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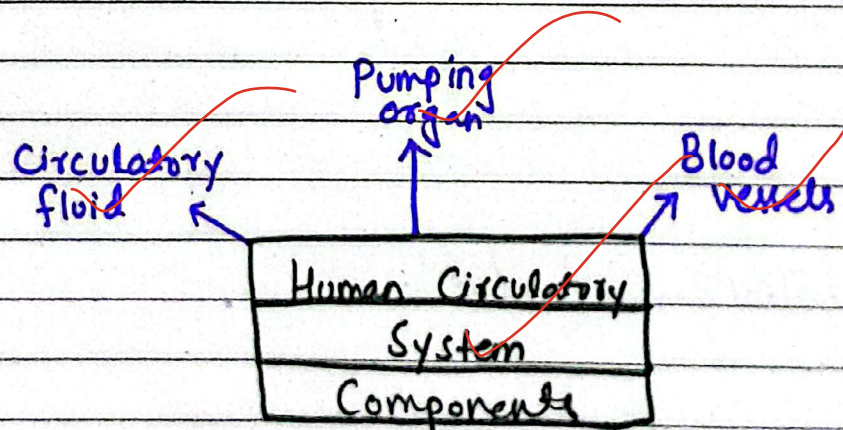
Test 1: General Science And Ability

Question 1

- a) What is circulatory system? Describe working of human heart.

Circulatory System:

The system of human body responsible for transportation of nutrients and minerals to the cells as well as collection of nitrogenous waste from cells through flowing circulatory fluid in blood vessels.



Working of Human Heart:

Human heart is a pumping organ composed of cardiac muscles and enclosed by peritoneal membrane.

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a) Structure of Human Heart:

⇒ Heart consist of four lobes two Atrio-ventricles and two ventricles

⇒ The upper two lobes of heart are called Atria and lower two lobes are called ventricles

⇒ In right atrium and right ventricle there is tricuspid valve while there is bi-cuspid valve in left atrium and ventricles

⇒ Besides that, there are Atrio-ventricular nodes and semilunar valves on right side of heart.

⇒ There is also a pair of coronary arteries arising from left lobes of heart & called "coronary arteries" which supplying blood to heart

b) Working of Heart:

Human heart supply blood to all the body in following steps

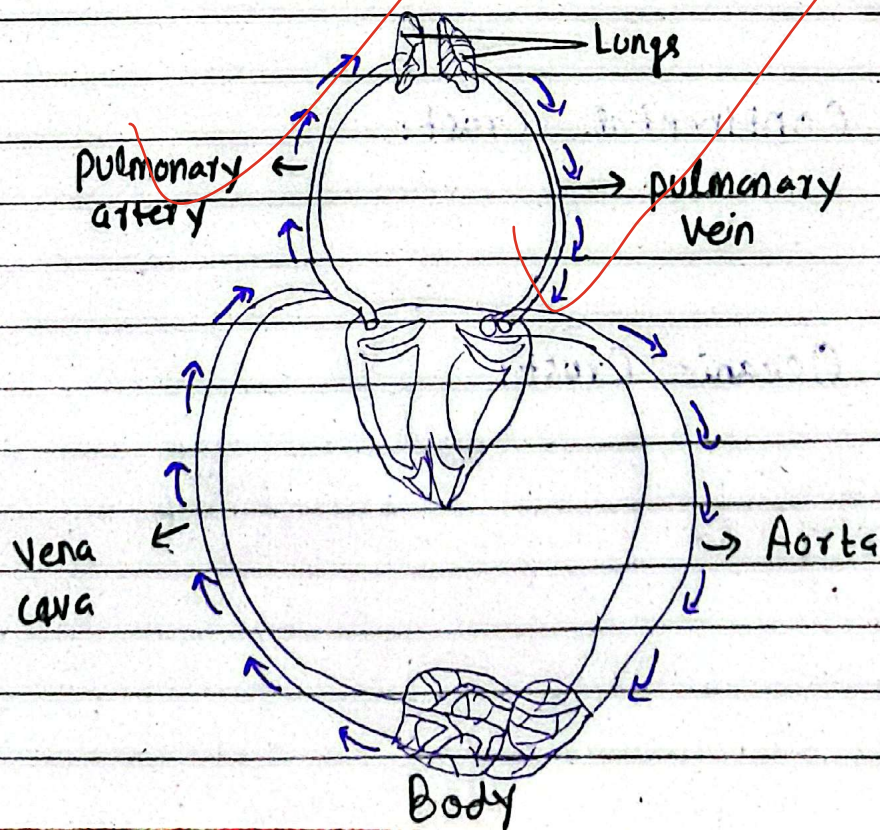
- 1) Oxygenated blood from lungs enters into Left Atria via pulmonary veins, which passing through bicuspid valve enter into Left Ventricle
- 2) From Left Ventricle blood is distributed to all the body through

