

GK-1 GSA

Q No. 2

a. Briefly explain lipids. What are some major types? What are their functions?

Answer: Lipids

"Lipids" word is derived from "Lipos" meaning fat. Fatty acids, glycerol, triglycerides and steroids are the primary building blocks of lipids. Triglycerides are synthesized from glycerol and fatty acids. Fats, oils and steroids are most important lipids found in nature. Phospholipids are another class of lipids they are found in cell membranes. Two most common phospholipids are lecithins and cephalins. Lipids are not only found in human diet and human body but they are also used as raw material in manufacturing soaps, paints, detergents, cosmetics and polishes. They are also used in pharmaceuticals.

Types of lipids

There are different types of lipids. Lipids are mainly divided into saturated, unsaturated and trans as fatty acids. And simply as simple lipids, compound lipids and derived lipids on the basis of the group attached to fatty acids.

Simple lipids

These are compounds of fatty acids with glycerol. e.g.; oils and fats

Compound lipids

These are compounds of fatty acids and contain an additional group. e.g.; lipoprotein, phospholipids (have phosphorous as an additional group)

Derived lipids

These are substances derived from simple and compound lipids by hydrolysis. e.g.; sterols, vitamin D and Terpenes.

Saturated Fatty Acids

Saturated fat is solid at room temperature. It is also known as 'solid fat'. It is found in milk, cheese and meat. Saturated fat raise the cholesterol in the body. It is called bad or unhealthy fat. A healthy diet has less than 10% of daily calories from the saturated fat.

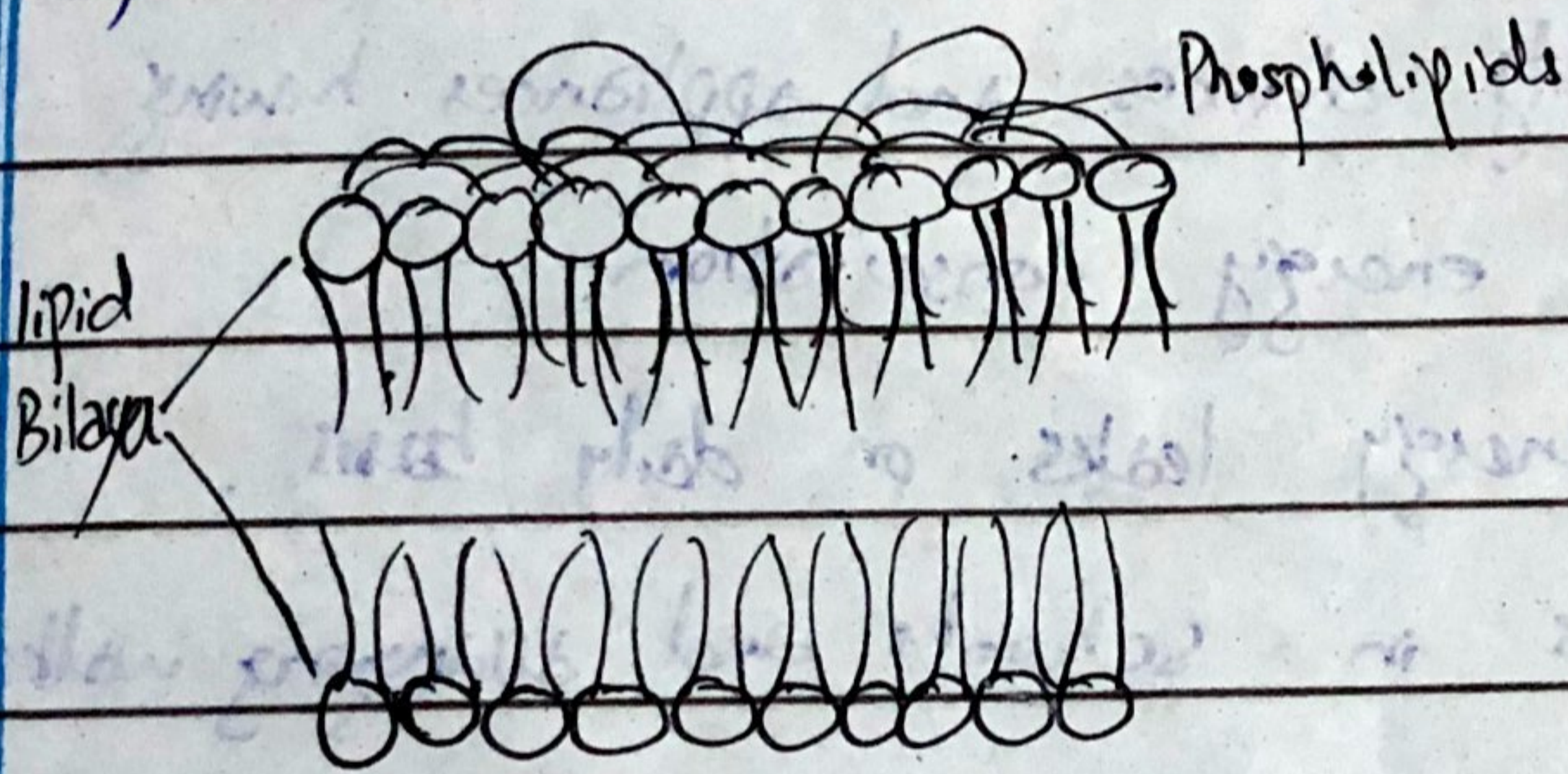
Unsaturated Fatty Acids

They are in liquid form obtained mainly from plant oils. They are considered good fats as they help with the cholesterol

regulation.

Transfat

Trans-fat is a fat that is changed by the process of hydrogenation. This process increases the shelf life of fats and make them harder at room temperature. They are used in processed canned food and snacks. They increase cholesterol level. So, they should be taken in very small quantity.



Fluid Mosaic Model
Phospholipids, lipids
bi-layer in plasma
cell membrane

b. Enlist few measures for energy conservation and its sustainable use.

Answer:

Energy Conservation

Energy conservation is the act of reducing the usage and wastage of energy. Energy conservation is the means of reducing the wastage and consumption of energy.

