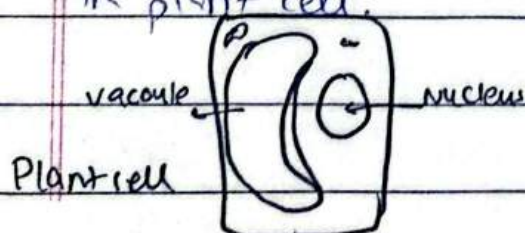


QUESTION #2

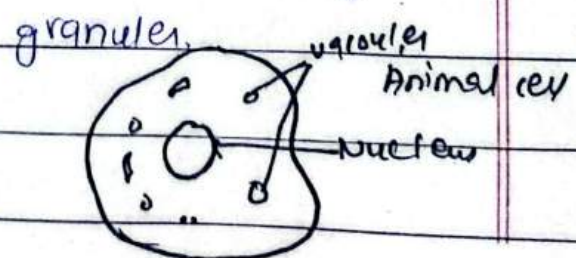
9- Differentiate between Plant and animal cell

PLANT CELL

- 1- Plant cells are usually larger in size.
- 2- Plant cell contains cell wall and cell membrane.
- 3- A single large vacuole is present in plant cell.
- 4- Plastids are present in plant cell.
- 5- Plant cell lacks centrioles.
- 6- Nucleus is present at the periphery in plant cell.
- 7- Plant cells can synthesize nutrients through photosynthesis.
- 8- Starch grains are the major storage material in plant cell.

ANIMAL CELL

- Animal cells are usually smaller than plant cell.
- Cell membrane is present in animal cell while cell wall is absent.
- Animal cell contains large number of small vacuoles.
- Plastids are absent in animal cell.
- Animal cell has centrioles.
- Nucleus is present at the center of an animal cell.
- Animal cell cannot synthesize nutrients.
- The storage material in animal cell is glycogen granules.



6- Urine Formation in Human body:

1- Excretory System:

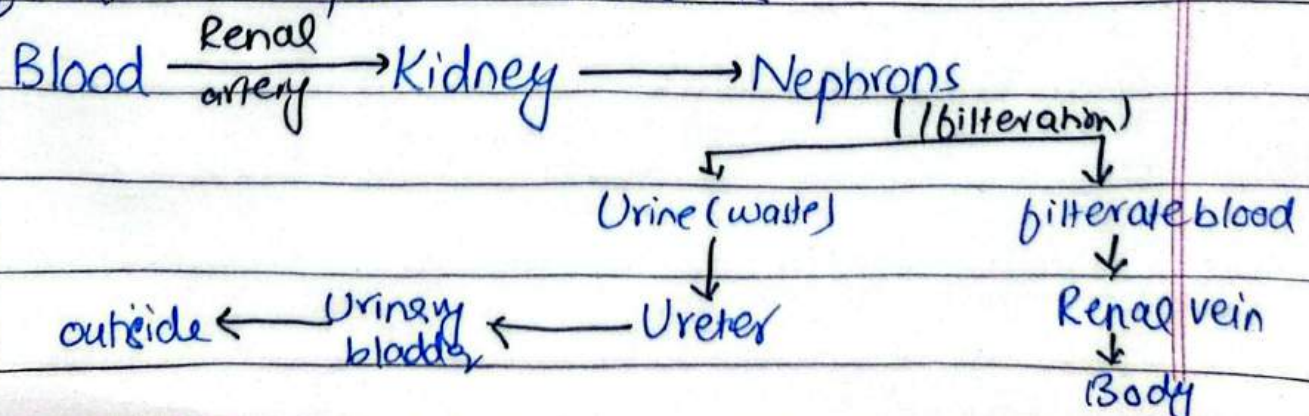
Excretory system is an organ system in human body that is responsible for the separation and removal of nitrogenous waste from the body. It is mainly responsible for the formation of urine as a waste product in human body. It is composed of a set of kidneys

2 Urine: (main excretory organ), two ureters, urinary bladder, and urethra.

2- Kidneys:

In human body, there are 2 kidneys present. The basic structural and functional unit of kidney is a cell called nephron. Each kidney contains one millions nephrons in it.

The weight of kidneys is 1% of the body but it receives 20% of blood supply for filtration. The process involved is -



Urine is the liquid by-product of metabolism formed through renal filtration in kidney. It contains 95 percent water and 5 percent of nitrogenous waste.