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- ^{aorta}
~~superior vena cava~~, which is further divided into arteries supplying blood to arms, legs, shoulders and head through arteries and capillaries.
- 3) After gaseous exchange at cellular level de-oxygen blood from the body is collected by veins that finally opens into single large Vena Cava. (Superior vena cava collecting deoxygenated blood from head and inferior vena cava from lower parts of body.)
- 4) Vena cava pour deoxygenated blood into right atrium and ventricles and through pulmonary arteries deoxygenated blood enters lungs to get oxygenated again and cycle is repeated.

Diagrammatic Representation:



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Q1: b) Explain the internal structure of Earth?

1) Earth and its internal structure

Earth is only habitable planet of our solar system, third of eight planets and only known place in universe to support life.

⇒ Earth inner mainly consist of three layers crust, mantle and core.

a) Crust:

The outermost layer of earth on which humans reside is called crust.

⇒ Earth's crust is mainly composed of oxygen, silicon, aluminium, iron, calcium, sodium, potassium etc.

⇒ Crust make up less than 1% of earth by mass, but consist of

i) Continental Crust:

→ Has low density

→ Has composition similar to granite.

ii) Oceanic Crust:

→ It has relatively high density

→ It is composed of basalt.

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b) Mantle:

The largest and thickest layer of geosphere between crust and core is called mantle.

⇒ Mantle is composed of magnesium, aluminium, silicon and oxygen and silicates.

⇒ It extends from the base of crust to a depth of 2900 km.

c) The Core:

The inner most layer of earth is called core.

⇒ It has both liquid and solid component and it is mainly made up of iron, nickel and oxygen.

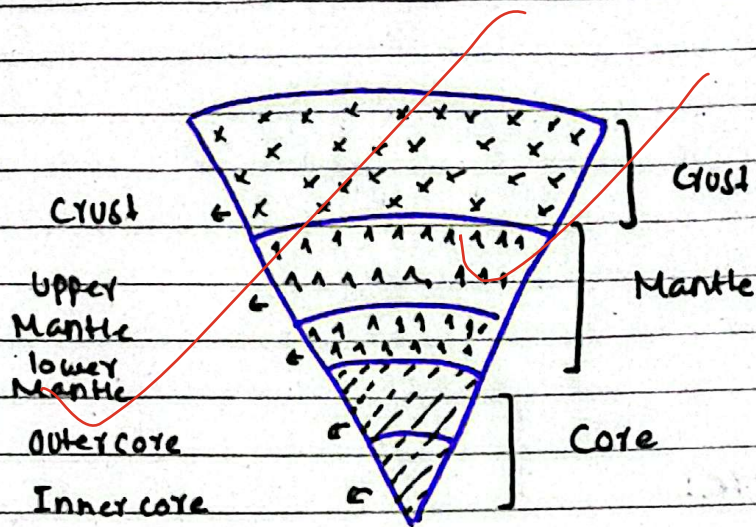
⇒ Core has further two parts

i) Inner Core:

It is very hot and dense solid sphere mainly composed of iron and nickel.

ii) Outer Core:

It is a liquid layer surrounding inner core. It is made up of iron and nickel but in fluid state.



Inner structure of earth

Question No: 02

Difference between Plant and Animal cell

Difference between Plant And Animal Cell

1) Cell Wall:

Plant cell have

Animal cell don't have

2) Vacuole:

⇒ Plant cell has large central Vacuole

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⇒ Animal cell has numerous small vacuoles.

3) Shape:

⇒ Plants cells mostly have rectangular shapes

⇒ While animal cells are irregular in shape.

4) Position of Nucleus:

⇒ Plant cell have nucleus on periphery due to large central vacuole.

⇒ Animal cells have vacuole in center of cell.

5) Flagella for locomotion:

⇒ Plant cells lack

⇒ Animal cells have

6) Chloroplast:

⇒ Plant being photosynthetic
.. have chloroplast

⇒ Animal cell don't have

7) No. of Mitochondria:

⇒ Plants cells have lesser number of mitochondria

⇒ Animal cells have greater number of mitochondria

8) Peroxisomes:

⇒ Plant cells have peroxisomes that perform storage function in early stages of plants

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⇒ Animal cell don't have this organelle.