Measures for energy conservation and its sustainable use

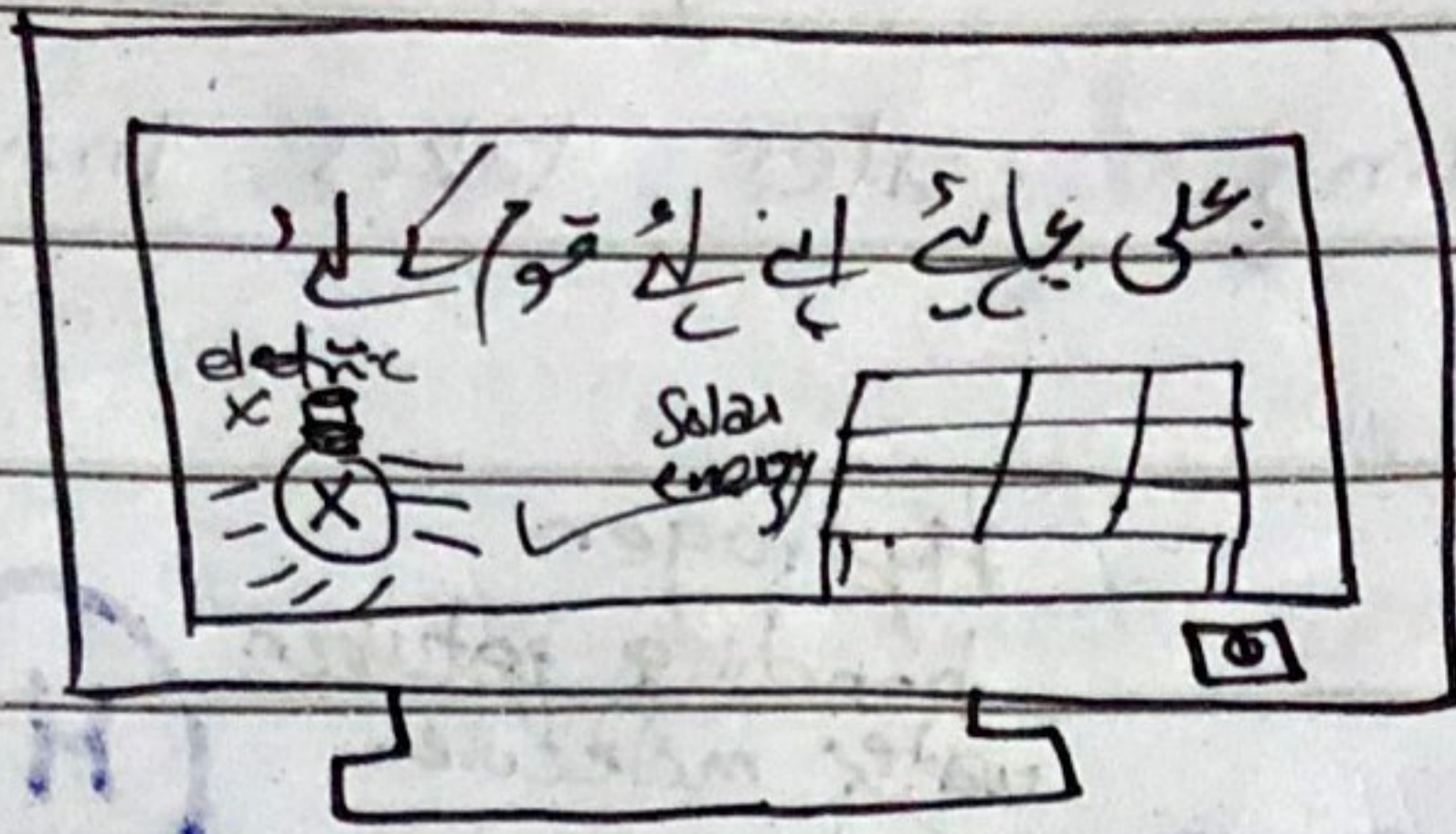
Different measures can be taken for the sustainable use of energy and its conservation.

Some of the measures are enlisted below:

- * Turning off high power devices when not in use like, AC, TV, LEDs, tubelights, inverters etc.
- * Using good quality devices and appliances having the feature of energy conservation.
- * Checking the energy leaks on daily basis.
- * Raising awareness in schools and organising walks for the conservation of energy.
- * Use of energy saving bulbs and lights.
- * Using warm drinks and ~~wear~~ wearing warm clothes instead of depending on electrical appliances like electric bed sheets, electric heaters and warmers in winter.
- * Converting to ecofriendly and cheaper sources of energy like solar energy.
- * Daily reminders texts on mobile phones and reminders through newspaper and electronic media should be given to the public for the

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sustainable use of energy and energy conservation.



c. What is hydrogen bonding? Give elaborate structures as examples.

Answer :

