# 2. Human System

## Exercise Questions

### 1. Question

Who controls (the motion of) food, digested food extract and residue left?

A. Sphincter muscles

B. Mucosa

C. Mucus epithelium

D. Both (b) and (c)

### Answer

The motion of food, digested food extract and residues left are all controlled by sphincter muscles. These sphincter muscles act as a valve to control the flow of partially digested food from stomach to small intestine.

### 2. Question

Which teeth in the following are most developed into carnivorous animals?

A. Incisors

B. Canines

C. Pre-molar

D. Molar

### Answer

Canines are most developed teeth found in carnivorous animals. Canines are two in each jaw and are used in tearing the flesh by carnivorous animals.

### 3. Question

Main function of epiglottis is-

A. Sending food into pharynx.

B. Preventing food from entering into windpipe.

C. Taking food upto duodenum

D. None of the above

**Answer**

Epiglottis is a flap of tissue where the esophagus and windpipe meet. The epiglottis prevents food from entering into the windpipe and thus acts as a trap door. When food is swallowed, the epiglottis lowers and covers the windpipe thus food does not enter the windpipe, while when inhaling the epiglottis raises and air moves into the windpipe.

**4. Question**

Maximum food digestion by enzymes is accomplished here at-

A. Jejunum

B. Ilium

C. Duodenum

D. Large intestine

**Answer**

Maximum food digestion by enzymes is accomplished in the duodenum part of small intestine. Small intestine begins from pyloric part of stomach and ends up in large intestine. The chemical digestion of food by enzymes takes place in duodenum which is the first part of small intestine that is attached with the stomach.

**5. Question**

Which one in the following is not a salivary gland?

A. Parotid gland

B. Submandibular Gland

C. Sublingual gland

D. Pituitary gland

**Answer**

Pituitary gland is an endocrine gland and not salivary gland. Is found at the base of brain and it secretes hormones like oxytocin, ADH, ACTH, TSH, FSH, and LH. Parotid gland, submandibular gland and sublingual gland are salivary glands. Parotid gland is found in cheeks and secretes serum-y liquid, Submandibular gland secretes liquid and mucus, sublingual gland secretes mucus and is found below the tongue.

**6. Question**

Which enzyme in the following is not secreted by pancreas?

A. Amylase

B. Trypsin

C. Renin

D. Lipase

**Answer**

Renin is an enzyme secreted by stomach in the form of gastric juice.

**7. Question**

Which organ in the following is a secondary respiratory organ-

A. Mouth

B. Nose

C. Nasopharynx

D. Larynx

**Answer**

Mouth works as a secondary respiratory organ. The main respiratory organ is nose but as and when required mouth is used in respiration but the air that is inhaled through mouth is not as pure as that inhaled through nose.

**8. Question**

The number of lobes found in left lung is-

A. 3

B. 4

C. 2

D. 1

**Answer**

Left lung consists of 2 lobes while the right lung consists of 3 lobes. These lobes further have sub-lobes and each sub-lobe is divided into smaller parts. Right lung is shorter and broader than left lung. Also, males have heavier lungs than females.

**9. Question**

What is found in alveoli?

A. Squamous epithelium

B. Epithelium

C. Cartilagious rings

D. None of the above

**Answer**

Alveoli are the small sacs which fill with air when we inhale. These are cup-shaped structures found at the end of each bronchial tube. It consists of rows of squamous epithelium that help in gaseous exchange from blood flowing in the surrounding capillaries.

**10. Question**

Liquid Part of blood is known as-

A. Serum

B. Lymph

C. Plasma

D. None of the above

**Answer**

The liquid part of blood is known as plasma. It is composed 90% of water, 6-8% plasma proteins and 1% electrolytes. The main functions of blood plasma is to transport nutrients, gases, vitamins, to maintain blood pH and to regulate electrolyte balance.

**11. Question**

Where does the development of red blood cells generally occur?

A. Spleen

B. Red bone marrow

C. Lymph nodes

D. None of the above

**Answer**

The development of red bone marrow occurs in the red bone marrow. Whenever oxygen deficiency occurs erythropoietin production by kidneys is stimulated which thereby stimulates the red blood cell production in the red bone marrow. Once the oxygen levels are restored, production of erythropoietin is inhibited.

**12. Question**

Which cell in the following is not a white blood cell?

