NOTES

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SCIENCE

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TRANSPORTATION IN ANIMALS AND PLANTS

Circulatory System

The organ system of the body that is responsible for the **transport of material** throughout the body is called the **circulatory system**.

- The materials transported are nutrients, oxygen, carbon dioxide, cells, etc
- The medium of transportation is blood.
- The primary parts of the circulatory system are heart, arteries and veins.

Blood

- Blood is a fluid tissue that transports nutrients and oxygen to the cells and carries away carbon dioxide and other waste products in our body.
- The fluid part of blood is called plasma and has various salts and nutrients dissolved in it.
- Blood cells are suspended in plasma and they are Red Blood Cells (RBCs), White Blood Cells (WBCs) and Platelets.

Plasma

- Plasma is the liquid component of the blood in which most of the blood cells are suspended.
- It is mostly made up of water (up to 95%) and contains dissolved nutrients, carbon dioxide and oxygen.

RBC

- Red Blood Cells (RBC) present in the blood are responsible for the transport of oxygen throughout the body.
- They contain a red pigment called haemoglobin, which binds with the oxygen.
- The reddish colour of the blood is due to haemoglobin.

WBC

- The blood contains white blood cells (WBC), which are part of the immune system.
- They are like soldiers, which fight and kill germs that may enter the body.

Blood Platelets

- Platelets are the smallest cells in the blood.
- By clumping together, they form a blood clot, preventing loss of blood due to bleeding.
- They prevent excessive damage to the blood vessels by binding together at the site of damage.

Blood Vessels

- Blood vessels are tubes that carry blood all over the body.
- Arteries, veins and capillaries are collectively called as blood vessels.

Arteries

- Arteries are blood vessels that carry oxygenated blood to the cells and tissues of our body.
- They carry blood from the heart to the tissues.

Veins

- Veins are blood vessels that carry away deoxygenated blood from the cells and tissues of our body.
- They carry blood from tissues to the heart.

Capillaries

- Capillaries are the smallest of the body's blood vessels.
- It serves the most important task of the circulatory system: exchange of material between circulation and cells.
- The fine network makes it easy for the process of diffusion of materials due to the increase in surface area.

Heart

- The heart is a muscular organ in animals that pumps blood through blood vessels to all the parts of the body.
- The heart consists of four chambers that prevent the oxygenated and deoxygenated blood from mixing.
- The upper chambers are called as atria and the lower chambers are called as ventricles.

Valves

- Valves are present in the heart as well as in veins.
- In the heart, they are present between atria and ventricles and at the base of big vessels leaving the heart.
- Valves are responsible for the unidirectional flow of blood in the body.
- Opening and closing of the valves present in the heart is responsible for the lub-dub sound of the heart.

Pulmonary Circuit

- It is the network of arteries and veins connecting the heart and lungs.
- Deoxygenated blood is pumped from the blood to the lungs for oxygenation.
- The oxygenated blood returns to the heart to be pumped to the rest of the body.



Oxygenation of Blood

- Oxygenation of blood occurs at the alveoli in the lungs.
- The alveoli have blood vessels wrapped around it and the blood is oxygenated by diffusion.

Pulse

- The heart periodically expands and contracts to pump blood into the arteries, which also expands and contracts as the blood flows through them. This is called pulsation.
- This pulsation of the arteries can be felt at certain places of the body such as the wrist.
- Pulsation is measured as the number of heartbeats per minute, which is nothing but pulse rate

Excretory System

Excretion

The process of removal of waste products from the cells of living organisms is called excretion.

- For human beings, the waste products are in the form of carbon dioxide, urine and faeces.

Kidneys

- Our body's main excretory organs are the kidneys.
- There is a pair of kidneys present on either side of the spine.
- Each kidney is a bean-shaped organ, reddish in colour.
- It contains millions of tiny tubules that act as microscopic filters and filter out the useful and harmful substances from the blood.
- The useful substances are again reabsorbed back into the blood and only harmful substances are concentrated.