Hydrogen Bonding

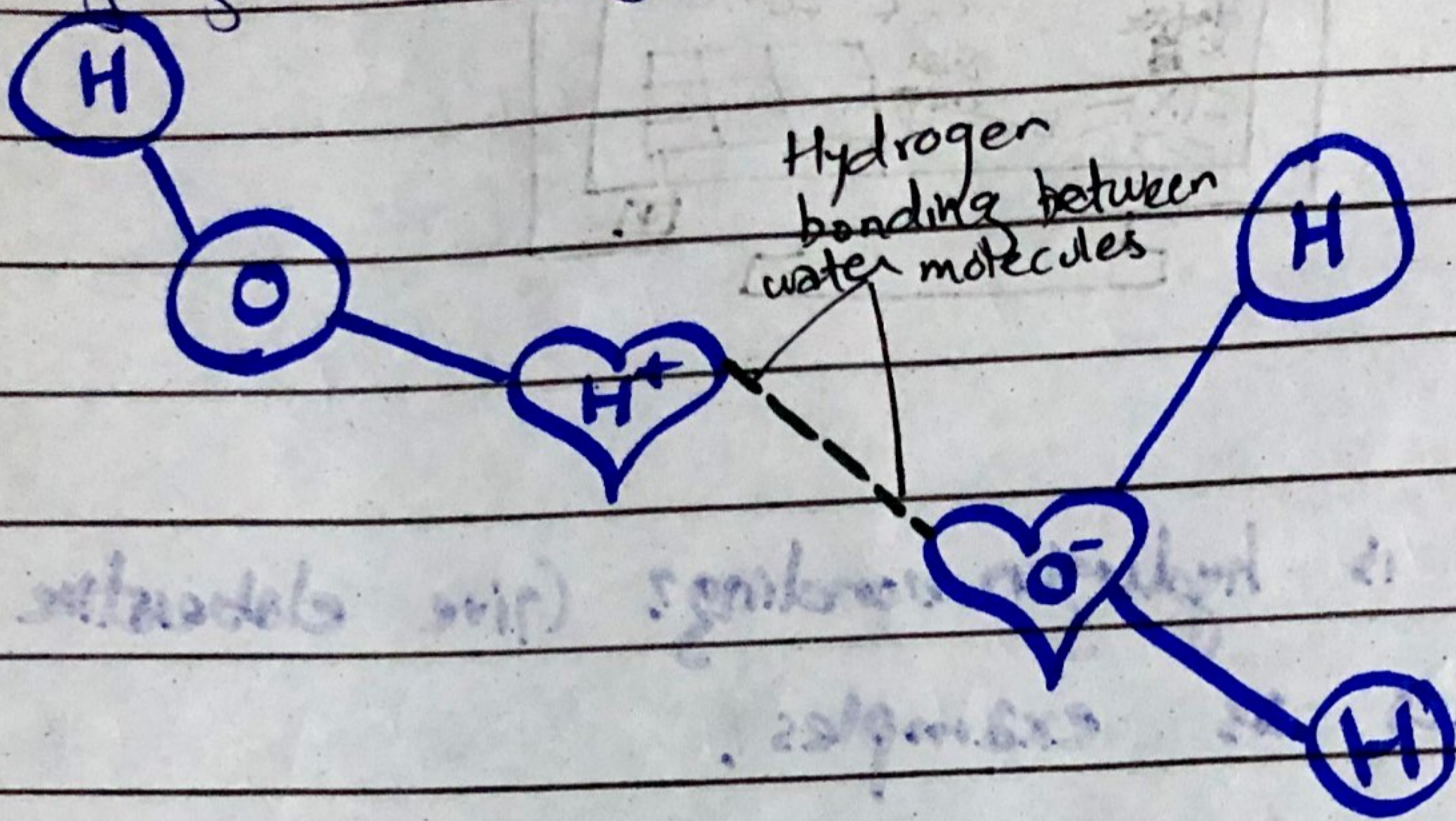
Hydrogen bonding is a strong electrostatic force of attraction between the hydrogen atom of one molecule which is positively charged to the nitrogen, oxygen or F atom of another molecule which is negatively charged. The positive charge on hydrogen atom and negative charge on O, N or F is because of the difference in electronegativity.

Examples

1. Water

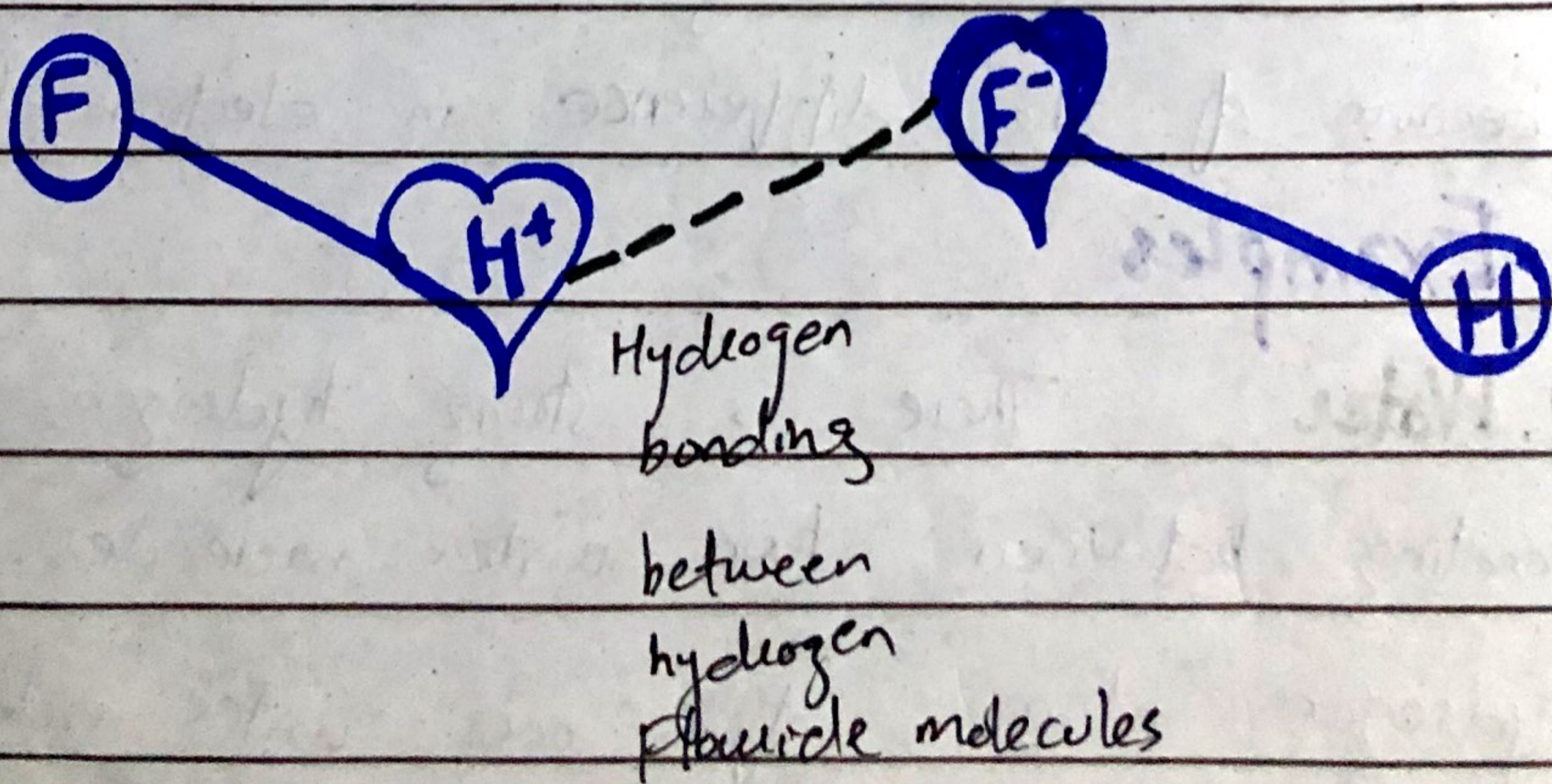
There is strong hydrogen bonding between two water molecules. The hydrogen atom of one water molecule

is attracted towards the oxygen atom of the other water molecule. Therefore due to this hydrogen bonding water takes time to boil.