A. B-lymphocyte

B. Platelets

C. Basophil

D. Monocyte

**Answer**

B-lymphocytes, basophil and monocytes are white blood cells. Lymphocytes provide immunity, basophil is a granulocyte, monocytes are converted to macrophage when mature, these macrophages eat the outer antigens. Platelets are different from white blood cells and they help in coagulation of blood.

**13. Question**

In which blood group, both the antigens A and B are found present on red blood cells?

A. O

B. A

C. B

D. AB

**Answer**

Both the antigens A and B are found present on red blood cells in type AB blood group. People with type AB blood group are universal recipient and can receive blood from any blood type.

**14. Question**

How many time blood flows through heart during circulation?

A. One

B. Three

C. Two

D. Four

**Answer**

Blood flows 2 times through the heart during circulation. The first time, blood flows through heart when impure blood is brought from body (by vena cava) to heart and the second time blood flows through heart when pure blood enters from lungs to heart via pulmonary vein and is transported to the body by aorta.

**15. Question**

Human excretes mainly which substance?

A. Ammonia

B. Uric acid

C. Urea

D. Both (a) and (c)

**Answer**

Humans are ureotelic, they excrete urea. The ammonia produced by cells is converted by liver into urea which is excreted by the body after being filtered by the kidneys.

**16. Question**

Where is glomerulus found?

A. In Bowman's capsule

B. In renal tubule

C. In Henle's loop

D. None of the above

**Answer**

Glomerulus is found in the Bowman's capsule. Glomerulus is a bunch of branched afferent arteries capillaries. The renal artery that brings impure blood to the Bowman's capsule is connected to one end of glomerulus while the other end of glomerulus is connected with renal vein that takes purified blood.

**17. Question**

Main male sex hormone is-

A. Estrogen

B. Progesterone

C. Testosterone

D. Both (b) and (c)

**Answer**

Testosterone is the main male sex hormone that determines the primary and secondary sex characteristics of males. Estrogen and progesterone are female sex hormones and are secreted by the ovaries.

**18. Question**

Which in the following is primary reproductive organ-

A. Scrotum

B. Ovary

C. Testes

D. Both (b) and (c)

**Answer**

Testes and ovary are the primary reproductive organs of male and female respectively. Scrotum is a pouch of skin that contains the testes to keep them at a temperature lower than that of the body for sperm formation. Testes in males are responsible for sperm formation and secretion of testosterone while ovaries in females are responsible for ovum formation and secretion of estrogen and progesterone.

**19. Question**

Motor nerves send stimuli-

A. From central nervous system to organs.

B. From organs to central nervous system.

C. Both (a) and (b) are right

D. Both (a) and (b) are wrong

**Answer**

Motor nerves are neurons that send commands from central nervous system to a muscle, gland or an organ which further creates voluntary movement.

**20. Question**

Corpora quadrigemina is found in-

A. Fore brain

B. Hind brain

C. Mid brain

D. Both (a) and (b)

**Answer**

Brain is divided into three parts- fore brain, mid brain and hind brain. The mid brain is divided into 4 lobes found between the hind brain and hypothalamus. Corpora quadrigemina is the term given to each of these lobes. These lobes have different functions, the upper 2 lobes are concerned with vision and the lower two lobes are responsible for hearing.

**21. Question**

Which hormone is not secreted by pituitary gland?

A. Growth Hormone

B. Vasopressin

C. Melatonin

D. Prolactin

**Answer**

Melatonin is secreted by pineal gland and not pituitary gland. Growth hormone, vasopressin and prolactin are secreted by the pituitary gland. Pituitary gland is found near to hypothalamus at a lower side in the brain while pineal gland is found in upper part of fore-brain.

**22. Question**

Which is responsible for circadian rhythm?

A. Thyroid gland

B. Pancreas

C. Adrenal gland

D. Pineal gland

**Answer**

The superchiasmatic nucleus found in the hypothalamus is responsible for controlling circadian rhythm. This superchiasmatic nucleus is found adjacent to the pineal gland. The pineal gland produces melatonin which helps in maintaining circadian rhythms and regulating reproductive hormones.

**23. Question**

Write the name of fundamental structural and functional unit of body.

**Answer**

Cell is the functional/ fundamental and structural unit of the body. These are the smallest unit that has the ability of all life functions. Different cells perform different functions. The cells that have the same functions together form tissues which further forms organs. Various organs combine to form organ system which forms the entire body.