3- Process of Urine formation in Nephron:

The structural units of nephron are Bowman's capsule, glomerulus, proximal convoluted tubule, distal convoluted tubules, ascending and descending loop of Henle, and a collecting duct. The process of urine formation involve three steps:

a- Glomerular Filtration: Blood entering the nephron is filtered through glomerulus. It is a ball of capillaries whose walls being porous carrying out most of the filtration. The resultant by-product is glomerular filtrate. This filtrate contains useful substances like glucose, amino acids, and salts in aqueous solution. The glomerular filtrate appears in Bowman's capsule, which is a cup-shaped swelling.

b- Selective Reabsorption: The useful component like glucose, amino ~~water~~ acid, excess of salt

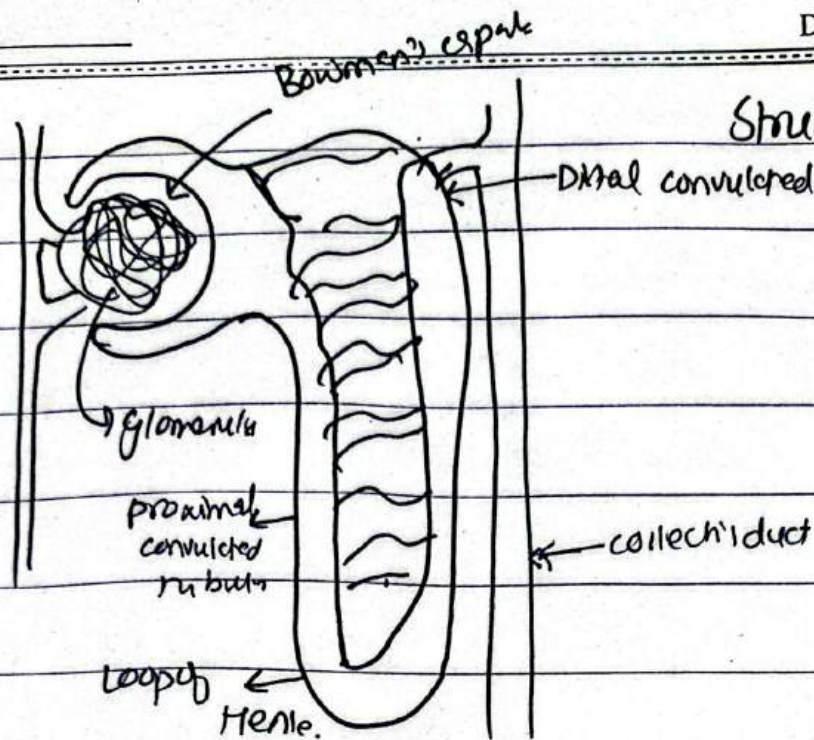
and water are reabsorbed at Proximal convoluted Tubule (PCT), loop of Henle (ascending and descending), and Distal convoluted Tubule (DCT). The filtrate leaving this stage contains nitrogenous waste in it. The selective reabsorption of each part is shown below.

Part of Nephron Selective Reabsorption of

- 1- Proximal convoluted tubule (active & passive transport) → Glucose + Amino acid (100%)
→ Water (60-65%)
- 2- Ascending loop of Henle → Reabsorption of salts as it is only permeable to them.
- 3- Descending loop of Henle → Reabsorption of water as it is only permeable to it.
- 4- Distal convoluted tubule → Water and Sodium (Na^+)
with help of anti-diuretic hormone ADH.
- c- Secretion of Hydrogen ions (H^+):

Hydrogen ion (H^+)

are secreted through tubular secretions of PCT, DCT and collecting tubule to balance the pH of filtrate. After this, urine is formed and moved out of the body through ureter to urinary bladder and urethra.



Structure of Nephron.

X ————— X

C- DRM and Weaknesses of DRM in Pakistan.

1- DRM:

DRM is a short abbreviation for Disaster Risk management. It refers to all aspects of managing disasters and risks. It includes prevention and mitigation, preparedness, anticipatory action, response and recovery. Prevention means to prevent a risk from occurring while mitigation means to reduce the impact of a risk.

