Simulating Glomerular Filtration

Identify All Indicated Structures of Renal Corpuscle. (5 points)

A. __________________________
B. __________________________
C. __________________________
D. __________________________
E. __________________________

Complete activities 1, 2 & 3 as described in the lab manual and answer the following questions.

Activity 1: Investigation the Effect of Flow Tube Radius on Glomerular Filtration

6. What happens to the glomerular filtration rate as the afferent radius is increased? **(2 points)**
7. If the efferent radius is increased, what happens to the glomerular filtration rate? (2 points)

Activity 2: Studying the Effects of Pressure on Glomerular Filtration

8. Why does an increase in pressure result in a faster glomerular filtration rate? (2 points)

Activity 3: Assessing Combined Effects on Glomerular Filtration

9. One of the experiments you performed in the simulation was to close the valve at the end of the collecting duct. Is closing that valve more like constricting an afferent arteriole or more like a kidney stone? Explain (2 points)

10. What might happen to total glomerular filtration and therefore urine production in a human kidney if all of its collecting ducts were totally blocked? (2 points)
Simulating Urine formation

Complete activities 4, 5 & 6 as described in the lab manual and answer the following questions.

Activity 4: Exploring the Role of the Solute Gradient on Maximum Urine Concentration Achievable

11. In the presence of ADH, what happened to the urine concentration as the gradient concentration was increased? (2 points)

Activity 5: Studying the Effect of Glucose Carrier Proteins on Glucose Reabsorption

12. What happened to the amount of glucose in the urine as the number of glucose carriers was increased? (2 points)

13. Explain why we would expect to find glucose in the urine of the diabetic person? (2 points)

Activity 6: Testing the Effect of Hormones on Urine Formation

14. When either aldosterone or ADH is present, how does the volume of urine differ from the baseline measurement? (1 points)
15. Knowing that alcohol blocks ADH release, what would be the anticipated physiological effect of excess consumption? (2 points)

16. Are the effects of aldosterone and ADH similar or antagonistic? (1 point)

Extra Credit: (2 points)

If a single nephron was blocked, how would this affect overall kidney function?

What are the most important nitrogenous wastes that are removed from blood by glomerular filtration?