**24. Question**

Define digestive system.

**Answer**

Digestive system is a system of organs where many organs and gland work together to digest the food that we eat and discard the waste. The digestive system works from ingestion of food to being digested and absorbed by the body to defecation of waste.

**25. Question**

What is the function of sphincter muscles?

**Answer**

Sphincter muscles (kidney) are two muscles found at the point where the urinary bladder opens to the urethra. These muscles help to prevent urine from leaking into the urethra. Pyloric sphincter muscles (stomach) prevents the backflow of food from intestines to stomach.

**26. Question**

Write the name of glands associated with digestive system.

**Answer**

The glands associated with digestive system are- salivary glands, liver and pancreas. The salivary gland produces saliva in the mouth which digests the starch in food to make food soluble and smooth. Pancreas secretes insulin, glucagon and pancreatic juice. Insulin and glucagon function to control the blood sugar levels of our body. The pancreatic enzymes help in digestion of protein, fat and carbohydrates present in the food. Liver produces bile salts which break down lipids to fatty acids.

**27. Question**

What is the function of incisor teeth?

**Answer**

Humans have diphyodont system, where 2 sets of teeth- milk and permanent teeth occur during the entire life, and heterodont types of teeth i.e. different types of teeth. Humans have 16 teeth both in upper and lower jaw. Incisors are wide, flat and sharp front teeth which are used to cut the food with their thin edges.

**28. Question**

How many parts of stomach are?

**Answer**

Stomach has 3 parts- Cardiac part, pyloric part and fundis part. The cardiac part is the left large part where the esophagus enters in the stomach. The pyloric part is the right small part where the stomach and small intestine attach to each other. Fundis part is found between the cardiac and pyloric part, i.e., it is the middle part.

**29. Question**

Where does the maximum absorption of digested food occurs?

**Answer**

The maximum absorption of digested food occurs in the small intestine part of the alimentary canal. It begins from the pyloric part of stomach and ends up into large intestine. Small intestine has 3 parts- duodenum, jejunum and ileum.

**30. Question**

Name the largest gland founds in body.

**Answer**

The largest gland found in human body is the liver. It is found below the diaphragm and is triangular in shape. The gland produces bile which help in breaking down lipids to fatty acids (in small intestine).

**31. Question**

Which gland secretes ptylin enzyme?

**Answer**

The parotid gland (salivary gland) secrete ptyalin enzyme (also known as amylase). Its function is to break down starch to maltose. The saliva secreted by parotid, submandibular and sublingual glands lubricate and soften the food mass which is then chewed and swallowed.

**32. Question**

How many cartilages are found in larynx?

**Answer**

Larynx is a small structure that joins laryngopharynx and trachea. 9 cartilages are found in larynx, 3 unpaired (thyroid, circoid and epiglottis) and 3 are paired (arytenoid, cuneiform, and corniculate).

**33. Question**

Who produces mucus in windpipe of human beings?

**Answer**

Trachea is the windpipe of human beings. It is a long tube made up of C-shaped hyaline cartilage that is lined by pseudo stratified ciliated columnar epithelium. This epithelium found in the traches is responsible for producing mucus in the windpipe. The mucus purifies the air first and then sends the pure air to lungs.

**34. Question**

How much blood is found in a normal man?

**Answer**

A normal man has 5 litres of blood in his body. Blood helps in transporting oxygen and nutrients to cells. Blood is composed of two parts, liquid and solid. The liquid part of blood is plasma and solid part consists of cells.

**35. Question**

What is the life span of a platelet?

**Answer**

Life span of platelets is 10 days. Platelets are cells without nucleus and their main function is to help in coagulation of blood. They are about 3 lacs per mm cube in blood.

**36. Question**

What is called the process of ammonia excretion?

**Answer**

The process of ammonia excretion is known as ammonotelism. Ammonia is a nitrogenous waste. Ammonotelism occurs in bony fishes, amphibians and aquatic insects. They excrete ammonia and for excreting ammonia a lot of water is required.

**37. Question**

What is pericardium?

**Answer**

Pericardium is the double walled membranous covering that encloses the heart. Pericardium is filled with pericardial fluid which protects the heart from shocks.

**38. Question**

What is the function of vena cava?

