**HND 2nd Semester**

**Course Title: Anatomy Instructor: Dr. Ahmed Hayat**

 **MID Term Assignment Marks: 30**

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***NOTE: Mention your name and roll number on the assignments.***

Q1: Write **a paragraph on the** process of food digestion. Highlight the functions of each organ involved.

Q2: How kidneys are involved in urine formation. Explain the process step by step in detail.

 **Digestion**;

“The chemical and mechanical breakdown of large, complex, non-diffusible food into small, simple, diffusible and soluble form is called digestion.

 **Components of digestion**

**. Ingestion- the taking in of nutrients.**

**.Propulsion-** mixes and moves the contents along the alimentary tract.

**.Digestion**- the chemical breakdown of large organic molecules into smaller components by enzyme.

**Absorption**- the transport of digested nutrients to body tissues.

.**Egestion –**the elimination of food waste materials from the body.  **.Organs of the digestive system that are involved in the food digestion**

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Continuous muscular digestive tube winding throughout the body.

. contain the following organs.

Mouth, phayranx, esophagus, stomach, small intestine and large intestine

**.Accessary digestive organ**

Liver, pancrease and salivary glands

 **Function of the tongue**

Helps grind food into a bolus which contain partially digested food and saliva

Helps form words and is a sensory organ for taste

 **Function of the teeth**

The teeth grind and chew food, breaking it into small manageable pieces. This chewing process is known as mastication.

**Function of the salivary glands**

Produce and secrete saliva

Moisten food, compacting it into a bolus

Dissolve food chemical so they can be tasted.

**Function of the esophagus**

Muscular tube that propel food to stomach; bolus enter stomach through esophageal hiatus

Esophageal gland produces mucus to lubricate the bolus

Esophageal sphincter prevents backflow from oral cavity

Cardiac sphincter prevents backflow from esophagus.

 **Function of the stomach**

Temporary storage area for food

Mixes food with digestive juices that contain enzymes to breakdown protein and lipids.

Acids in the stomach kills bacteria.

**Function of the small intestine**

The small intestine is where most chemical digestion takes place.

Digestion of protein and carbohydrates

Many of the digestive enzymes that act in the small intestine are secreted by the pancrease and liver.

The small intestine is where the site where most of the nutrients from ingested food are absorbed.

**Function of the large intestine**

Reabsorption of remaining water and electrolytes

Production and absorption of vitamins B and K

Elimination of faces

**Function of liver**

Filter and process nutrients rich blood of carbohydrates, proteins and lipids from intestine.

Production and regulation of cholesterols

Remove drugs and hormones from circulation

Storage of vitamins and minerals

Production of bile which emulsifies of fats.

**Function of pancreas**

Pancreas secrets different types of chemical which have their own functions

. Pancreatic juice is alkaline due to bicarbonates which neutralizes the acid chyme and regulate the PH of intestine

**Amylase.**

**I**t is a carbohydrates digesting enzyme which digests starch into maltose.

**Lipase**

**It** is a fat digestive enzyme which hydrolyses small percentage of fats into fatty acid and glycerol

**Trypsin**

Trypsin is a protein digestive enzyme.

Q NO-2 ; Answer

**Urine formation;**

The human kidneys perform a variety of functions ; nearly all are carried out by nephrons. The nephron filter blood; remove wastes which are passed out as urine.

There are three main steps of urine formation:

1-Glomerular filtration

2-Reabsorption

3-secretion

**1-Glomerular filtration**

 It is filtration under pressure. The diameter of efferent arteriole is half as compared to afferent arteriole. It result in a high blood pressure in glomerulus. About 20% of the plasma is filtered into Bowmans capsule. This filtered blood is called glomerular filtrate.

This filtrate has to cross endothelium of the capillaries’ basement membrane of capillaries and endothelium of Bowman’s capsule. It has chemical composition similar to that of blood plasma.

**Glomerular filtrate**:

It contains glucose, amino acid, vitamins ions, nitrogenous waste, some hormones and water.

**2-Reabsorption**:

The reabsorption process in the nephrons is very selective. The useful substances for the body are reabsorption

**Proximal convoluted tubul**

Over 80% of the glomerular filtrate is reabsorbed in proximal convoluted tubules. Here all of the glucose, amino acid, vitamins, hormones and about80% of the sodium chloride and water are reabsorbed.

**Loop of Henel:**

 The function of Loop of Henel is to conserve water. The wall of ascending limb is impermeable to water, however, sodium, chloride, potassium and other ions are absorbed actively here. The plasma becomes concentrated and fluid in the ascending limb becomes very dilute. The descending limb is highly permeable to water.

**Distal convoluted tubules:**

 The distal convoluted tubules have osmoregulatory role and also control blood PH by secreting hydrogen ions. The collecting ducts are impermeable in nature. ADH opens water channels in collecting ducts to allow water to move out of the filtrate. It reduces the volume urine making it more concentrated.

**Secretion:**

The filtrate absorbed in the glomerulus flows through the renal tubule, where nutrients and water are reabsorbed into capillaries. At the same time, waste ions and hydrogen ions pass from the capillaries into the renal tubule. This process is called secretion. The secreted ions combine with the remaining filtrate and become urine. The urine flows out of the nephron tubule into a collecting duct. It passes out of the kidneys through renal pelvis, into the ureter and down to the bladder.

Urine is about 95% water and 5% waste product. Nitrogenous waste excreted in urine include urea, ammonia and uric acid. Ions such as sodium, potassium, hydrogen and calcium are also excreted.

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