



The Open University of Sri Lanka

B Sc Degree/ Stand Alone courses in Science – 2008/09

CHU 3238/CHE 5238 – Polymer Chemistry – Level V

Assignment Test II

Date : Tuesday 24th February 2009

Time : 4.00 pm – 5.30 pm

- Answer all the questions.
- Choose the most correct answer to each question and mark this answer with an "X" on the answer script.
- Use a PEN (not a pencil) in answering.
- Any question with more than one answer will NOT be counted.
- 1/6th marks will be deducted for each incorrect answer.
- The use of a non-programmable electronic calculator is permitted.
- Logarithm tables will be provided.

Gas Constant (R)	=	8.314 J K ⁻¹ mol ⁻¹
Avogadro Constant (L)	=	6.023 x 10 ²³ mol ⁻¹
Planck Constant (h)	=	6.63 x 10 ⁻³⁴ Js
Velocity of light (C)	=	3.0 x 10 ⁸ ms ⁻¹
Atmospheric Pressure (π)	=	10 ⁵ Pa (Nm ⁻²)
Faraday constant (F)	=	96,500 C mol ⁻¹
Log _e (X)	=	2.303 log ₁₀ (X)

PART A - Answer all questions.
(60 marks)

1. HDPE is a polymer having
 - 1) low density, low softening point and low permeability.
 - 2) high density, high softening point and low permeability.
 - 3) low density, low softening point and high permeability.
 - 4) high density, high softening point and high permeability.
 - 5) high density, low softening point and low permeability.

2. Field latex can be coagulated by adding
 - 1) 1% ammonia solution.
 - 2) concentrated sulphuric acid.
 - 3) buffer solution of pH 7.
 - 4) 1% acetic acid.
 - 5) 1% alkali solution.

3. Ribbed Smoked Sheets (RSS) are graded as RSS₁, RSS₂,.....etc. according to their
 - 1) elasticity.
 - 2) dryness.
 - 3) impurities.
 - 4) thickness.
 - 5) color.

4. Zinc oxide is added in the rubber formulation to
 - a) form zinc complex with accelerator and sulphur.
 - b) reduce activation energy of the vulcanization process.
 - c) enhance the rate of the reaction.

- The correct statement/s is/are
 - 1) a and b only.
 - 2) b and c only
 - 3) a and c only
 - 4) All of above.
 - 5) None of the above.

5. Beaching of field latex can be done by adding
 - 1) water.
 - 2) thiols.
 - 3) ammonia.
 - 4) phenol.
 - 5) sulphur.

6. In the vulcanization process, sulphur is used as
 - 1) an antioxidant.
 - 2) an activator.
 - 3) an accelerator.
 - 4) as a cross linking agent.
 - 5) a inhibitor.

7. Thermosets can be formed by
 - 1) condensation polymerization.
 - 2) anionic polymerization.
 - 3) free radical polymerization.
 - 4) coordination polymerization.
 - 5) cationic polymerization.

8. Thermoplastics
 - 1) have cross linked three dimensional structure.
 - 2) are hard and brittle.
 - 3) are long chain linear polymers.
 - 4) are insoluble in any solvent.
 - 5) cannot be soften by heating.

9. HDPE have

- a) amorphous structure. b) crystalline structure. c) low permeability.

The correct statement/s is/are

- 1) a only. 2) b only 3) c only 4) a and c only. 5) b and c only.

10. Syndiotactic polymers can be represented as

- 1) ||||| 2) ddddddd 3) dkldldldl 4) dddldldll 5) |||||ddll

11. What statement is true about T_g ?

- 1) Polymers with bulky groups have low T_g .
2) Polymers having cross links have low T_g .
3) Polymers with flexible chains have high T_g .
4) Polymers with flexible chains have low T_g .
5) Rigid chain polymers have low T_g .

12. Polymers with inflexible chains have

- a) high T_g b) low T_g c) high T_m d) low T_m

The correct statement/s is/are

- 1) a and b only. 2) b and c only 3) c and d only 4) a and c only.
5) a and d only.

13. Crystallization of polymers occur when

- 1) the temperature is higher than T_g . 2) rapid cooling from melt.
3) the temperature is below its melting point. 4) the temperature is above its melting point.
5) arranging of chains in random ways.

14. The relationship between the molar mass (M) of a polymer and the T_g is given by

- 1) $T_g^\alpha = T_g - \frac{k}{M}$ 2) $T_g^\alpha = T_g + \frac{k}{M}$ 3) $T_g^\alpha = T_g + \frac{2k}{M}$
4) $T_g^\alpha = T_g - \frac{2k}{M}$ 5) $T_g^\alpha = T_g + 2\frac{k}{M}$

15. Consider following statements regarding melting points of crystalline polymers?

- a) Intermolecular bonding of polymers enhances the melting point.
b) Polymers with bulky side chains have high melting points.
c) Polymers with flexible groups have high melting points.

The correct statement/s is/are

- 1) a only. 2) b only 3) c only 4) a and b only. 5) a and c only.

16. For asymmetrical polymers, the relationship between the T_g & T_m is

- 1) $T_g = T_m$. 2) $T_g = \frac{1}{2} T_m$. 3) $T_g = \frac{2}{3} T_m$. 4) $T_g = 2T_m$. 5) $T_g = 3T_m$.

17. T_g can be measured using

- 1) IR Spectroscopy. 2) Differential Thermal Analysis. 3) Dilatometry.
4) Differential Scanning Colorimetry. 5) All of the above.

18. Presence of an aromatic ring in the polymer chain backbone

- 1) decreases T_g . 2) increases T_g . 3) doubles the value of T_g .
4) tripple the value of T_g . 5) doesn't change T_g .

19. Stereoregular polymers are

- a) isotactic b) atactic. c) syndiotactic

The correct statement/s is/are

- 1) a only. 2) b only 3) c only 4) a and b only. 5) a and c only.

20. The degree of crystallinity of a polymer is given by

- 1) $\rho - \rho_a$ 2) $\rho + \rho_a$ 3) $\frac{\rho - \rho_a}{\rho_c - \rho_a}$ 4) $\frac{\rho + \rho_a}{\rho_c + \rho_a}$ 5) $2 \frac{\rho + \rho_a}{\rho_c + \rho_a}$