Chronic Renal Failure

Description:
Do a full-brain workout to study for this exam. This technique is perhaps the single most effective way to master a topic because it includes: recalling information, describing a topic as thoroughly as possible, thinking about a concept from many angles, actively reviewing your notes and textbook, writing about a topic, seeking and correcting misunderstandings, and critically deriving the simplest correct answer for the question being asked.

Directions:

1. Follow these steps in sequential order:
    a. Using a colored pen (e.g. **green**) and only your own memory, write down everything you can to answer the question. This includes definitions, diagrams, feedback pathways, graphs, concept maps, keywords, sketches—anything at all.
    b. Using a different colored pen (e.g. **purple**) and all the resources you have available (notes, lecture recordings, the textbook, the Internet, etc.), fill in any information you did not originally include in your answer. Additionally, use a third color of pen (e.g. **red**) to correct anything that you wrote down incorrectly.
2. Once you have collected all the pertinent information to answer the question in one place, *in a separate space* work to come up with the most complete, yet concise answer possible that would correctly answer the question being asked.

Inking Prompt:
You are physician and a patient comes in severely dehydrated, but claims she is urinating frequently and in large quantities. She claims to be drinking large quantities of water, but it seems to go right through her. You do some tests and find out that her creatinine level (a substance in the blood that is freely filtered in the kidney, but is not reabsorbed nor secreted) is 8.7 mg/dL (normal = 0.6–1.0 mg/dL), and their urine osmolarity is <100 mOsm (normal = 500 mOsm).

a) Based on this information, decide whether her glomerular filtration rate if low, normal, or high. Explain your answer.
b) You conclude that your patient is in chronic renal failure, which has been caused by damage to the peritubular capillaries surrounding the loop of Henle. Draw a representative nephron and explain how damaged peritubular capillaries could result in her symptoms (i.e. high creatinine, low urine osmolarity, frequent urination, and unsatiable thirst).