2. Hydrogen Fluoride

Hydrogen bonding also exist between the Fluorine of one HF molecule and Hydrogen atom of another hydrogen Fluoride molecule. This hydrogen bonding is between the negatively charged fluorine of one HF molecule and positively charged hydrogen of other HF molecule.



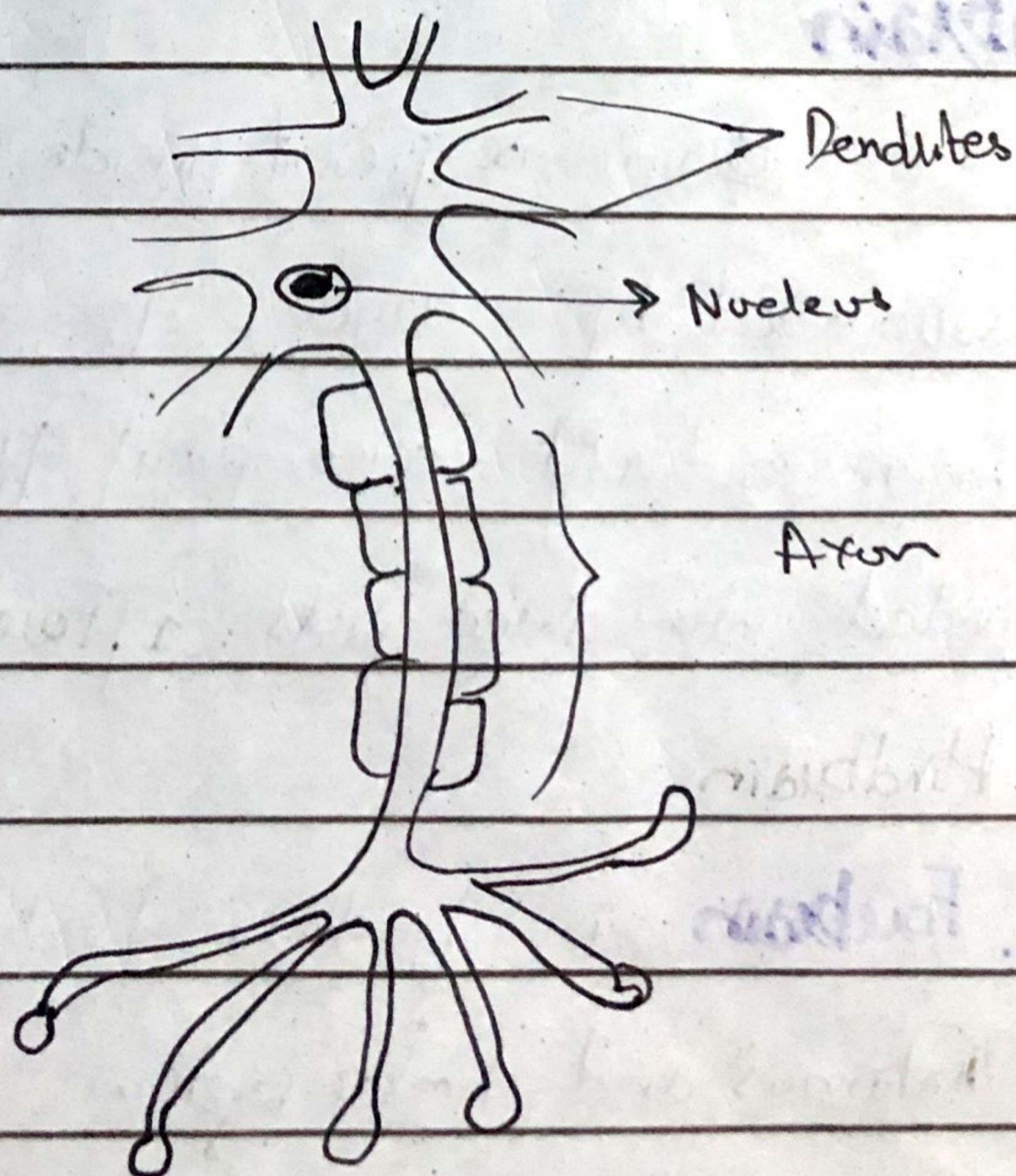
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d. Discuss the nervous system of the human body.

Answer : Nervous System

The nervous system of the human body consist of central nervous system and peripheral nervous system. It comprises of neurons, nerve, brain, spinal cord and ganglia.

Neuron :

Neuron is the structural and functional unit of nervous system. They consist of three parts body, axon and dendrites. These parts help them to send and receive chemical and electrical signals.



Neuron

Peripheral Nervous System: Consists of 1 1 3 but Nerves and ganglion

Nerves

Neurons cells combine to form nerves. Nerves carry signals from brain to the other parts of body. They are Cranial Nerves, Brachial plexus, Thoracoabdominal nerves, Lumbar plexus and Sacral plexus.

Ganglion

is a collection of neuronal bodies found in the somatic and autonomic branches of the peripheral nervous system (PNS).

Central Nervous System

Central nervous system comprises brain and spinal cord

① Brain

Brain is present inside a bony cranium, surrounded by layer of membrane called meninges and cerebrospinal fluid. Human brain is divided into three parts: 1. Forebrain 2. Midbrain 3. Hindbrain

1. **Forebrain** is further divided into cerebrum, Thalamus and limbic system.

i). Cerebrum

Cerebrum is largest part of brain. It is divided into two cerebral hemispheres

through corpus callosum. Right hemisphere controls the left side of body and left hemisphere controls the right side of body. Outer region of cerebrum is called cerebral cortex. It receives sensory information processes this information and store it in memory for use in future. It controls voluntary movements and is responsible for thinking. It is also involved in intelligence, reasoning and judgment.

ii). Thalamus

Thalamus transfers auditory, visual and information from the skin to the limbic system.

iii). Limbic System

Limbic system is further divided into Hypothalamus, Amygdala and Hippocampus.

a). Hypothalamus

controls body temperature, menstrual cycle, hunger, water balance and circadian cycle.

b). Amygdala

produces sensation of pleasure, punishment, sexual arousal and feelings of fear and rage.

c). Hippocampus

controls long term memory and is

involved in learning process.

