Lab Partner:_____ Name:_____

_____

Composition of each Hand Cream

Ingredients	Mixture 1	Mixture 2	Mixture 3	Mixture 4
Polar Ingredients				
Water	25 mL	25 mL	25 mL	25 mL
Triethanolamine	1 mL	1 mL	1 mL	-
Propylene glycol	0.5 mL	0.5 mL	-	0.5 mL
Nonpolar Ingredients				
Stearic Acid	5 g	5 g	5 g	5 g
Methyl Stearate	0.5 g	0.5 g	-	0.5 g
Lanolin	4 g	4 g	4 g	4 g
Mineral Oil	5 mL	-	5 mL	5 mL

Part 1 – Preparation of the Hand Creams

Mixture	Record any observations you make while preparing the hand creams.
Mixture #1	
Mixture #2	
Mixture #3	
Mixture #4	

Part 2 – Characterization of the Hand Creams

Hand Cream	pH	Smoothness	Appearance	Homogeneity
Mixture #1				
Mixture #2				
Mixture #3				
Mixture #4				

Questions

1. Describe the properties of hand cream mixture #1, which contained all of the necessary ingredients.

2. Explain how the properties of hand cream mixture #2 differed from those of #1.

3. Based on your observations, what is the function of mineral oil in a hand cream?

4. Explain how the properties of hand cream mixture #3 differed from those of #1.

5. Based on your observations, what is the function of propylene glycol and methyl stearate in a hand cream?

6. Explain how the properties of hand cream mixture #4 differed from those of #1.

7. Based on your observations, what is the function of triethanolamine in a hand cream?

8. The structure of triethanolamine is $N(CH_2CH_2OH)_3$. Stearic acid is an 18-carbon saturated fatty acid. Write the equation for the acid-base reaction between triethanolamine and stearic acid. Name the salt formed. (This salt is the emulsifying agent in the hand creams you made.)

9. If triethanolamine was omitted in the hand cream, what would be the consequence? Explain in chemical terms.

10. Do you think it would be possible to prepare a hand cream without water? Explain why or why not.

11. Draw the structures of methyl stearate and propylene glycol. Which one is polar, and how can you tell? Which is nonpolar and how can you tell?

12. If a hand cream appeared smooth and uniform after you prepared it, but after a week of storage most of the water and most of the oil separated, what do you think must have gone wrong with the preparation?