9) Storage Material / Nutrient:

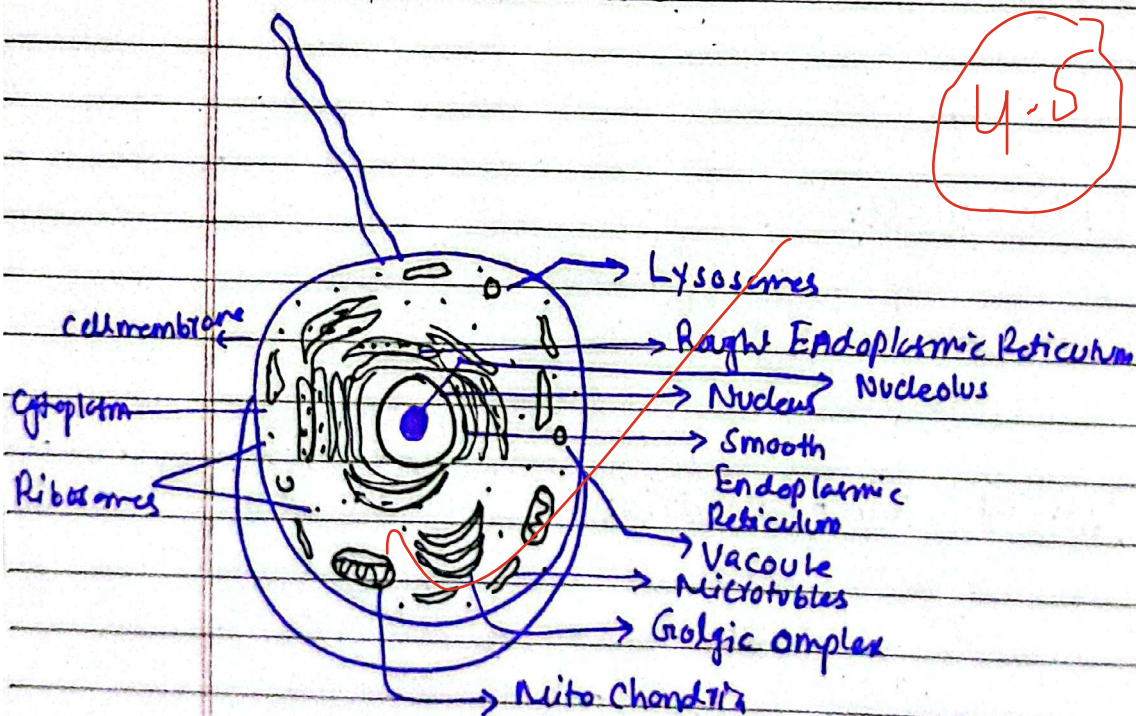
⇒ Plant store starch for energy

⇒ Animal store glycogen for energy

10) Centrioles:

⇒ Plants cells lack centrioles and have plasmodesmata

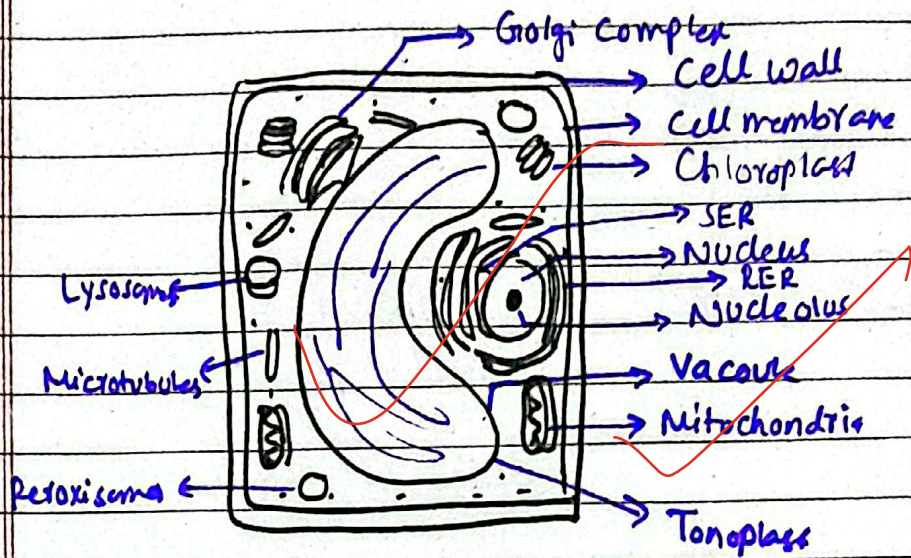
⇒ Animals cell contain pairs of centrioles



Structure of Animal cell

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Structure of plant cell

b) How Urine formation takes place in human body

Urine formation in Humans:

⇒ A pair of kidneys in human is involved in filtration of blood and formation of urine. Per heart beat kidneys receive 20% of blood that got filtered.

Nephrons:

The structural and functional unit of kidneys is called nephrons. There are millions of nephrons in each kidney.