2. Midbrain

connects forebrain with hindbrain. It is divided into reticular formation, which is important in screening the input information. It controls reflex movements of eye. It acts as a relay center for auditory information.

3. Hindbrain

is the lowest part of brain. It is divided into 1. Medulla 2. Pons

3. Cerebellum

1. Medulla

controls heartbeat, blood pressure, swallowing and breathing.

2. Pons

controls transition between sleep and wakefulness.

3. Cerebellum

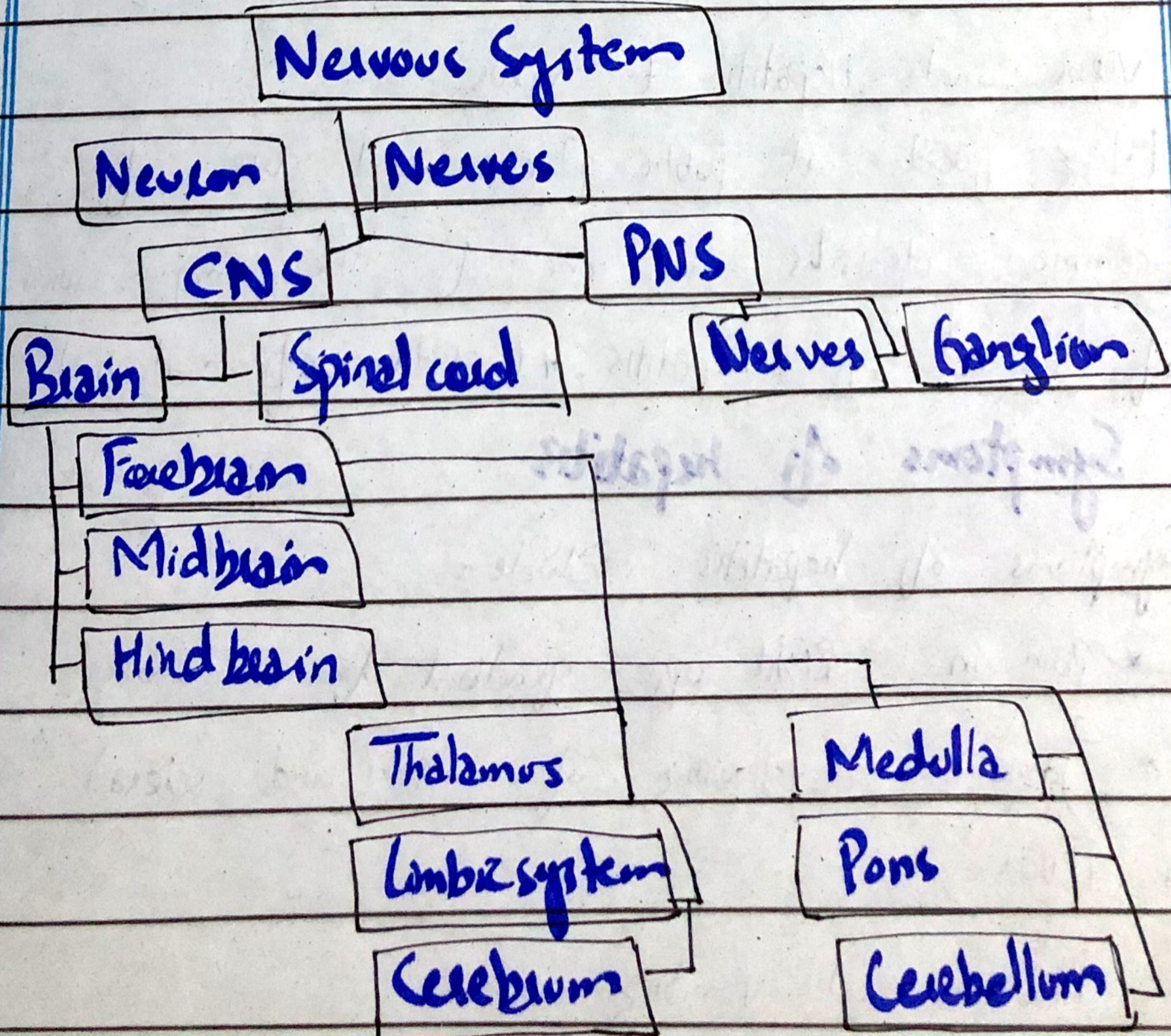
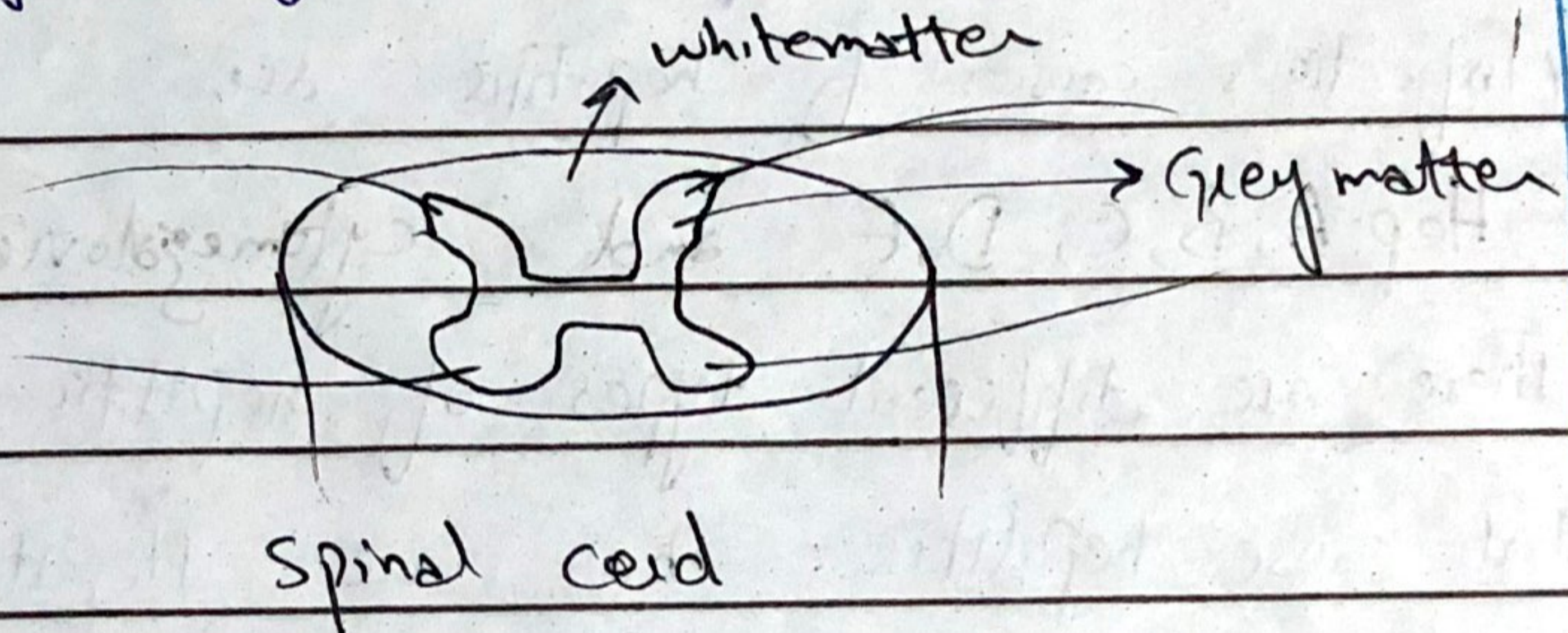
is important in coordinating movements and maintaining position of the body. It is also involved in memory storage and in learning.

