

**Histology Evaluation Exam**  
**Second Year Medical Students – 15 April 2015**

**Answer Key**

• **Section A:**

1			√			16					√
2	√					17		√			
3			√			18		√			
4				√		19					√
5	√					20			√		
6		√				21	√				
7		√				22		√			
8			√			23	√				
9		√				24		√			
10					√	25			√		
11				√		26				√	
12					√	27	√				
13			√			28				√	
14		√				29		√			
15		√				30			√		

## **Section B: (10 Marks)**

### ***1. The inactive thyroid follicles contain more colloid than the active follicles.***

TSH stimulates the follicular cells to uptake the colloid to form T3 & T4 (thyroxin hormones). Subsequently, the amount of colloid is considerably reduced in the active follicles. The inactive follicles however, contain more colloid since their uptake is reduced than the active follicles.

### ***2. The number of goblet cells gradually decreases along the respiratory passages downwards.***

Goblet cells secrete mucus to clean and trap foreign bodies. Their functional necessity decreases downwards in the respiratory passages. Their mucus secretion *might block the small respiratory bronchioles* and alveoli. That's why they disappear gradually downwards in the respiratory system.

### ***3. The sublingual salivary gland has more myo-epithelial cells than the parotid gland.***

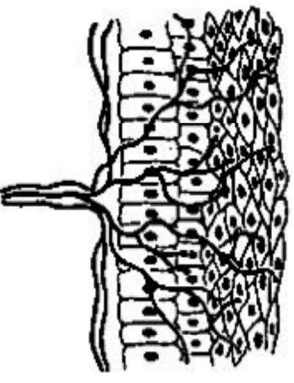
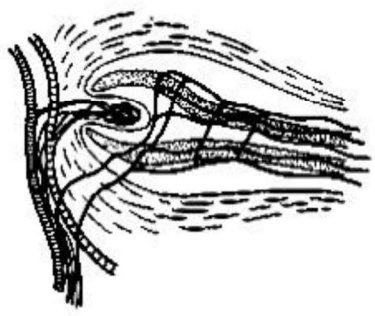
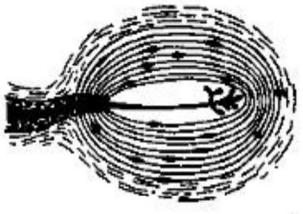
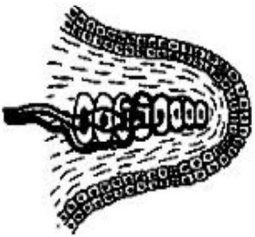
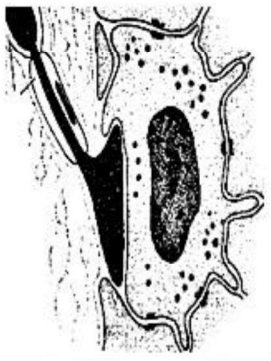
The sublingual salivary gland contains mainly mucus acini producing mucous "viscid" secretions. On the other hand, the parotid gland contains only serous acini and secretes pure serous "watery" secretions. Contraction of myo-epithelial cells is required more in the sublingual salivary gland to release its viscid mucous secretions.

### ***4. The fovea of the retina contains cones only and has less number of layers, if compared to other parts of the retina.***

The fovea is the most sensitive part of the retina. It needs cones to discriminate colors and permit better visual acuity than rods. The cells and layers diverge to the periphery of the fovea to let the light fall directly on the cones, enhancing the visual acuity.

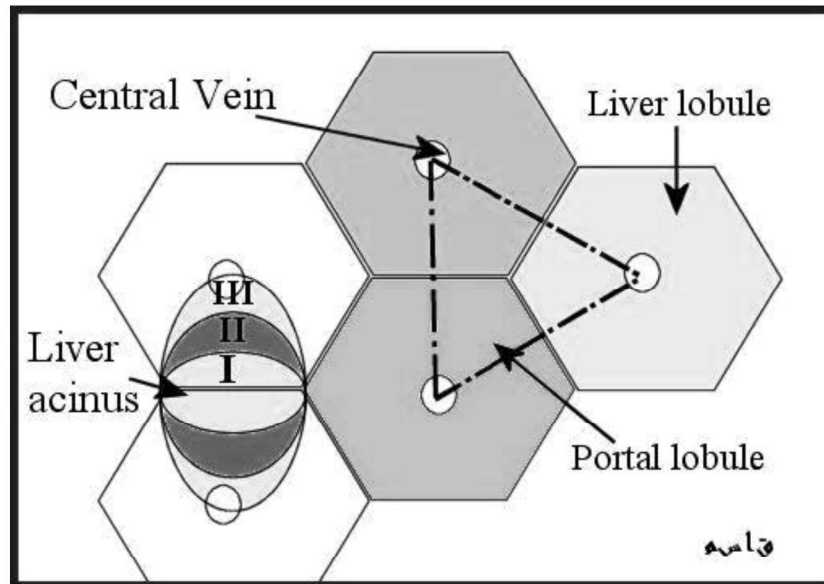
## **Section C (15 Marks):**

### **1- Skin receptors**

<b>Receptor</b>	<b>Function</b>
 <p><b>Free Nerve Endings</b></p>	<ul style="list-style-type: none"> <li>• Pain, temperature, itching and touch.</li> </ul>
 <p><b>Hair Follicle Ending</b></p>	<ul style="list-style-type: none"> <li>• Responds to hair displacement.</li> </ul>
<b>Receptor</b>	<b>Function</b>
 <p><b>Pacinian corpuscle</b></p>	<ul style="list-style-type: none"> <li>• Detect pressure changes and vibrations.</li> <li>• Mechanoreceptors in the deeper organs.</li> </ul>
 <p><b>Meissner Corpuscle</b></p>	<ul style="list-style-type: none"> <li>• Light touch or low-frequency stimuli.</li> </ul>
 <p><b>Merkel Cells</b></p>	<ul style="list-style-type: none"> <li>• Slow-adapting mechanoreceptors, sensitive to sustained touch and pressure.</li> </ul>

## 2- Hepatic lobule, hepatic acinus and portal lobule

**The hepatic lobule:** is a polygonal histologic unit of the liver, consisting of cords of hepatocytes arranged around a central vein.