Preparedness focus on enhancing capability and improving ability to deal with risk. The anticipatory action means to take action in advance for a risk. Likewise, the response

means responding to a disaster while recovery focuses on all effort to recover from a disaster.



2- DRM and Pakistan:

Pakistan is located at a faultline of geographic and climate disaster. The situation is aggravated by the recurrent security threats and challenges. It has a long-history of facing earthquakes, draughts, wildfires, floods, landslides, terrorist and urban flooding. Pakistan's lack of preparedness and mitigation has resulted into in comprehensible human and capital loss. The recent floods of 2025 are living example of this. DRM in Pakistan is dealt under National Disaster Management Authority (NDMA) and Provincial Disaster Risk Management Authorities (PDMA).

3- WEAKNESSES OF DRM IN PAKISTAN:

Following are

Shortcoming in DRM of Pakistan:

- i. Dearth of Resources and human force.
- ii - Lack of coordination among different departments.
- iii. NDMA and PDMA are not streamlined properly.
- iv - No proper warning systems.
- v. Insufficient risk assessment in ^{term} of impact.
- vi. Unplanned urbanization.
- vii. Lack of awareness and education.
- viii. Too much focus on response instead of preparedness and recovery.
- ix - Prevailing corruption.

4- STRATEGIES TO STRENGTHEN DRM IN PAKISTAN:

Pakistan needs

to work on preparedness and recovery of ability. For this, it needs to ensure:

- i. Devolution of PDMA to district and local level.
- ii. Construction of flood defenses and changing of urbanization plans and altitudes.
- iii. Improving preparedness with real-time risk assessment.
- iv. Inclusion of ^{climate-}resilient infrastructure in new projects.

v- Real time monitoring of disasters and risks through GPS system.

vi- Conduct of 9 through hazard identification and risk assessment.

X ——— X

d- Ceramics and its types.

1- CERAMICS:

Ceramics are non-metal compounds made up of clay. These inorganic compounds are prepared by heating clay at high temperatures along with some minerals.

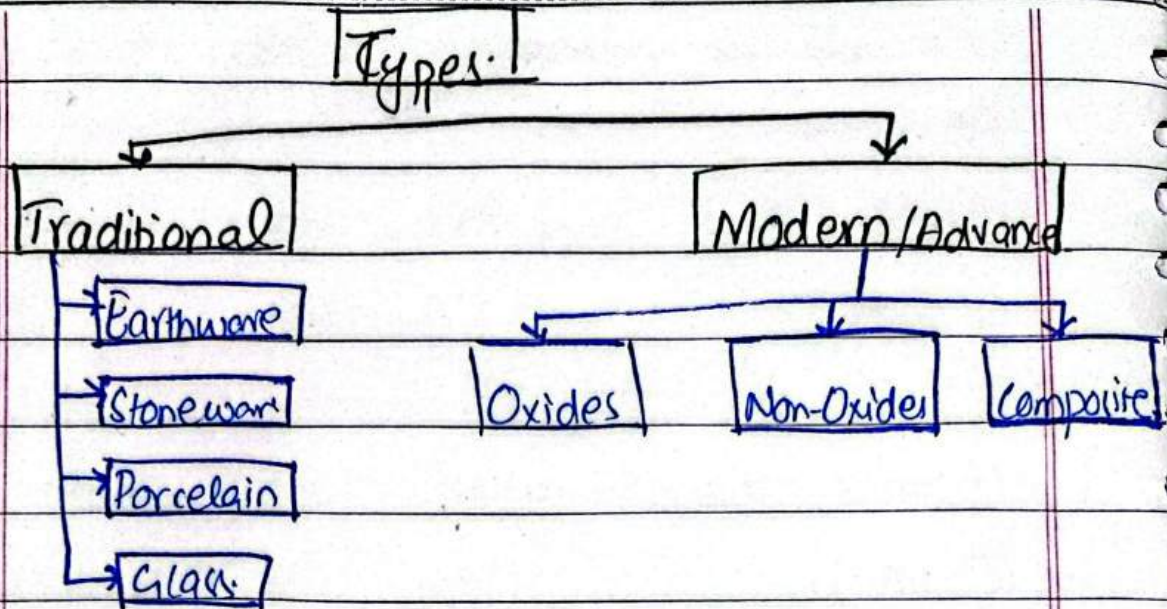
2- CHARACTERISTICS OF CERAMICS:

The properties of ceramics that distinguish them from other materials are:

- i- They are chemically inert and are oxidation resistant.
- ii- They are brittle but extremely hard and show stiffness under compression.
- iii- Ceramics are durable and water resistant.
- iv- They are non magnetic and have high melting and boiling points.