② Spinal Cord

Medulla oblongata narrows down to

the vertebral column to form spinal cord.

Spinal cord consists of an inner butterfly shaped grey matter containing central canal and an outer white matter. It serves as a pathway between different parts of the body and brain. 31 pairs of nerves originate from spinal cord called spinal nerves. 12 pairs of nerves originate from brain called cranial nerves.



Q4:

2. What is hepatitis? Explain its causes, symptoms and prevention.

Answer: **Hepatitis**

Hepatitis is the inflammation of liver. It is a viral infect caused by hepatitis virus.

Causes of hepatitis

* Infectious causes of hepatitis are

Hep. A, B, C, D, E and cytomegalovirus

There are different types of hepatitis viruses that cause hepatitis. These are Hepatitis A virus,

Hepatitis B virus, Hepatitis C virus, Hepatitis D virus and Hepatitis E virus.

Eating food at public places and use of common utensils are one of the major causes of spread of hepatitis. * Liver damage from alcohol.

Symptoms of hepatitis

Symptoms of hepatitis include:

* Pain in right upper quadrant of abdomen

* Jaundice (yellowing of skin and sclera)

* Fever

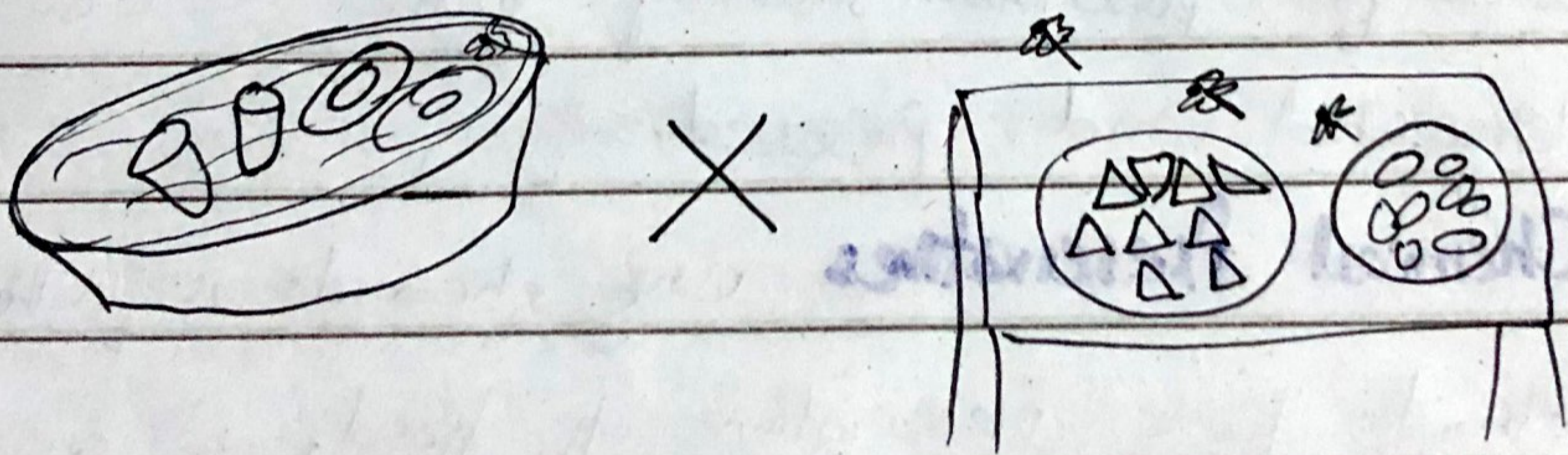
* Nausea and vomiting

- * Dark coloured urine and pale coloured stool
- * Fatigue

Prevention of Hepatitis

Hepatitis can be prevented by following methods:

- * Vaccination of hepatitis
- * Avoid sharing personal items like razors, epilators, tooth brushes, towels
- * Don't share drug needles
- * Avoid getting tattoos and piercing with unsterilized equipments.
- * Avoid unclean food and water
- * Avoid eating street food
- * Always wash your hands after using restroom.



b. Elaborate few methods of food preservation

Answer:

Food Preservation

Food preservation is a

process through which food is preserved.
It is done to preserve the natural characteristics and appearance of food and to increase the shelf life of food for storage.

Methods of food preservation

* By adding preservatives food is preserved.

There are different kinds of preservatives.

Natural food preservatives comes from sugar,

salt, alcohol, vinegar etc. These are traditional preservatives that are used at home while making pickles, jams and peanut butter etc.