**Answer**

Vena cava returns oxygen poor blood to the right atrium. The superior vena cava brings deoxygenated blood from the top part of the body(head) to heart. Inferior vena cava brings deoxygenated blood from the lower part of the body to heart.

**39. Question**

What is called the process of ammonia excretion?

**Answer**

The process of ammonia excretion is known as ammonotelism. Ammonia is a nitrogenous waste. Ammonotelism occurs in bony fishes, amphibians and aquatic insects. They excrete ammonia and for excreting ammonia a lot of water is required.

**40. Question**

Which is the main excretory organ in human being?

**Answer**

The main excretory organ in human being is kidney that release about 80% of liquid waste from the body. Kidneys are bean-shaped organs located in the left and right of vertebrae column backside below stomach. Each kidney is made up of nephrons. Nephrons are the functional unit of kidney.

**41. Question**

Name the organ producing ovum.

**Answer**

The organ that produces ovum is ovary. Ovary is the main female reproductive organ that exists in a pair. Ovaries also produce the 2 female reproductive hormones, estrogen and progesterone.

**42. Question**

Write the name of main sex hormone of females.

**Answer**

The main sex hormones of females are estrogen and progesterone. These hormones are the reason behind changes that occur between puberty and sexual maturity. Puberty in females occurs at the age of 12-14years while sexual maturity around 18-19years. The secondary sex characteristics of females are development of breast, beginning of menstruation, hair near armpits and genitals, oily skin etc.

**43. Question**

Where does grey matters is found?

**Answer**

Grey matter is found inside the spinal cord as a long column from beginning to end. Spinal cord is a nerve canal, the middle part of which has a central canal. This central canal has 2 layered thick boundary of which the inner layer is called the grey matter. White matter is found in the external layer of the same central canal.

**44. Question**

Name the organ systems responsible for coordinating between various organs.

**Answer**

Nervous system is responsible for coordinating between various organs. It controls the functions of every other systems and communicates with them in order o coordinate performance and to provide the body with its needs.

**45. Question**

Where does grey matter is found?

**Answer**

Grey matter is found inside the spinal cord as a long column from beginning to end. Spinal cord is a nerve canal, the middle part of which has a central canal. This central canal has 2 layered thick boundary of which the inner layer is called the grey matter. White matter is found in the external layer of the same central canal.

**46. Question**

Write name of a neurotransmitter.

**Answer**

Neurotransmitters are chemicals that our brain uses to communicate and function with the rest of our body. These are signaling molecules that transmit messages between neurons. **Acetylcholine** is a neurotransmitter and it was the first to be discovered.

**47. Question**

Write name of a hormone secreted by thyroid gland.

**Answer**

Thyroid gland is found in front of the trachea. Hormones secreted by the thyroid gland are **thyroxine** and **triiodothyronine** which regulate body metabolism and growth & differentiation of tissues.

**48. Question**

Secretion of adrenaline hormone is done by which gland?

**Answer**

Adrenaline hormone is known as the flight or fight hormone. It is secreted adrenal gland which are found in a pair present at upper part of kidneys. Adrenaline when released causes an increase in the blood sugar level of the body and releases fatty acids thereby providing energy in situation of fight or flight.

**49. Question**

Write the organs included in digestion work.

**Answer**

The organs included in digestion are mouth, pharynx, esophagus, stomach, small intestine and large intestine. The mouth receives food and begins mechanical digestion by breaking down the food.The food mixed with saliva, known as bolus, passes down through the pharynx to esophagus via peristalsis. The partially digested food enters the stomach from esophagus. Further digestion occurs in the stomach by churning the bolus and mixing it with the gastric juices.Chemical digestion takes place in small intestine. It secretes chemicals which break down the food and take away nutrients to blood stream. The undigested food is passed to the large intestine where maximum water is reclaimed before egestion of solid faeces.

**50. Question**

Explain the structure and function of stomach.

**Answer**

Stomach is a muscular J shaped structure, situated in the left part of abdominal cavity behind the diaphragm. It is found between esophagus and duodenum. It continues from esophagus at cardiac sphincter and with the duodenum at pyloric sphincter. The stomach is divided into 4 parts- the cardia, the fundus, the body of stomach and the pyloric part. Stomach functions to further digest the food by churning the bolus and mixing it with the gastric juices that are secreted by its own linings.Stomach also stores food which allows us to go many hours between meals.

**51. Question**

Where does salivary gland find? Explain its structure.

