velocity of light, (c)	$= 3 \times 10^{8}$ ms^{-1}
Standard atmospheric pressure, (π)	$= 10^{5}$ Pa(Nm^{-2})
Gas Constant (R)	$= 8.314$ J mol^{-1} K^{-1}
Faraday constant (F)	$= 96{,}500$ C mol^{-1}
Log_e (x)	$= 2.303\ \text{Log}_{10}$ (x)

PART A – Answer all questions. (30 marks)

- Answer all questions
- Choose the most correct answer to each question and mark a cross" X" over the answer on the given answer sheet.
- Use a PEN (not a pencil) in answering.
- Any answer with more than one cross will not be counted.
- 1/6th marks will be deducted for each incorrect answer

1). Oxidative degradation results in
(a) discoloration (b) surface changes (c) hardening

The correct statement/s is/are,
1. (a) only 2. (b) only 3. (c) only 4. (a) and (b) only 5. (a), (b) and (c)

2). Which statement is **not** true about poly(vinyl acetate)?
1. It is prepared by bulk polymerization using vinyl acetate as a monomer.
2. It is prepared by suspension polymerization using vinyl acetate as a monomer.
3. It is prepared by emulsion polymerization using vinyl acetate as a monomer.
4. It is prepared by solution polymerization using vinyl alcohol as a monomer.
5. It is used to manufacture poly (vinyl alcohol) by hydrolysis.

3). Which statement is **not** true about field latex?
1. It is a colloid.
2. It is a basic solution.
3. It contains mostly water.
4. Iso electric point is in between 4.5-5.0.
5. If left unattended, undergoes gradual thickening and finally causes coagulation.

4) Ribbed smoked sheets (RSS) are graded as RSS1, RSS2, RSS3...etc due to its
1. color. 2. refractive index. 3. density. 4. mass. 5. size.

5) Which statement is **true** about thermoplastics?
1. They are hard and brittle.
2. They are formed by step growth polymerization.
3. They have cross linked three dimensional networks.
4. They can be softened by heating.
5. They are not soluble in any solvent.

6). The correlation between polydispersity factor, $\frac{\bar{M}_W}{\bar{M}_n}$ and the percentage conversion, p can be represented as

1. $\frac{\bar{M}_W}{\bar{M}_n} = p$ **2.** $\frac{\bar{M}_W}{\bar{M}_n} = (1-p)$ **3.** $\frac{\bar{M}_W}{\bar{M}_n} = (1+p)$ **4.** $\frac{\bar{M}_W}{\bar{M}_n} = 2p$ **5.** $\frac{\bar{M}_W}{\bar{M}_n} = (p-1)$

7). With few assumptions, it was confirmed experimentally that considering the kinetics of free radical polymerization, the order of the reaction is

1. one. 2. zero. 3. two. 4. between one and two. 5. between one and zero.

8). Which statement is **true** about free radical polymerization?
1. The rate of reaction decreases with increase of temperature.
2. The rate of reaction increases with increase of temperature.
3. The rate of reaction doesn't change with temperature.
4. The chain length increase with increase of temperature.
5. The chain length doesn't change with temperature.

9). According to standard symbols, which relationship is true at ceiling temperature?

1. $k_{dp}[M]=k_p$ **2. 1.** $k_p[M]^2=k_{dp}$ **3.** $k_p[M]=k_{dp}$ **4.** $k_{dp}[M]=2k_p$ **5.** $k_p[M]=2k_{dp}$

10). In cationic polymerization,
1. the degree of polymerization increases with decrease in temperature.
2. the degree of polymerization increase with increase in temperature.
3. the degree of polymerization doesn't change with the temperature.
4. The rate of reaction increases with decrease in temperature.
5. The rate of reaction doesn't change with the temperature.

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MCQ ANSWER SHEET: Mark a cross (x) over the most suitable answer.

Index No. | |

		Marks
Unanswered		
Correct Answers		
Wrong Answers		
Total		

1.	1	2	3	4	5	2.	1	2	3	4	5	3.	1	2	3	4	5
4.	1	2	3	4	5	5.	1	2	3	4	5	6.	1	2	3	4	5
7.	1	2	3	4	5	8.	1	2	3	4	5	9.	1	2	3	4	5
10.	1	2	3	4	5												

PART B – Answer all questions only in the space provided. Attached sheets will not be graded. (70 marks)

01.(a) What is meant by auto coagulation in rubber latex? Explain how it happens?

(09 marks)

(b) i. What is meant by photo degradation?

(02 marks)

ii. How do you prevent photo degradation? Discuss.

(08 marks)

(c) i. What is meant by thermal degradation?

(02 marks)

ii. "Teflon possesses high thermal stability" Explain the statement.

(d) i. Name three properties of HDPE? **(03 marks)**

ii. What are the methods of producing HDPE? Explain. **(03 marks)**

(08 marks)

02. (a) i. Write down Carother's equation for a 1:1 bi functional reaction mixture. Identify the terms used.

(05 marks)

ii. Describe the effect on degree of polymerization when mono functional impurities are present in bi functional reaction mixture? Illustrate with an example.

(10 marks)

iii. Calculate the percentage conversion of polyethylene from ethylene? Molecular weight of polyethylene sample is 56,0000 g/mol.

(10 marks)

(b) Explain the kinetic interpretation of auto acceleration with steady state assumptions?

(10 marks)