Freezing, salting and drying are also considered natural methods of food preservation.

Coffee powder and soup are dehydrated and freeze dried for preservation. Similarly fruits are also dehydrated and preserved.

Chemical Preservatives using chemicals is another method for preservation of food.

Benzoates, sulphites, nitrates and sorbates are

used as chemical preservatives. Ethanol is

used in food and wine. Unlike natural

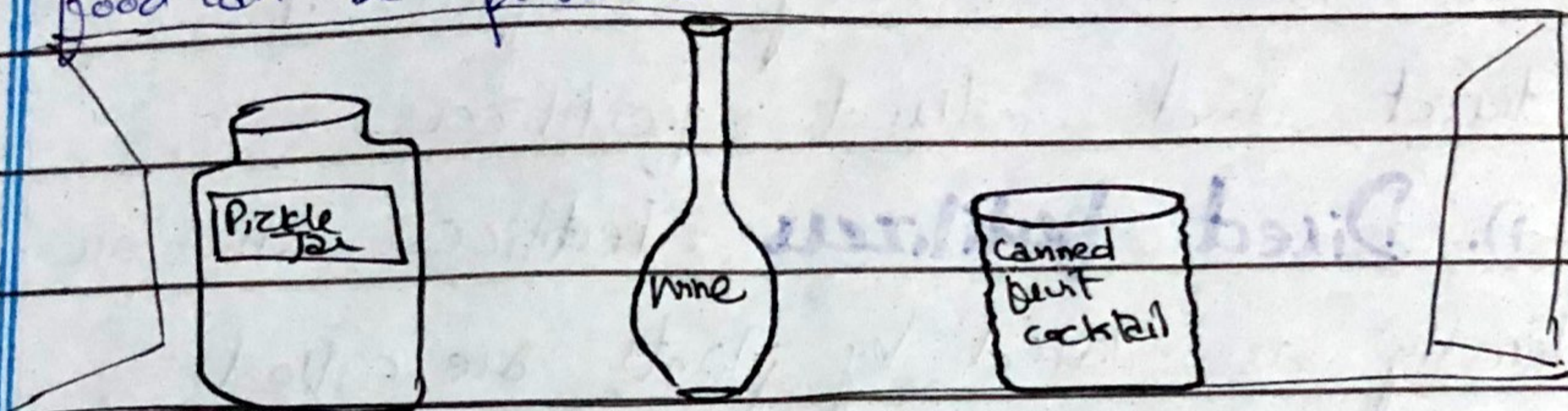
preservatives chemical preservatives are harmful.

Also food is processed and canned in factories through

which it can be preserved.

Artificial Preservatives are chemical substances that decrease and, stop and delay the growth of bacteria, spoilage and discoloration.

These are some of the ways through which food can be preserved.



Food Shelf

c. Explain Fertilizers, What are their types.

Answer:

Fertilizers.

A fertilizer is any material of natural or synthetic origin that is applied to the soil or plant leaves to provide essential nutrients to plants which are required for their growth. It also depends on soil fertility and organic things like worm castings and seaweed.

Three main nutrients are required for plant

growth i.e

Nitrogen → leaf growth

phosphorus → for development

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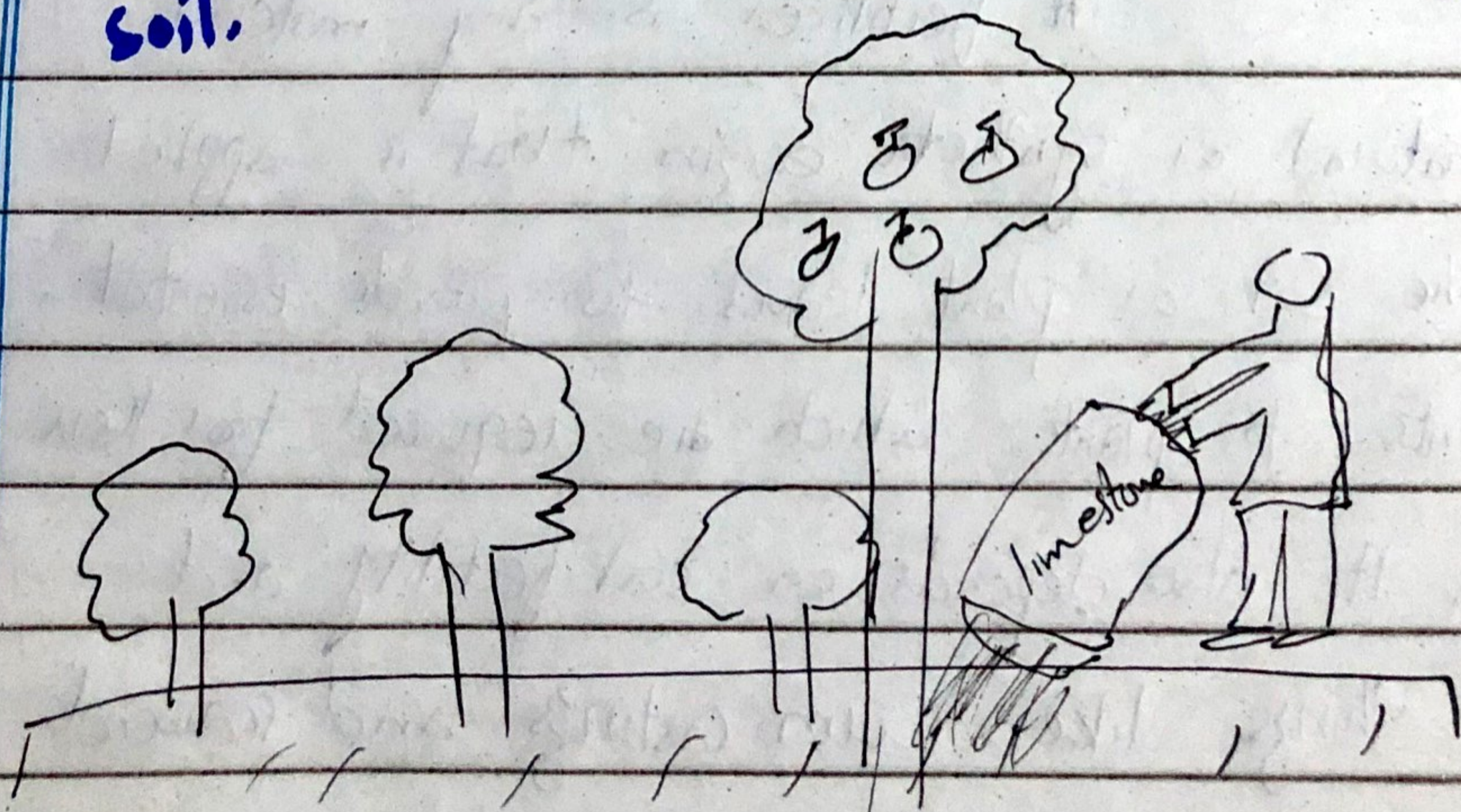
of seeds, flowers, fruit, roots
Potassium → for strong stem growth,
movement of water in plants,
promotion of flowering and fruiting.