**Answer**

Salivary gland produces saliva in the mouth which helps to wet the food and form bolus. These glands secrete serumy liquid and mucus. Saliva digests the starch present in food to maltose and makes the food soluble. Parotid gland, submandibular gland and sublingual gland are the 3 types of salivary gland. Which secrete serumy liquid and mucus.

**52. Question**

Explain the main function of nose.

**Answer**

Nose is the main respiratory organ. It is actually a large cavity that is divided into 2 parts by a thin bone and membrane. The hair that filter the air entering the nose are found in the nasal cavity whose back part opens into the nasopharynx. It provides an airway for respiration, moistens, warms and filters the air from foreign matter, that enters through the nostrils.

**53. Question**

How does pharynx help in respiratory work?

**Answer**

Pharynx is a muscular passage extending from nasal cavity to larynx. It is composed of 3 parts- nasopharynx, oropharynx and laryngopharynx. The inhaled air travels from nasal cavity to oropharynx via nasopharynx. From oropharynx air enters into larynx through laryngopharynx. The epiglottis acts as a lid due to which air enters the trachea and not into the alimentary canal. The trachea thus provides a clear airway for air to enter the lungs and also leave the lungs.

**54. Question**

Write the importance of respiratory muscles.

**Answer**

Air enters into the lungs by contraction of diaphragm and leaves the lungs by relaxation of diaphragm. Respiratory muscles are required for inhaling and exhaling air from the atmosphere. These muscles are found in the lungs. The most important respiratory muscles are the inter costal muscles which are found in sets. The external intercostal muscles that pull the ribs together thus raising the rib cage during inspiration and the internal intercostal muscles which depress the rib cage during expiration.

**55. Question**

Define blood and write its functions.

**Answer**

Blood is a liquid connective tissue that is slightly alkaline with a pH of 7.4. It is composed of 2 parts, liquid and solid. The liquid part of blood is plasma and solid part consists of cells. The blood plasma forms 55% part of blood with 92% water in it and 8% organic and inorganic substances. The main function of blood is transporting oxygen to tissues, transporting nutrients like glucose, amino acids and fatty acids, regulation of body pH, removal of wastes like carbon dioxide, urea and lactic acid.

**56. Question**

State the role of blood vessels in blood circulatory system.

**Answer**

There are two types of blood vessels- artery and veins. These blood vessels circulate blood in the body parts. Arteries move oxygen-rich blood away from heart (except pulmonary artery). Veins move deoxygenated blood (oxygen deficient) towards heart. These blood vessels form a network of capillaries which facilitates exchange of material between blood and surrounding cells.

**57. Question**

Explain the structure of kidney.

**Answer**

Kidneys are bean-shaped organs located in the left and right of vertebrae column backside below stomach. Each kidney is enclosed in a renal capsule which is surrounded by the adipose tissue. Internally the kidney has the following parts- renal cortex, renal medulla, renal pyramids, renal columns and renal pelvis along with major and minor calyces. Kidney is the main excretory organ of excretion that release about 80% of liquid waste from the body. Blood enters the kidney through renal artery and leaves the kidney through renal vein.

**58. Question**

Write about the other excretory organs used in function of excretion other than kidney.

**Answer**

The other excretory organs used in function of excretion other than kidney are ureter, bladder and urethra. Urine from nephron is brought to the collecting duct of kidneys where the urine enters the ureters. There are 2 ureters, each opening from one kidney into the urinary bladder. The urinary bladder stores urine and it size increases as the amount of urine collected increases. When the CNS gives a voluntary message the muscles of bladder contract and the bladder sphincter relaxes thus excreting urine out through the urethra.

**59. Question**

Write the functions of primary reproductive organs in females.

**Answer**

The primary reproductive organs in females is ovary which are responsible for ovum formation (gametogenic function) and secretion of estrogen and progesterone (endocrine function). Ovum is the female gamete.Estrogen and progesterone are the two female sex hormones.

**60. Question**

What is the function of vas deferens human reproductive system?

**Answer**

Vas deferens is a thin tube that extends from epididymis to urethra in the penis. There are 2 functions of vas deferens-

a. receiving sperm from epididymis and carrying it to the ejaculatory duct.

b. storing them temporarily in its internal space. It also helps to move the sperm by peristalsis.

**61. Question**

What is the importance of spinal cord?

