FLINN SCIENTIFIC

Name_____

Physical Properties of Proteins

Results and Discussion

Data Table A. *Solubility and Protein Denaturation*

Effect of Strong Acid and Base				
Test Tube		**1**	**2**	**3**
Protein Solution		**Albumin**	**Casein**	**Gelatin**
Initial Appearance				
Effect of HCl Addition	**2 drops**			
	5 drops			
	10 drops			
	10 drops			
Effect of NaOH Addition	**5 drops**			
	10 drops			

Effect of Inorganic and Organic Additives			
Test Tube	**1**	**2**	**3**
Additive	**$CuSO_4$**	**$AgNO_3$**	**Isopropyl Alcohol**
Results			

Data Table B. *"Salting Out" with Ammonium Sulfate*

	Observations
Effect of Ammonium Sulfate	
Test Tube 1 (Albumin + $CuSO_4$)	
Test Tube 2 (Filtrate + $CuSO_4$)	
Test Tube 3 (Redissolved solid + $CuSO_4$)	

Data Table C. *Effect of Heat*

	Temperature	Additional Observations
Initial temperature (water bath)		
First signs of precipitate appeared		
Solution appeared milky white		
Final observations		

Post-Lab Questions

Use a separate sheet of paper to answer the following questions.

1. Compare and contrast the effect of strong acid (2.5 M HCl) on albumin, casein, and gelatin. Which protein was most sensitive to the action of strong acid? Least sensitive?
2. Do strong acid and strong base have similar effects on protein solubility and denaturation? Explain.
3. Which metal salts ($CuSO_4$ and $AgNO_3$) caused albumin denaturation? Relate this observation to the fact that silver salts are more toxic than copper salts.
4. You have just been to the doctor's office to receive an inoculation. Before administering the injection, the doctor wipes the area with an alcohol swab. Do your results for the effect of alcohol on albumin denaturation support the use of isopropyl alcohol as a disinfectant?
5. The reaction of $CuSO_4$ with proteins in strong base is used as a color test to identify proteins. What do the results obtained in Part B for the reaction of $CuSO_4$ with albumin and the filtrate tell you about the effectiveness of the "salting out" procedure with ammonium sulfate?
6. Is the denaturation of albumin by ammonium sulfate reversible or irreversible? Explain on the basis of your observations for the reaction of $CuSO_4$ with albumin (test tube 1) and the redissolved precipitate (test tube 3), respectively, in Part B.
7. Based on the results of Part C, suggest a reason why heat is an effective form of sterilization for biological materials and equipment.