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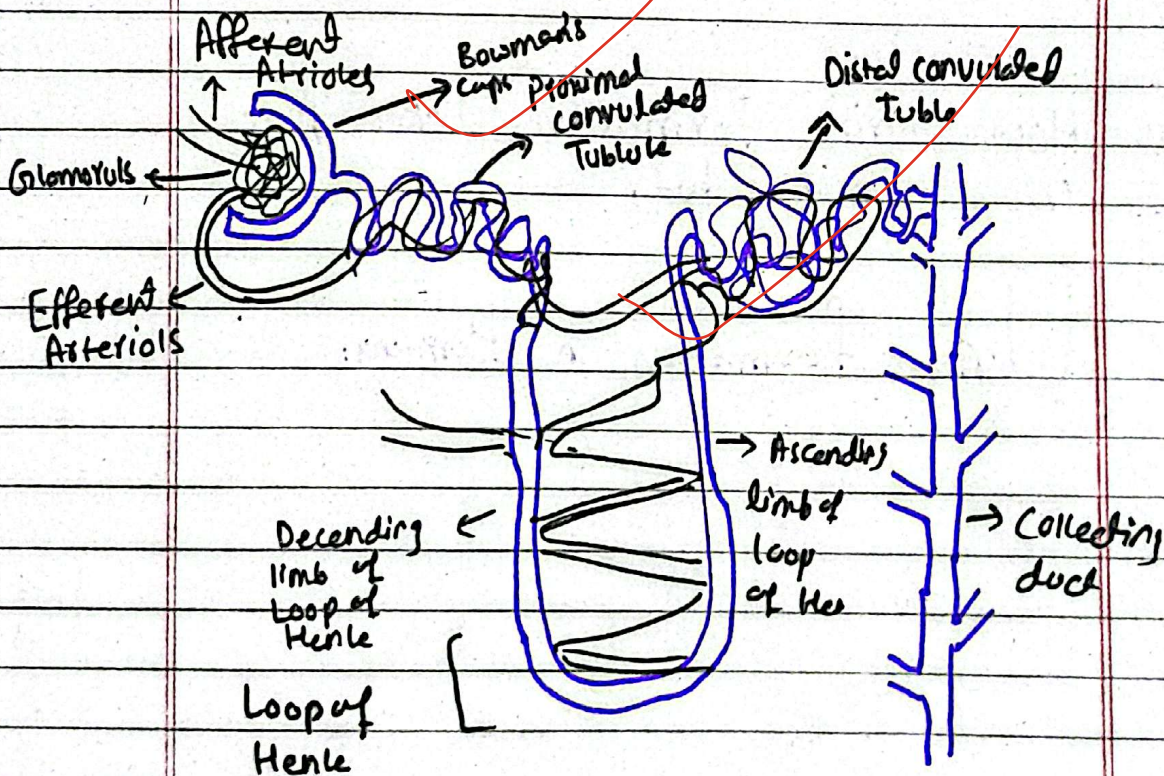
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Nephrons filter blood and produce urine through filtration, reabsorption, ~~ultra~~ secretion, ~~ultra~~ filtration and excretion.

Structure of Nephron:

↓ ↓ ↓ ↓ ↓

Bowman's Capsule	Proximal Convoluted tubule	Loop of Henle	Distal Convoluted tubule	Collecting duct
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Structure of Nephron

Steps of Urine formation

1) Filtration

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- 2) Reabsorption
- 3) Secretion
- 4) Ultrafiltration
- 5) Excretion

1) Filtration:

Blood entering into Bowman's capsule is filtered through capillary pressure. Blood cells cannot cross walls of capillaries but other small molecules cross walls of capillaries.

This includes glucose, amino acid, salts, nitrogenous wastes etc.

3) Secretion:

As the filtrate which is now called glomerular filtrate when passed through loop of henle then lumen of loop secretes H^+ ions to maintain the pH of filtrate.

2) Reabsorption

Many useful substances are present in the glomerular filtrate. That must be reabsorbed back into blood. These include essential salts and metabolites.

4) Ultrafiltration

Once the filtrate passes through descending limb of loop of henle

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Water is reabsorbed back into glom interstitial fluid. As filtrate move up into ascending limb of loop of Henle water is reabsorbed actively. This is mainly done through **Anti-Diuretic Hormone**, released from posterior pituitary gland to actively absorb water.

5) Excretion:

Until now all the useful constituents of glomerular filtrate is reabsorbed and ultra-absorbed. Now the fluid passing through collecting ducts of millions of nephron contain urine have nitrogenous waste, excess water, and other harmful substances. Collecting ducts open into **Ureter** that enter **Urinary bladder** that temporarily stores urine until it is released from **Urethra**.

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