**Answer**

The spinal cord is the primary pathway of information between the nervous system of body and brain. It receives sensory information from various body parts and convey it to the brain. It also carries messages from brain to peripheral nervous system. Motor neurons are present in spinal cord which adjust reflexes and direct the voluntary movements. Spinal cord plays central role in coordinating muscle movements and interpreting sensory inputs.

**62. Question**

What are the function of fore-brain? Explain its structure.

**Answer**

Fore brain is the largest and most well-developed part of the brain. The main parts of fore brain are the cerebrum, thalamus and hypothalamus. Cerebrum is the main thinking part of the brain and it performs functions of thinking, consciousness, knowledge etc. The cerebral hemispheres consist of grey matter which is called the cortex. Both the cerebral hemispheres are connected by corpus callosum. Thalamus diagnoses the sensory information transmitted to the brain. Hypothalamus (found in the diencephalon part) links the nervous system to endocrine system via the pituitary gland, controls metabolism, regulates the body temperature, regulates water balance, sleep etc. It is the center for hunger, thirst, sleep, temperature, fatigue etc.

**63. Question**

What is the role of hypothalamus in endocrine system?

**Answer**

Hypothalamus links the nervous system to endocrine system via the pituitary gland. It sends signals to pituitary glands if any condition needs to be corrected. The hypothalamus itself acts as an endocrine organ by releasing the hormones ADH and oxytocin into circulation at neurohypophysis. It contains autonomic centers which have direct control over the adrenal gland.

**64. Question**

Explain the exocrine and endocrine function of pancreas.

**Answer**

The pancreas lies between the inferior border of stomach and proximal portion of the small intestine. The exocrine function of pancreas is: the acinar cells secrete pancreatic juice which help in food digestion. The endocrine function is secretion of insulin and glucagon by the islets of Langerhans. These hormones play major role in blood glucose level regulation.

**65. Question**

Write a detailed note on human digestive system. Explain the importance of enzymes used in digestive system.

**Answer**

Digestive system is a system of organs where many organs and gland work together to digest the food that we eat and discard the waste. The digestive system works from ingestion of food to being digested and absorbed by the body to defecation of waste. The process of digestion is as follows- The mouth receives food and begins mechanical digestion by breaking down the food. The food mixed with saliva, known as bolus, passes down through the pharynx to esophagus via peristalsis. The partially digested food enters the stomach from esophagus. Further digestion occurs in the stomach where the bolus is churned and mixed with the gastric juices. Chemical digestion takes place in small intestine which secretes chemicals that break down the food and take away nutrients to blood stream. The undigested food is passed to the large intestine where maximum water is reclaimed before egestion of solid faeces.

The digestive enzymes assist in digestion and absorption of nutrients in the small intestine. In the process of digestion, the salivary gland produces saliva in the mouth which digests the starch in food to make food soluble and smooth. Pancreas secrete insulin, glucagon and pancreatic juice. The pancreatic enzymes help in digestion of protein, fat and carbohydrates present in the food.Liver produces bile salts which breakdown lipids to fatty acids.

**66. Question**

What is the importance of trachea, bronchiole, lungs and respiratory muscles in human respiratory system?

**Answer**

● Trachea is the windpipe of human beings. It is a long tube made up of C-shaped hyaline cartilage that is lined by pseudo stratified ciliated columnar epithelium. Trachea joins larynx with bronchi and take air from neck to chest.

● The trachea gets divided into 2 parts in the chest cavity and enter into the lungs from each side. These parts/ branches are known as primary bronchi which split into secondary bronchi. Secondary bronchi again splits into tertiary bronchi in each part of the lungs. These tertiary bronchi are further split into small bronchioles. The main function of bronchi and bronchiole is to carry air from trachea to the lungs. They have smooth muscle tissues in their walls that help to regulate the air flow into the lungs.

● Lungs are 2 sac like spongy organs that are found in our chest/ thoracic cavity. Left lung consists of 2 lobes while the right lung consists of 3 lobes. The function of lungs is to bring oxygen into the body when we inhale and to remove carbon dioxide from our body when we exhale.

● Air enters into the lungs by contraction of diaphragm and leaves the lungs by relaxation of diaphragm. Respiratory muscles are required for inhaling and exhaling air from the atmosphere. These muscles are found in the lungs. The most important respiratory muscles are the inter costal muscles which are found in sets. The external intercostal muscles that pull the ribs together thus raising the rib cage during inspiration and the internal intercostal muscles which depress the rib cage during expiration.

