



## QUESTIONS

1. Identify the hormone that stimulates the reabsorption of water and helps to produce a decrease in blood osmolarity.
2. Describe the sequence of events that begin in the juxtaglomerular apparatus and lead up to the secretion of aldosterone.
3. Calcium is normally present in the plasma at a concentration of about 0.1 g/L. Calculate the mEq/L of calcium ( $\text{Ca}^{++}$ ) in the plasma given that the atomic weight of calcium is 40.
4. Describe the likely results obtained when a dehydrated desert prospector drinks a liter of water and subsequently collects and analyzes his urine over the next 3 hours. Compare these results to that of an intoxicated alcoholic who also drinks a liter of water and collects and analyzes his urine over the same 3 hour period. How do these results differ from a normally hydrated individual.

	Dehydrated Prospector	Intoxicated Alcoholic
Urine Volume		
Specific Gravity		
$\text{Na}^+$ and/or $\text{Cl}^-$ Content		

5. Explain the results and differences above.

6. Explain why glucose in the urine is often accompanied by an increased volume of urination.
7. Outline the different renal mechanisms (stimulus and response) operating to restore water homeostasis in a dehydrated person. Indicate (i.e. diagram) the role of antidiuretic hormone (ADH), aldosterone, atrial natriuretic hormone and glomerular filtration in this situation.
8. Many clinically used diuretic drugs inhibit  $\text{Na}^+$  re-absorption in the loop of Henle. This in turn increases the delivery of  $\text{Na}^+$  to the distal convoluted tubule and collecting duct.
- Explain how these types of diuretics decreases blood volume and pressure
  - Explain why these types of diuretics can lead to decreased blood potassium levels (hypokalemia).

9. Excess dietary salt (NaCl) is always accompanied by an increase in blood volume. With your knowledge of osmoregulation which hormones are involved in producing these effects. *Explain*

### **Clinical Correlation**

Background:

A 47 year old lawyer with a history of alcoholism had been feeling tired for several months but had attributed this to the stress he was under associated with a current case he was working on.

Coworkers had even commented that he was looking particularly haggard, and that his usually prominent tan had “yellowed”. In addition he noticed that his urine was particularly dark and that it seemed to take longer for the bleeding to stop if he cut himself shaving. On visiting his physician the following urinalysis results were obtained:

Urinalysis:	
Appearance . . . . .	dark yellow
Bilirubin . . . . .	positive
Urobilinogen . . . . .	negative

Follow up X-rays reveal gall stones in the common bile duct, and stool samples demonstrate the presence of steatorrhea confirming the diagnosis of extrahepatic cholestasis (bile duct obstruction) or obstructive jaundice.

A. Define steatorrhea.

B. Explain how obstruction of the common bile duct might produce steatorrhea and a tendency to bleed.

C. Explain how obstruction of the bile duct can lead to the presence of bilirubin in the urine. Include in your answer an indication of what form of bilirubin would be expected in the urine. Explain why other forms of bilirubin are NOT found in the urine.