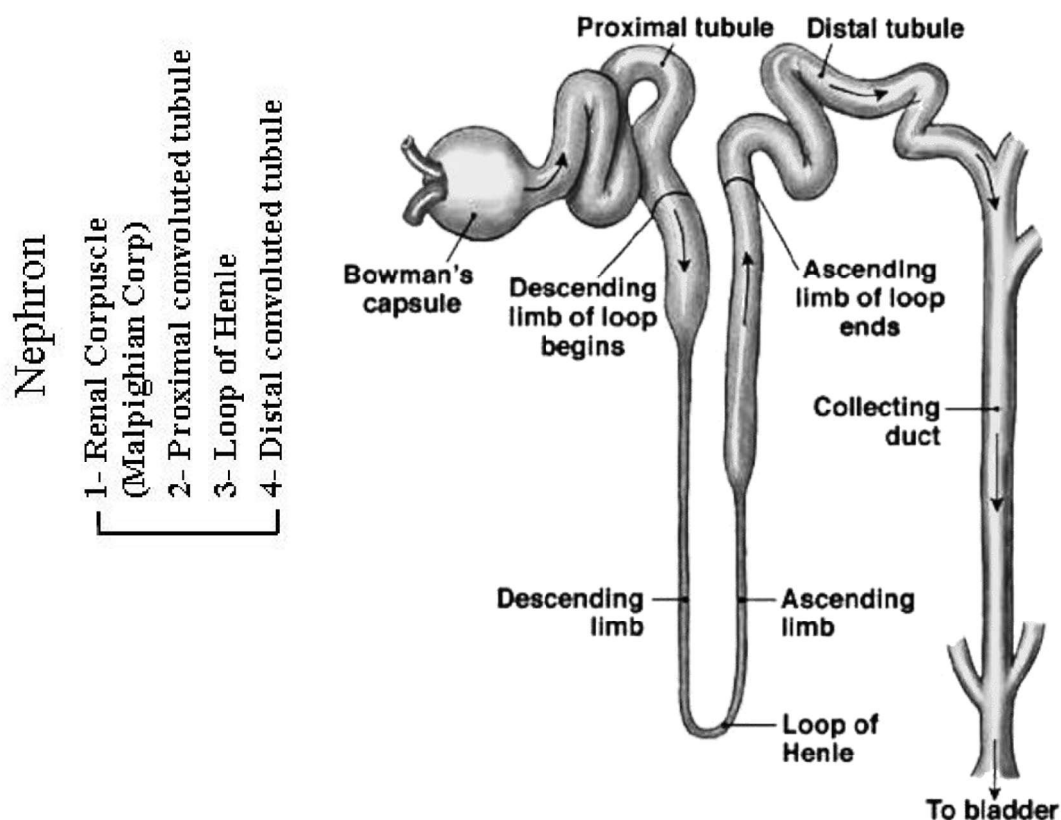


**The hepatic acinus:** is the functional unit of the liver, consists of an oval mass of hepatocytes aligned around the hepatic arterioles and portal venules. The acinus is divided into three zones (1, 2 and 3) based on the metabolic function. Zone 1 is closest to portal tract and receives the most oxygenated blood while zone 3 is furthest away, receiving the least amount of oxygenated blood.

**The portal lobule:** is the triangular area lined by an imaginary line connecting 3 adjacent central veins. The portal triad is located in the center of the portal lobule.



### 3- Structure of the nephron:



The nephron is the functional and structural unit of the kidney. It consists of renal (Malpighian) corpuscle, proximal convoluted tubule, loop of Henle and a distal convoluted tubule.

The Renal (Malpighian) corpuscle has 2 ends (vascular and urinary poles). It consists of 2 layers: Inner visceral layer (podocytes) and outer parietal layer (simple Squamous Epithelium).

The diameter of proximal convoluted tubule is larger than that of distal convoluted tubule. The proximal tubules are lined by 3-5 large cuboidal cells while the distal tubule is lined with 5-8 smaller cubical cells.

The loop of Henle consists of thin descending limb, lined by simple squamous epithelium and a thick ascending limb, lined by simple cubical epithelium. The descending limb descends from the cortex to the medulla. The ascending limb ascends back to the cortex.

#### **4- Steps of spermatogenesis**

**Spermatogenesis can be divided into 3 phases:**

1. ***Spermatocytogenesis*** in which spermatogonia divide repeatedly by mitosis → spermatocytes.
2. ***Meiosis***, during which the spermatocyte divide with a 50% reduction in the number of chromosomes and amount of DNA → spermatids.
3. ***Spermiogenesis***, during which the spermatids undergo morphological changes → spermatozoa.
  - **Spermiogenesis consists of 3 phases:**
    - 1- The *Golgi Phase*
    - 2- The *Acrosomal Phase*
    - 3- The *Maturation Phase*

#### **5- Compare different levels of the spinal cord**

	Cervical	Thoracic	Lumbar
<b>Outline</b>	oval	Circular	Circular
<b>Central canal</b>	more anterior	anterior	central
<b>White matter</b>	large area	medium	smaller area
<b>Ant. Horns</b>	Thick	Thin	Thick
<b>Post. Horns</b>	thin, diverging	thin & less diverging	thick & parallel
<b>Lat. Horns</b>	absent	present	absent