Urinary System

1. Name and describe the functions of the four organs of the urinary system.

2. Describe the gross anatomical areas and structures of the kidney: renal capsule, cortex, medulla, sinus, pelvis, hilus, papillae, column, pyramid, major and minor calyces.

3. Draw, label and describe the structural areas of the nephron: glomerulus, Bowman's capsule, proximal convolutions, desc. limb of the loop of Henle, asc. limb, distal convolutions, collecting ducts, afferent and efferent arterioles, and peritubular capillaries.

4. Discuss the three basic processes in urine formation: glomerular filtration, tubular reabsorption, and tubular secretion. Relate these functions to the nephron structures described in Obj. # 3.

5. Define GFR explaining the driving forces and opposing forces involved. Describe how GFR is auto-regulated via dilation and constriction of aff. and eff. arterioles (myogenic effect or auto regulation).

6. Describe the juxta-glomerular apparatus and macula densa and explain their roles in regulation of GFR.

7. Describe original components of filtrate and list which components are reabsorbed and actively secreted. Describe the final composition of urine.

8. Describe the three methods of water reabsorption used to form concentrated urine: obligatory water reabsorption , facultative water reabsorption (ADH), and counter-current multiplier mechanism.

9. Thoroughly describe the release and role of aldosterone hormone in urine production.

10. Distinguish between cortical nephrons and juxtamedullay nephrons in terms of both location and significance.

11. Discuss the role of ADH in controlling urine concentration.

12. Discuss the reabsorption of nutrients (glucose, amino acids, etc.) in the PCT. Explain why these processes are rate-limited.

13. Describe the process of tubular secretion and discuss its importance.

14. Discuss the role of the kidney nephrons in regulation of blood pH.

15. List and discuss both the normal and abnormal constituents of urine.

16. Describe the process of voiding by describing the two reflex arcs which control sphincter action.