3- TYPES OF CERAMICS:

Ceramics are of following types:



a- Traditional Ceramics: Traditional ceramics are made from naturally occurring materials like clay and silica. These ceramics are being used by humans for hundreds of years. These include:

Earthenware → Porous and fired at low temperatures

Stoneware → Dense, waterproof, more durable. eg mugs

Porcelain → fired at high temperatures eg fine china.

Glass → due to inorganic nature

b- Advanced Ceramics: These ceramics are engineered for specific high-performance tasks and are made from synthetic powders like oxides, carbides and nitrides. Advanced ceramics are further divided into 3 categories

i- **Oxides:** These contain oxides of elements

like Alumina, iron oxide etc.

ii- Non-oxide: Non-oxide ceramic don't contain oxygen and are formed from carbides, nitrides or borides.

iii- Composite: Composite ceramics are made by combining both oxides and non-oxides to reduce brittleness.

4- APPLICATIONS OF CERAMICS:

Due to their chemical inertness and other properties, ceramics are widely used in industry for multiple purposes like.

- i- Construction : bricks, floor tiles etc.
- ii- Electronics : spark plugs, computer chips etc.
- iii- Aerospace : Heat shield tiles for space shuttle etc.
- iv- Medical : Dental crowns, bone replacements
- v- Industrial - cutting tools, furnace linings.
- vi- Automotive : brake discs etc.
- vii- Camouflage or coating to reflect radiation.
- viii- Kitchen ware -

X == X

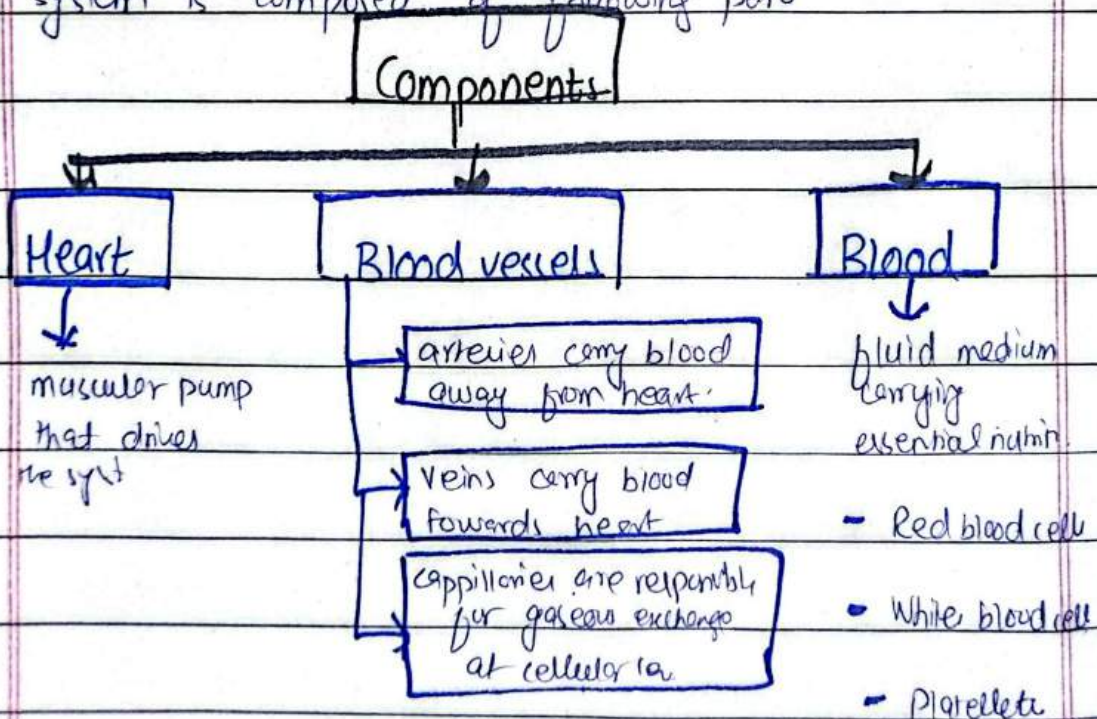
QUESTION # 01

a- Circulatory System and working of human heart:

1- CIRCULATORY SYSTEM:

Circulatory system is a part of organ (heart) and blood vessels that help in transporting of nutrients, oxygen, hormones, cellular waste throughout the body. It is the primary service of body for delivery and removal.

