Chapter 18 The Urinary System: Renal Function Exam Study Questions

18.1 Functions of the Urinary System
1. List the main and secondary functions of the urinary system and kidney
   a. __________________________________________________________
   b. __________________________________________________________
   c. __________________________________________________________
   d. __________________________________________________________
   e. __________________________________________________________
   f. Secondary functions: ____________________________________________

18.2 Anatomy of the Urinary System
1. Select the correct number for each urinary component.
   a. ___form urine.
   b. ____ transport urine from kidneys to bladder.
   c. ___ store urine.
   d. ____ excrete urine from bladder to outside of body.
   e. ____________________________

2. The functional units of the kidney are the _______________. Both nephron types form _______.
   Juxtamedullary nephron is also responsible for ____________________________.

3. Complete the sequence involving all parts of the nephron (Figure 18.4): Fluid moves through
   Bowman’s Capsule → ________ tubule → ____________ (both descending and ascending limb)
   → ____________ tubule → ____________ duct.

4. The Juxtaglomerular apparatus located where the initial part of the ________ ________, has these two
   components: ___________ and ___________. The function of juxtaglomerular apparatus is
   ____________________________.

5. Blood supply
   a. Blood enters the kidneys through the __________ artery
   b. Complete the sequence of the blood supply of a nephron below: ____________ arteriole →
      ____________ capillaries → ____________ arteriole → ____________ capillaries and vasa
      ________.

6. Two components of a juxtaglomerular apparatus are: _______ _______ and _______ cells. A
   juxtaglomerular apparatus functions in ____________________________

7. Clinic Connection. List two factors that contribute to kidney stones (page 506).
18.3 Basic Renal Exchange Processes

1. Renal Processes and Location

<table>
<thead>
<tr>
<th>Definition</th>
<th>Section of Renal Tubules Involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filtration</td>
<td></td>
</tr>
<tr>
<td>Reabsorption</td>
<td></td>
</tr>
<tr>
<td>Secretion</td>
<td></td>
</tr>
<tr>
<td>Excretion</td>
<td></td>
</tr>
</tbody>
</table>

2. The renal corpuscle consists of _____________ (capillaries) and _____________ (renal tubules).

3. The filtration membrane consists of: _____________ endothelial cells with fenestration,
   _____________ membrane, and the _____________ (podocyte) (with filtration slits). This filtration
   membrane permits (large or small) molecules to be filtered.

4. What drives filtration? ____

5. List and define four Starling Forces.

<table>
<thead>
<tr>
<th>Four Starling Forces</th>
<th>Definition</th>
<th>For or Against Filtration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Define
   a. GFP
   b. GFR
   c. Filtration fraction
d. Filtered load

e. Transport maximum

f. Renal threshold

7. Regulation of GFR.

<table>
<thead>
<tr>
<th>Regulatory Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrinsic regulation</td>
</tr>
<tr>
<td>MAP between 80-180 mm Hg</td>
</tr>
<tr>
<td>a.</td>
</tr>
<tr>
<td>b.</td>
</tr>
<tr>
<td>c.</td>
</tr>
<tr>
<td>Extrinsic regulation</td>
</tr>
<tr>
<td>MAP &lt; 80 or &gt;180 mm Hg</td>
</tr>
</tbody>
</table>

8. Select the incorrect statement about the mechanism of reabsorption.
   a. Water is reabsorbed by osmosis.
   b. Sodium is reabsorbed by active transport.
   c. Urea is passively reabsorbed.
   d. Glucose is passively transported across the apical membrane.

9. (T/F) Secretion follows the same processes and mechanism as reabsorption except that movement goes the opposite direction.

18.4 Regional Specialization of the Renal Tubules

1. According to Table 18.2,
   a. Most of small organic molecules such as amino acids and vitamins are reabsorbed at ______________; ions are NOT reabsorbed at______________.
   b. Which tubule segment does not secrete anything? _______________; which ions are secreted? __, __; H⁺ is only secreted in____________.
c. Which renal segment does not absorb water? ______________

2. Which segment of renal tubule has a lot of surface area and is called mass absorber? __________

18. 5 Excretion
1. Define
   a. Excretion rate.

       b. Clearance.

2. If amount of solute excreted per minute is less than filtered load then solute was __________

3. The clearances of ____________, and ____________ are used to measure GFR. Which one is used
   clinically to estimate GFR?

4. The clearance of PAH is used to measure ____________.

5. If the clearance of molecule “A” is greater than the GFR, molecule “A” is reabsorbed or secreted in
   the renal tubules.

6. Explain how micturition reflex work.