- These harmful substances are present in a dissolved state in water and now it is called as urine.
- Urine is excreted out of the body.
- Thus, kidneys act as filters of our body.

Ureters

- Urine is sent from the kidneys to the urinary bladder through tubes called ureters.

Urinary Bladder

- The urinary bladder is a muscular bag where urine is accumulated and excreted from the body through the urethra.
- It can hold about 300-500 mL urine for a while before the urge to empty occurs.

Dialysis

- Dialysis is the filtering of blood outside the human body using a machine, when both the kidneys fail.

Excretion in Other Animals

- Excretion in different animals differs based on the excretory material.
- Ammonia, urea and uric acid are the commonly excreted material.

Transportation in Plants

Osmosis

Osmosis is the movement of solvent molecules from a region of **lower solute concentration** to a region of **higher solute concentration** through a semi-permeable membrane.

Root Hair

- Root hairs are elongated extensions of the roots that are comparable to hairs on animals.
- They increase the surface area for increased exchange of water and minerals.

Phloem

- Phloem is the plant tissue that transports the soluble organic material created during photosynthesis from the leaves to the other parts of the plant.

Xylem

- Xylem is the plant tissue that transports the water and other nutrients from the roots to other parts of the plant.

Transpiration

- Transpiration is the loss of water in the form of water vapour from stomata present on leaves.
- This process also helps the plants absorb and distribute water through their roots.
- Transpiration exerts a straw-like effect and the water moves up against gravity in tubes made of xylem cells.

SOME IMPORTANT QUESTIONS

Question 1: Why is the transport of materials necessary in a plant or in an animal? Explain.

Answer 1: Transporting minerals to every cell in plants and animals is important as all the cells require specific nutrients and a regular supply of oxygen for releasing energy through respiration. The food we intake is broken down into smaller components for easy absorption by cells.

The oxygen we breathe also is transported to all the cells of the body. Organisms also require the execution of constant removal of waste materials such as carbon dioxide, urea and uric acid.
For the transportation of materials, humans have a very complex and specialized system, and in plants, transportation of water and minerals is performed through a vascular tissue system.

Question 2: What will happen if no platelets are in the blood?

Answer 2: Absence of platelets or lack of platelets in blood results in the blood being unable to clot. Blood clots are because platelets are present in the blood, which are responsible for releasing a few chemicals which clot the blood. Hence, if there are no platelets present in the blood, the blood will not clot and will not be able to prevent further bleeding.

Question 3:

Fill in the blanks.

(i) Haemoglobin is present in _____ cells.

(ii) Arteries and veins are joined by a network of _____ .

(iii) The rhythmic expansion and contraction of the heart is called _____.

(iv) The main excretory product in human beings is _____.

(v) Sweat contains water and _____ .

(vi) Kidneys eliminate the waste materials in the liquid form called _____ .

(vii) Water reaches great heights in the trees because of suction pull caused by _____ .

Answer 3:

(ii) **red blood** (ii) **capillaries.**(iii) **heartbeat.**(iv) **urea.**(v) **salts.** (vi) **urine.**(vii) **transpiration.**

Question 4: What are stomata? Give two functions of stomata.

Answer 4: Tiny pores on the lower side of the leaf's surface are known as stomata.
The functions of stomata are

1. Stomata help in the exchange of gases necessary for the respiration of the plant.
2. Evaporation of water from the surface of the leaf to the atmosphere also occurs through stomata. This process is also known as transpiration.

Question 5: What are the components of blood?

Answer 5: There are three components of blood those are:

1. Red Blood Cells (RBCs) 2. White Blood Cells (WBCs) 3. Platelets

1. Red Blood Cells (RBCs): Red blood cells in the blood are the most abundant cells present. It contains a red pigment known as haemoglobin that binds with oxygen. It's the haemoglobin which carries oxygen and transports it to all parts of the body.
2. White Blood Cells (WBCs): White blood cells are colourless cells without haemoglobin. Their main function is to fight against infections and protect the body from foreign particles like bacteria and viruses.
3. Platelets: Platelets are the smallest cells present in the blood. Their main function is to prevent bleeding.