**67. Question**

What is blood? Explain the different components.

**Answer**

Blood is a liquid connective tissue that is slightly alkaline with a pH of 7.4. It is composed of 2 parts, liquid and solid. The liquid part of blood is plasma and solid part consists of cells. The blood plasma forms 55% part of blood with 92% water in it and 8% organic and inorganic substances. The main function of blood is transporting oxygen to tissues, transporting nutrients like glucose, amino acids and fatty acids, regulation of body pH, removal of wastes like carbon dioxide, urea and lactic acid.

Blood is composed of red blood cells, white blood cells, platelets and plasma. The red blood cells constitute about 45% of blood and function to carry fresh oxygen through the body and remove carbon dioxide. The white blood cells make less than 1% of blood but are the part of body's immune system. They detect and fight foreign bodies or viruses. Platelets also form less than 1% of blood. They help in clotting the blood to stop bleeding at the time of any injury. The liquid part of blood is known as plasma. It is composed of 90% of water, 6-8% plasma proteins and 1% electrolytes. Plasma makes about 55% of blood The main functions of blood plasma is to transport nutrients, gases, vitamins, to maintain blood pH and to regulate electrolyte balance.

**68. Question**

Discuss the urine formation process in human. Explain the structure of kidney.

**Answer**

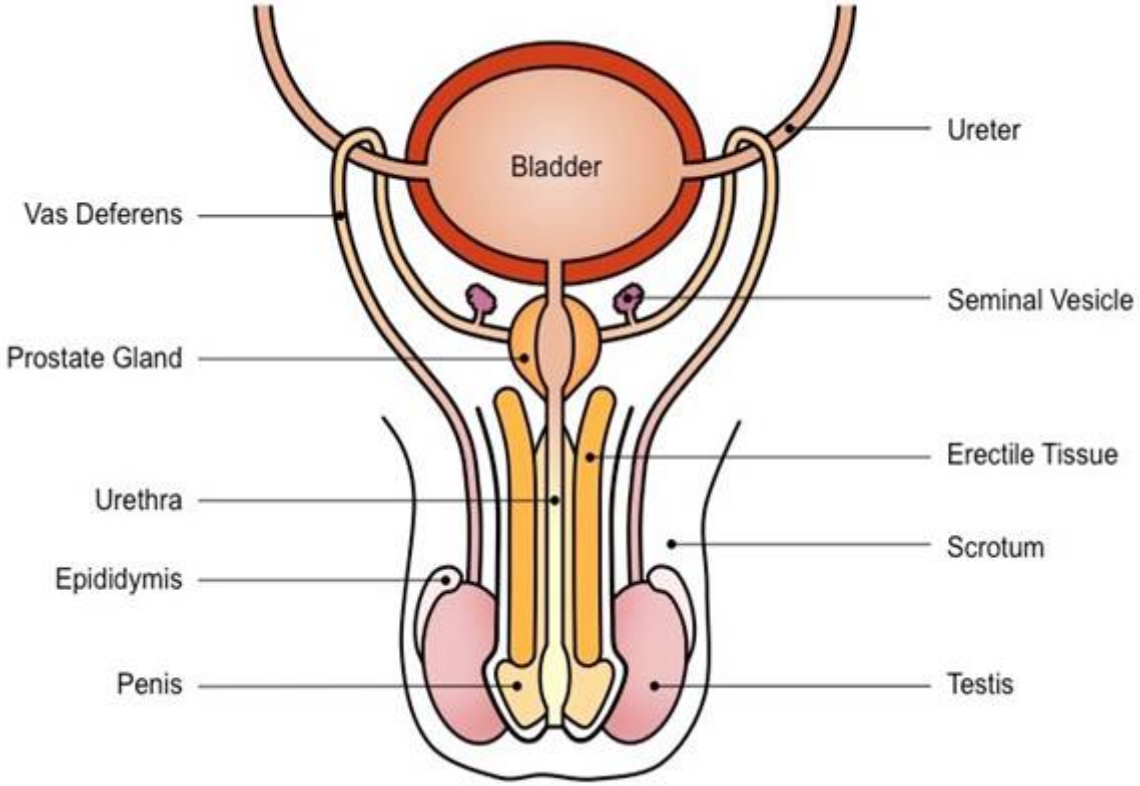
The main excretory organ in human being is kidney that releases about 80% of liquid waste from the body. Urine formation occurs in the kidney in 3 parts- glomerular filtration, re-absorption and secretion. The afferent arteriole brings blood to the kidney and forms a bunch of capillaries in the Bowman's capsule. Glomerular filtration occurs in the Bowman's capsule where glucose, salts, amino acids, urea get collected after filtration. Water and solutes that are smaller than proteins are forced into the renal tubule where reabsorption of water, glucose, amino acids and needed ions occurs and returns them back to the blood. Tubular secretion removes additional wastes from the blood and adds them to the filtrate. Further, water is removed from urine and returned to blood. Urine is sent to the collecting ducts.