Components of Circulatory System: Circulatory system is composed of following parts



2- WORKING OF A HUMAN HEART:

The human heart is primary organ that pumps blood. It carries out its function in double pump, i.e. that

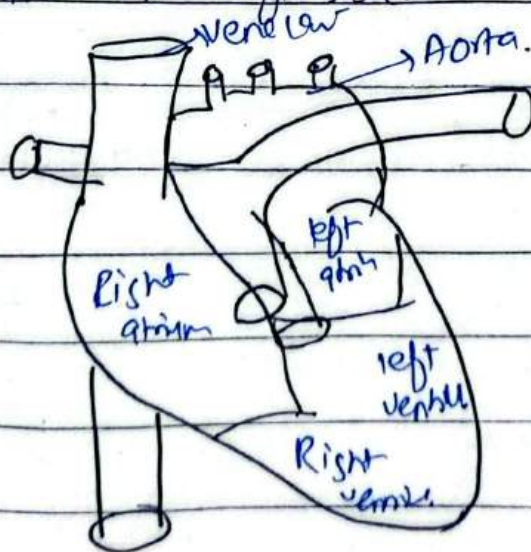
is, Pulmonary circuit (movement of blood from heart to lungs for oxygenation) and Systemic circuit (movement of blood from heart to all body parts).

i- Structure of Heart (human): Human heart is made up of 4 chambers.

a - Atrium (that receives blood)

b - Ventricle (pumps out blood)

There are right and left atrium and likewise right and left ventricle. There is a tricuspid valve between right atrium and right ventricle and a bicuspid one between left atrium and left ventricle. The right side of the human carries deoxygenated blood and oxygenated blood is present on left side.

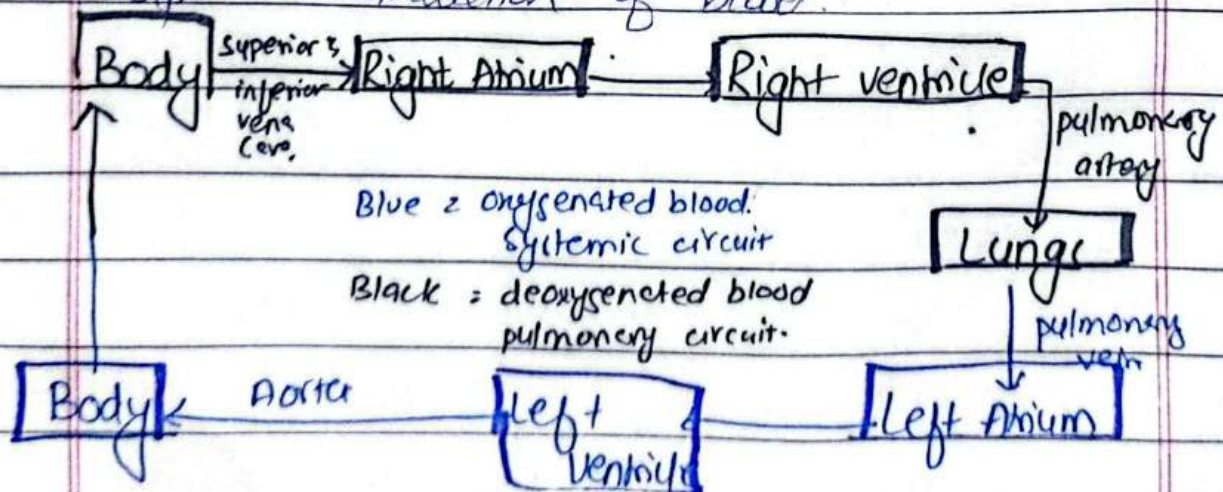


ii- Working and Functioning of a Human heart:

At The

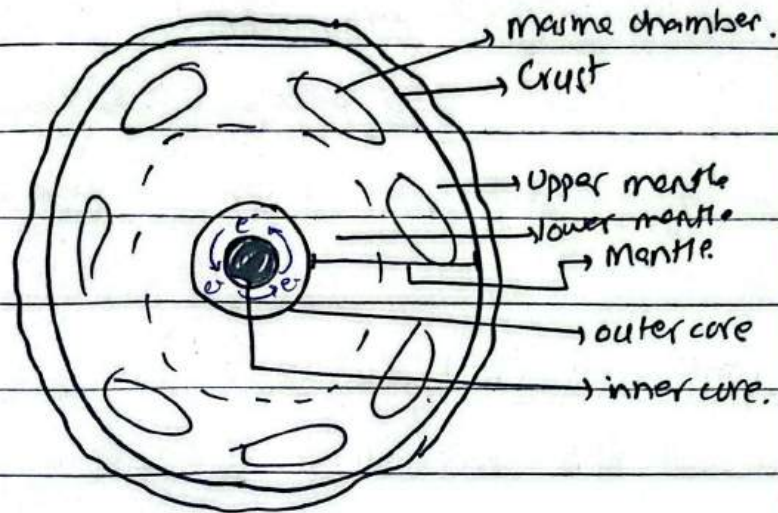
deoxygenated blood from whole body arrives in right atrium which pumps this deoxygenated blood to right ventricle. The right ventricle contracts and pumps the blood (deoxygenated) out of heart to lungs through pulmonary artery. At lungs, the deoxygenated blood receives oxygen and become oxygenated.

This oxygenated blood enters left atrium through pulmonary vein. The left atrium dumps blood into left ventricle which is the strongest part of heart. The left ventricle pumps oxygenated blood out of heart to all body parts through aorta. In this way, heart helps in circulation of blood.



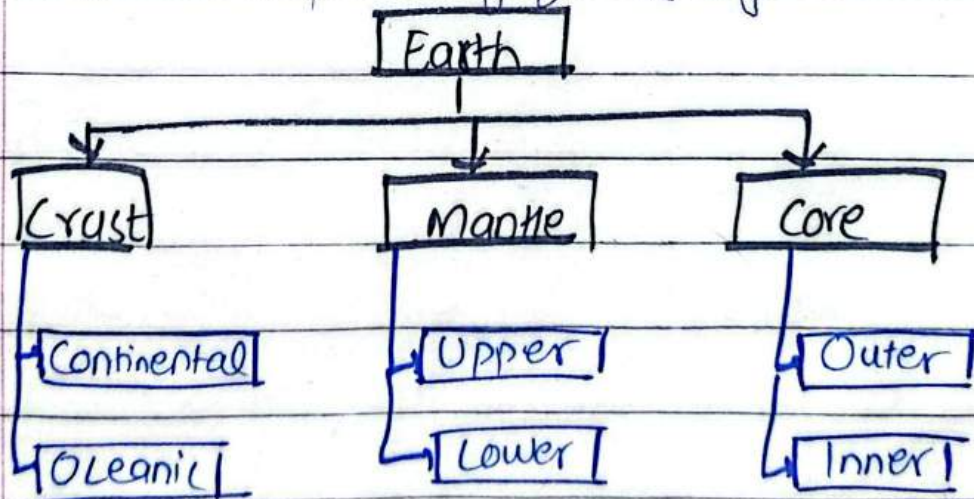
b- Internal Structure of Earth:

Earth is composed of layers in its internal structure. It is:



1- LAYERS OF EARTH:

The internal structure of Earth is composed of following layers:



a- Crust:

Crust is the outer most layer of Earth. It is made up of rocks and has depth of 5 km

to 70 km. It is further divided into 2 layer where it covers oceanic layer or is part of continent. Its composition of Silicon and Aluminium.

i- Oceanic crust: Oceanic crust is 5-10 km in thickness.

