

PAL Worksheet
Week 14 Problem Set 2

Renal

1. For each of the following indicate how urine volume would change and explain WHY this happens:
Liver failure (reduced production of plasma proteins)
Drugs that cause dilation of the afferent arteriole
Loop diuretics (prevent salt transporters in the loop of Henle)
ACE inhibitors
Alcohol
Diabetes Mellitus
Diabetes Insipidus
Hemorrhage (blood loss)

2. For each of the following, how urine concentration would change:
Hemorrhage
Drinking 1L of distilled water
Increase in ADH levels
Increase in Aldo levels

Renal/Respiratory/Acid Base

1. During childbirth, the blood flow through the placenta often becomes interrupted. This condition is known as “fetal stress”. If labor or delivery is prolonged “fetal distress” can develop and a cesarean section may be recommended. Indicate how you expect the following variables to change in a distressed fetus.
arterial PO₂, arterial PCO₂, blood pH (what type of acid/base disturbance is occurring and how does it develop?). What are potential dangers of fetal distress?

2. Clearly indicate how a urine sample from a patient with diabetes mellitus would be the same/different from a urine sample from a patient with diabetes insipidus in terms of:

	Diabetes Mellitus	Diabetes Insipidus
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Volume
Osmolarity
pH
Presence of ketones
Presence of proteins

Which of the two conditions would be accompanied by low blood PCO₂ – explain.

3. Jim is exploring the jungles of Nicaragua, when he realized he left his water bottle back at his base camp. Being thirsty, he finds a narrow stream of water and gulps down some of the murky liquid. As was to be expected, he develops a severe case of diarrhea the following day. How would you expect his condition to affect the following variables, explain:
Blood pH, urine pH, pattern of ventilation, urine volume, ADH levels

4. Carlos has exercise-induced asthma, which he normally can control adequately by using an inhaler containing beta-2 receptor agonists. When out playing basketball with his friends, Carlos realized that he forgot his inhaler at home. He still decides to play, even though his breathing is labored.
 - A. What kind of acid/base imbalance might Carlos develop?

 - B. Assuming Carlos was also sweating profusely during his workout, how would the following change (indicate increase, decrease, no change):
 - Blood osmolarity
 - Blood volume
 - Urine volume
 - Urine osmolarity
 - Urine pH
 - Blood pH
 - Blood ADH level
 - Blood Renin level
 - Blood Aldosterone level (remember that osmolarity trumps volume when it comes to Aldo release)