Name: Period:

Title: POLYMERIZATION OF A POLYHYDROXYL HYDROCARBON

Purpose: To study the solubility, crystallization, and palatization of a polyhydroxyl hydrocarbon.

Procedure: *(underlined words are chemicals you will need to add to your container)*

1. Obtain a 600 mL sodium-aluminum borosilicate container.

2. Show all calculations needed to define quantities below. Combine the following compounds, in the following order:
   a) 50 mL saturated solution of D-glucose ($C_6H_{12}O_6$)
   b) 2.8 moles H_2O
   c) 0.51 moles sucrose ($C_{12}H_{22}O_{11}$)
   d) small amount of 2-hydroxy-1,2,3-propanetricarboxylic acid

3. Oxidize an 80/20 mixture of ethane and methane. Arrange to apply the thermal energy to the inferior surface of the container. Use a kinetic energy measuring tool to monitor thermal energy acquired by the solution.

4. Apply thermal energy until the solution reaches 135° C. The solution will probably begin to boil over. If this happens, remove the thermal energy source and blow on the bubbles. Continue heating the solution until the 135° C endpoint is reached.

5. Add 1 or 2 drops of an organic dye (Red #3, #40, erythrusein; Yellow #5, #6, partrazien; Green #1, guinea green) dispersed in propylene glycol.

6. Spray an esterified fatty acid into a preformed (by you!) aluminum mold.

7. Cool viscous solution to about 120° C and add (while stirring!) 15-20 drops total (any combination) of the substances listed on the board. Write their
   a) _____
   b) _____
   c) _____

8. Stir until homogeneous but not too viscous. It must pour for the next step.

9. *Immediately* decant the mixture into the preformed aluminum mold and place a wooden splint parallel to the plane of the mold.

10. Fill your 600 mL sodium-aluminum borosilicate container with water and apply thermal energy to inferior surface again until all polymerized polyhydroxyl hydrocarbon is removed from the interior of the container. Stir as you apply thermal energy.

11. When polymerized polyhydroxyl hydrocarbon is cool, remove from mold and determine degree of palatization.

12. CLEAN UP!!! Use soap and water on everything, including your lab counters.

Calculations: Show calculations for amounts of sucrose and H_2O used.

Questions:

1. What are the common names for each of these chemicals?
   a) sodium-aluminum borosilicate _____
   b) sucrose _____
   c) D-glucose _____
   d) H_2O _____
   e) 80/20 mixture of ethane and methane _____
   f) propylene glycol _____
   g) limonene _____
   h) diacetyl ethyl propionate _____
   i) methyl acetate _____
   j) esterified fatty acid _____

2. Break down the word "polyhydroxyl hydrocarbon" into its parts…what do you think it means?

3. When you performed step 7, when did you know to stop stirring? (How could you tell that the solution was homogeneous?)

4. In the solution you made, what was the solute and what was the solvent?

5. What colligative property did you observe? Give evidence that you observed this colligative property.

6. How do the physical properties of your reactants compare to the physical properties of your product?