Question 6: Why is blood needed by all the parts of a body?

Answer 6: Blood is the main medium of transportation for the body. It is needed by all body parts as it performs the following important functions:

1. Blood transports oxygen from the lungs to all the cells in our body.
2. It carries carbon-di-oxide from the body back to the lungs so it can be exhaled easily.
3. Blood also regulates heat, thus helping in thermoregulation.
4. Blood contains WBCs responsible for fighting diseases and infections.

Question 7: Describe the function of the heart.

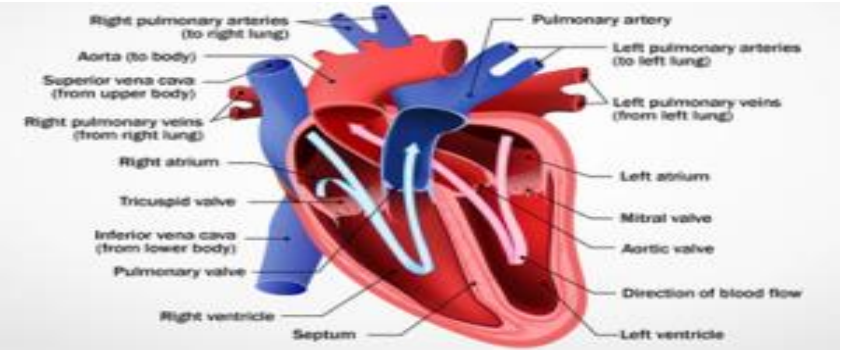
Answer 7: The heart is a muscular organ responsible for pumping blood and keeping a person alive. The human heart has four chambers; the two upper chambers are called the right and left atrium, respectively, and the two lower chambers are called the right and left ventricles.

The flow of blood in the human heart:

The right atrium receives deoxygenated carbon dioxide-rich blood from the body through the pulmonary artery. Blood from the right atrium is pumped to the right ventricle, which pumps blood to the lungs.

exchanging gases takes place in the lungs, and oxygen-rich blood exits the lungs and reaches the left atrium through the pulmonary vein. Blood is then pumped to the left ventricle, from where blood is pumped to all parts of the body.

Hence, the rhythmic contraction and expansion of the heart transports blood to all parts of the body and also causes the sound of a heartbeat.



Question 8: Why is it necessary to excrete waste products?

Answer 8: All cells in our body excrete waste while performing their function. This, although present in low quantity, is toxic for our body hence the need to excrete them. . The process of removing waste products produced in the cells of living organisms is called excretion.

Question 9:

The muscular tube through which stored urine is passed out of the body is called –

(a) kidney (b) ureter (c) urethra (d) urinary bladder

Answer 9: (c) Urethra

Question 10: They are pipe-like, consisting of a group of specialised cells. They transport substances and form two-way traffic in plants. Which of the following terms qualify for the features mentioned above?

(a) Xylem tissue (b) Vascular tissue (c) Root hairs (d) Phloem tissue

Answer 10: (d) Phloem tissue

Question 11: In which of the following parts of the human body are sweat glands absent?
(a) Scalp (b) Armpits (c) Lips (d) Palms
Answer 11: (c) Lips
Question 12: Veins have valves which allow blood to flow only in one direction. Arteries do not have valves. Yet the blood flows in one direction only. Can you explain why?
Answer 12: Arteries do not have valves. Yet the blood flows in only one direction as opposed to the unidirectional, rapid blood flow found in arteries.
Question 13: Arrange the following statements in the correct order in which they occur during the formation and removal of urine in human beings.
(a) Ureters carry urine to the urinary bladder.
(b) Wastes dissolved in water are filtered out as urine in the kidneys.
(c) Urine stored in the urinary bladder is passed out through the urinary opening at the end of the urethra.
(d) Blood containing useful and harmful substances reaches the kidneys for filtration.
(e) Useful substances are absorbed back into the blood.
Answer 34:
(d) Blood containing useful and harmful substances reaches the kidneys for filtration.
(e) Useful substances are absorbed back into the blood.
(b) Wastes dissolved in water are filtered out as urine in the kidneys.
(a) Ureters carry urine to the urinary bladder.
(c) Urine stored in the urinary bladder is passed out through the urinary opening at the end of the urethra.