It is denser and behaves like Iron. It is made up of basaltic rocks. It can sink into mantle through subduction.

ii- Continental crust: Continental crust is 20-70 km

is ~~thinner~~ thickness. It is less denser than oceanic crust and behaves like wood. It does not sink and is mostly made up of granite rock.

b- Mantle:

Mantle is the middle layer of Earth internal structure and is mostly composed of Silicon and magnesium. It goes to 2900 km in depth. It is also subdivided into two regions.

i- Upper mantle: Upper mantle extend down to 670 kms. It contains, solid, liquid and semi-solid material. There are magma chamber in upper mantle through which lava escapes towards the crust. Upper mantle has two zones namely:

- Asthenosphere, which is a zone of weakness and is present at depth of 400 km.
- Transition zone, as clear by name this zone phase transition of minerals happens. The mineral change their structure by forming other atomic arrangement. Transition zone is found at the depth of 400 to 670 km.

ii- Lower Mantle: Lower mantle starts at the depth of 2300 km. No matter from this layer can ever escape and reach the Earth's surface.

c- CORE:

Core is the inner most layer of Earth. It starts at the depth of 3500 km and is mostly composed of Iron (Fe). Core is also divided into 2 layers.

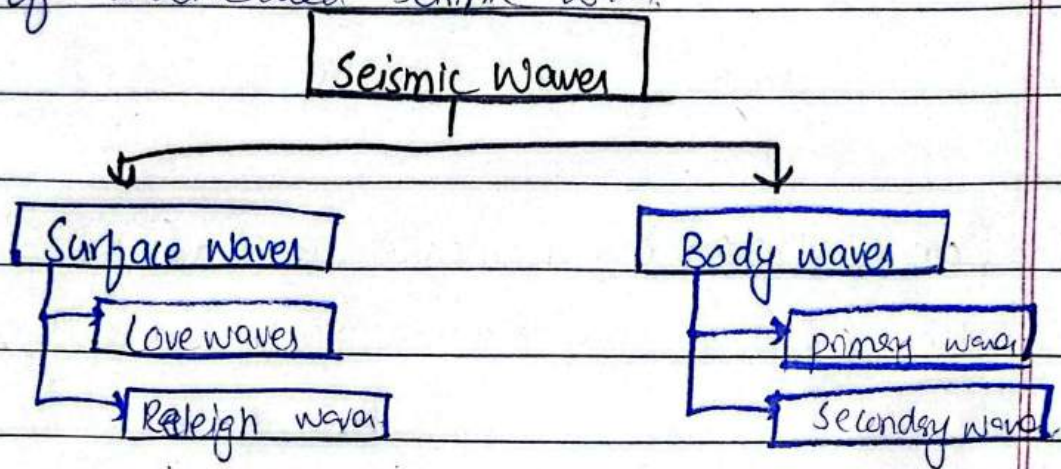
i- Outer Liquid Core: Outer layer of core is liquid in nature and spins in anticlockwise direction. This spin is responsible for the magnetic properties of Earth.

ii- Inner Solid Core: Inner core is solid in nature, and has no spin. It bears induced magnetism.

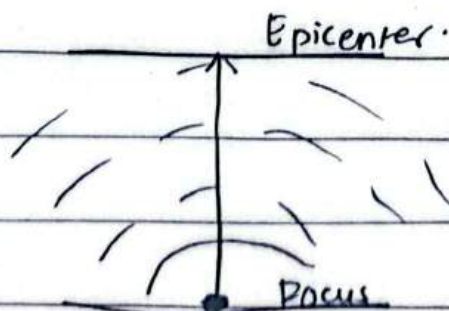
d- Phenomenon of Earthquake:

1- EARTHQUAKE:

An earthquake is the sudden shaking of surface of Earth caused by a quick release of energy in lithosphere of earth. It travel in the form of waves called seismic waves.



Surface waves travel along the surface of earth and usually cause the most damage to the infrastructure. Love waves move the earth back and forth while Raleigh waves move the ground up and down. Body waves have a deep focus in earth's surface.



b. Phenomenon of Earthquake:

Following phenomenon result in earthquake:

i- Plate tectonics: The movement of plate tectonics results in regional earthquake. There are two types of plate tectonic movement that ~~also~~ result in earthquake.

- Convergence: When two plate tectonics move towards each other and strike with one another, two case scenarios occur. If a continental plate strikes an ocean plate, the oceanic will slip and result in earthquake. If two continental plates strike each other, this causes shallow focus earthquake which is more destructive.

- Divergence: When two tectonic plates move away from each other, a mild earthquake occurs.

ii- Volcanism: Volcanic eruption also cause earthquake that is local in impact. It is due to the movement of tectonic plates to fill the gap created by release of magma.

Day: _____

Date: _____

- iii Meteorite: When a meteorite strikes Earth's surface, the collision also produces earthquakes.