Kidneys are bean-shaped organs located in the left and right of vertebrae column backside below stomach. Each kidney is enclosed in a renal capsule which is surrounded by the adipose tissue. Internally the kidney has the following parts- renal cortex, renal medulla, renal pyramids, renal columns and renal pelvis along with major and minor calyces. Kidney is the main excretory organ of excretion that releases about 80% of liquid waste from the body. Blood enters the kidney through renal artery and leaves the kidney through renal vein.

**69. Question**

Draw the diagram of male reproductive system. State the mechanism of primary reproductive organs in human being.

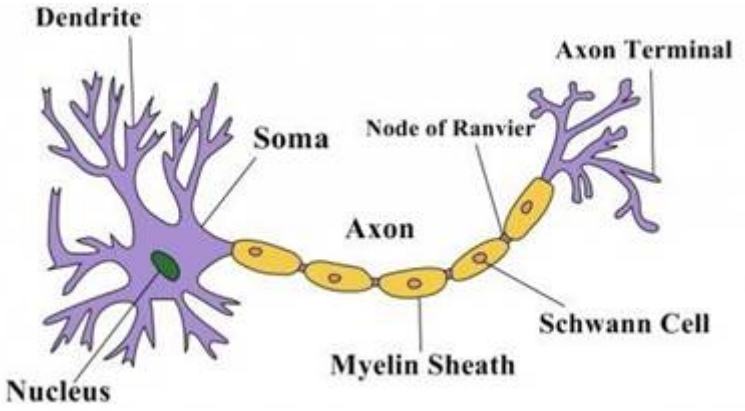
**Answer**




-The primary reproductive organs in males and females are testes and ovary respectively. These primary reproductive organs produce sex cells and secrete hormones. Such organs are called gonads (testes and ovary) and the sex cells they produce are called gamete cells. In males, testes are concerned with sperm formation an release the hormone testosterone. In females, ovaries are concerned with production of ovum and release the hormone estrogen and progesterone.

**70. Question**

Explain the structure of nerve cell through diagram. Explain the importance of hypothalamus and pituitary gland.




**Answer**

A nerve cell i.e., a neuron is the basic structural and functional unit of a nervous system. It is made up of dendrites that arise from the cell body or perikaryon and axon. The perikaryon contains a cell nucleus and perinuclear cytoplasm. It also has Nissl granules and some free ribosomes. The perikaryon has an axon hillock that gives rise to axon. Axon is a long cylindrical outgrowth which begins from cell body and ends up in branches. These branches have synaptic knobs at their ends which contain neurotransmitters. Neurotransmitters play an important role in nerve conduction.

Importance of hypothalamus- Hypothalamus found in the diencephalon part of the fore brain, controls metabolism, regulates the body temperature, regulates water balance, sleep etc. It is the center for hunger, thirst, sleep, temperature, fatigue etc. Hypothalamus links the nervous system to endocrine system via the pituitary gland. It sends signals to pituitary glands if any condition needs to be corrected. The hypothalamus itself acts as an endocrine organ by releasing the hormones ADH and oxytocin into circulation at neurohypophysis. It contains autonomic centers which have direct control over the adrenal gland.

Importance of pituitary gland- Pituitary gland is located just under the brain and has 2 lobes-anterior and posterior. This gland communicates directly with the hypothalamus (it is suspended from the hypothalamus) and secretes hormones that act on other glands. Such hormones are known as tropic hormones that act and influence other glands. The pituitary gland is also called the master gland of the body because it produces and secretes various hormones that regulate other glands. It secretes hormones like prolactin, vasopressin, growth hormone, oxytocin, gonadotropin etc.