Question 14:
Name the process and the organ which helps in removing the following wastes from the body.
(a) Carbon dioxide (b) Undigested food (c) Urine (d) Sweat
Answer 14:

PROCESS	**ORGAN**
a) Exhalation	Lungs
b) Egestion	Large Intestine
c) Excretion	Kidneys
d) Perspiration	Sweat Glands

Question 15: Fill in the blanks of the following paragraph using just two words – arteries and veins.

___(a)___ carry oxygen-rich blood from the heart to all parts of the body, and ___ (b)___ carry carbon dioxide-rich blood from all parts of the body back to the heart. ___ (c)___ have thin walls and __ (d)___ have thick elastic walls. Blood flows at high pressure in ___ (e)____. Valves are present in __ (f) ___, which allow blood to flow only towards the heart. __ (g)___ divide into smaller vessels. These vessels further divide into extremely thin tubes called capillaries. The capillaries join up to form ____ (h)_____.

Answer 15:

a)Arteries carry oxygen-rich blood from the heart to all parts of the body, and **b) veins** carry carbon dioxide-rich blood from all parts of the body back to the heart. **c) Veins** have thin walls, and **d) arteries** have thick elastic walls. Blood flows at high pressure in **e) arteries**. Valves are present in **f) veins** which allow blood to flow only towards the heart. **g) Arteries** divide into smaller vessels. These vessels further divide into extremely thin tubes called capillaries. The capillaries join up to form **h) veins.**

Question 16: Define pulse.

Answer 16: Throbbing or the rhythmic contraction and dilation that occurs in the arteries resulting from the heartbeat is called a pulse.

Question 17: Define osmoregulation.

Answer 17: Maintaining the osmotic pressure of the body fluids by controlling the amount of water and electrolyte in the body is called osmoregulation.



Question 18: Explain Dialysis.

Answer 18: Dialysis is a medical treatment performed in patients with weak or faulty kidneys. It is an artificial machine containing a tank with a solution of water glucose and salt with a concentration similar to blood. The patient's blood is taken through the artery and is allowed to pass through the solution for the removal of waste. The purified blood devoid of any impurities is then pumped back to the vein. Dialysis is continued until all the blood has been purified.

Question 19: Why do sponges and hydra lack blood?

Answer 19: Animals such as sponges and hydra do not possess any circulatory system as their habitat, water in which they live brings food and oxygen, and it enters through pores present on their body surface, and the waste is carried out. .

Question 20: Differentiate between Artery and Vein.

Answer 20: The following are the differences between artery and vein:

ARTERY	VEIN
Arteries carry blood from the heart to various body parts.	Veins carry blood from the various parts of the body to the heart.
Arteries carry oxygenated blood from the heart, except the pulmonary artery.	Veins carry deoxygenated blood from the body parts, except the pulmonary vein.
Arteries carry blood under high pressure.	In veins, blood flows comparatively slowly.
As blood flows rapidly, no valves are present.	Valves are present to prevent the blood from flowing backwards.

Question 21: Ammonia is excreted in gaseous form by:

- **Humans**
- **Pisces**
- **Reptiles**
- **Aves**

Answer 21: Pisces

CHAPTER-8

REPRODUCTION IN PLANTS

Reproduction:

- The process of producing offspring by the parent is called reproduction.
- It is a biological process.
- The offspring produced can and cannot be the exact copy of the parent.

Mode of Reproduction:

- There are two modes of reproduction, asexual reproduction and sexual reproduction.

Asexual Reproduction

- Reproduction that occurs without the involvement of male and female gamete is called asexual reproduction.
- Seed is not produced in this mode of reproduction.

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