Assignment 6
The due date for submitting this assignment is ______.

1. Two ends of each polymer molecule of a sample of Hevea are capped with —COOH group. A g of the sample is to be dissolved in 100 ml of chloroform for analysis with a spectrophotometer.

   a. What is the linear weight of the polymer?
   b. What is the weight of COOH groups attached to the polymer?

2. A sample serves to determine weight average molecular weight (M_w) of a 10% sample. The values in the range 1 x 10^3 to 1 x 10^6 g/mol. If the following methods, which is the most appropriate method to be employed?

   a. Dynamic pressure measurement
   b. Light scattering method
   c. Viscometry measurement
   d. Gel permeation chromatography

3. Which of the following methods can be applied to determine complete molar mass distribution of polymer sample?

   a. Dynamic pressure measurement
   b. Light scattering method
   c. Viscometry measurement
   d. Gel permeation chromatography

4. A list of different molecular weight measurement techniques is provided below. 

   a. Dynamic pressure measurement
   b. Viscometry measurement
   c. Light scattering method
   d. Gel permeation chromatography
   e. Ultraviolet absorption
   f. NMR

5. Which of the above methods can be used to determine absolute value of number average molecular weight (M_n)?

   a. All of these except a and b
   b. Only method a and c
   c. a, b, c, d
   d. a, b, c, d, e

6. From the elution pattern of the GPC plot, the following information can be obtained.

   a. M_n, M_w, and M_o
   b. M_n, M_w, and M_o, and P<sub>H</sub>
   c. M_n, M_w, and P<sub>H</sub>
   d. M_n, M_w, and P<sub>H</sub>, and P<sub>L</sub>

7. In MALDI-TOF MS of polymers, a mass is used to?

   a. Capture the polymer in active phase
   b. Measure the polymer molecule
   c. Segment the molecules
   d. Measure the number of change in polymer

8. NMR is used for determination of one of the following polymer attributes. Identify them.

   a. Carboxyl content
   b. Weight ratio of the polymer
   c. Degree of polymerization in a homopolymer
   d. Ratio of structure of a polymer

9. The linear weight of a polymer determined by an osmometric measurement is 1 x 10^3 g/mol at 25°C. The value of intrinsic viscosity in water at a polymer concentration of 1.5 g/ml at 25°C is 800 ml/g.

10. The solubility values (in mL) of a polystyrene sample in THF are given below.

    | Polystyrene | Concentration (g/ml) | Solubility (mL) |
    |-------------|---------------------|----------------|
    | 0.1         | 1.5                 | 10             |
    | 0.5         | 1.0                 | 50             |
    | 1.0         | 0.8                 | 100            |

   a. What is the concentration (g/ml) for which the solubility is 25 mL?

11. The solubility of the sample is given below.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Concentration (g/ml)</th>
<th>Solubility (mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>1.5</td>
<td>10</td>
</tr>
<tr>
<td>0.4</td>
<td>1.0</td>
<td>50</td>
</tr>
<tr>
<td>0.8</td>
<td>0.8</td>
<td>100</td>
</tr>
</tbody>
</table>

   a. What is the concentration (g/ml) for which the solubility is 25 mL?