Types of Fertilizers

Fertilizers are mainly classified as direct and indirect fertilizers.

i). **Direct fertilizers** : Fertilizers which are directly assimilated by plants are called direct fertilizers. e.g; nitrates, phosphates and ammonium compounds.

ii). **Indirect fertilizers** : These fertilizers are absorbed by soil and increase soil fertility. e.g; limestone is used to reduce acidity of soil.



d. What is anatomy of human tooth?

Answer :

Anatomy of Human Tooth

Adult humans have 32 teeth - 16 in upper jaw and 16 in lower jaw, that work together in chewing food.

The visible portion of tooth is called the **crown**. The part of tooth that is inside the gum is called **root**. Tooth is made of four distinct types of tissues. These are enamel, dentin, pulp and cementum.

Enamel

is the hardest substance in the human body. The clear outer layer of tooth above the gum line is enamel. It protects the inner layers of teeth from harmful bacteria and changes in temperature from hot or cold food.

Dentin

beneath enamel is a hard mineral material known as dentin.

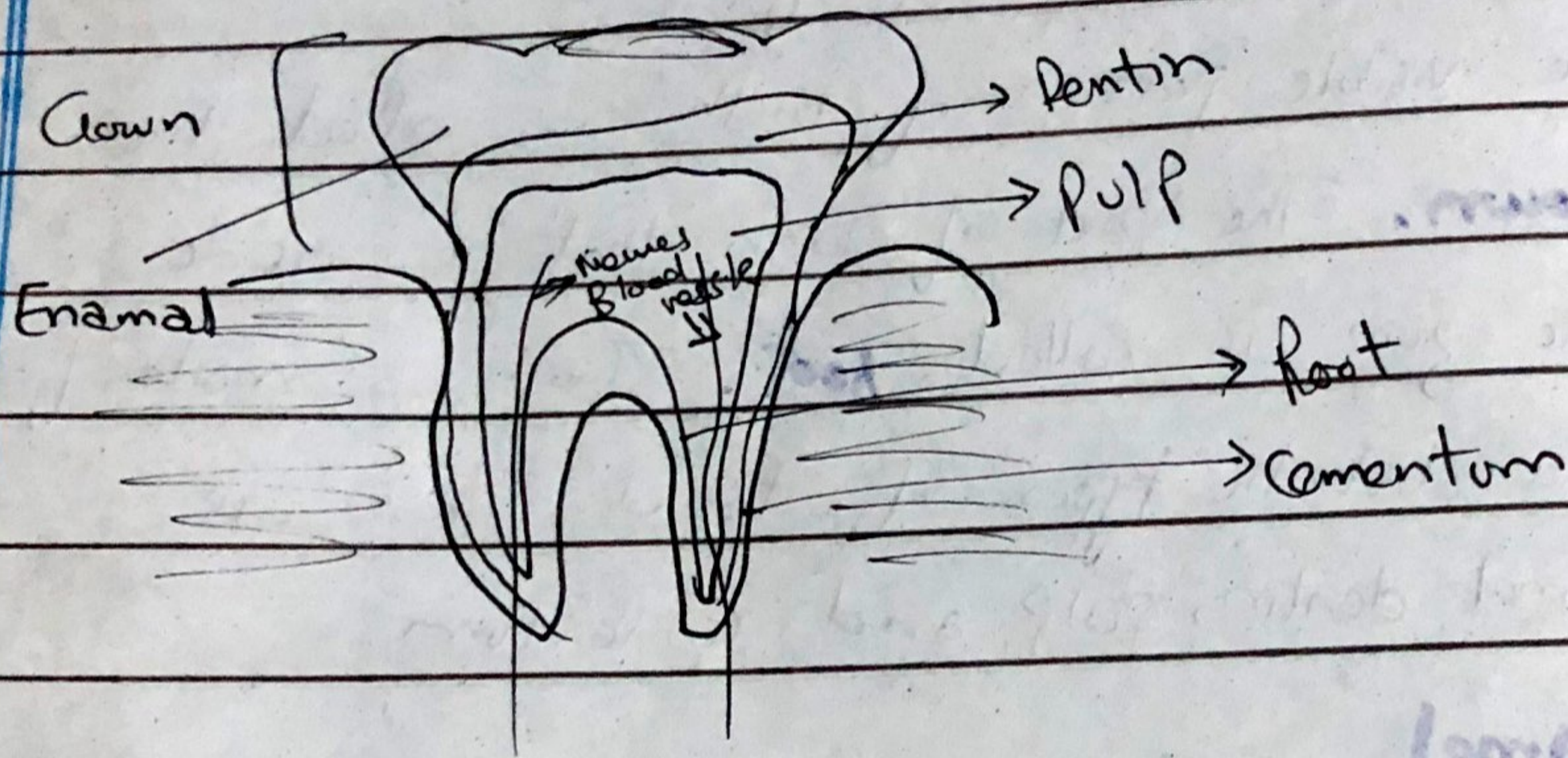
Pulp

is the cavity beneath dentin. It contains blood vessels and nerves which carry blood, oxygen

nutrient to tooth and transmit temperature
and pain sensations to the brain.

Cementum

The outlayer of tooth that lies below
the gum. It anchors tooth to the jawbone.



Q.6:

a: let the sum of 3 digit numbers = 15

sum of 10th and unit digit = 12

Difference of unit digit from 10th

digit = 2

What is three digit number

Solution:

let the number be $100x + 10y + z$

x, y, z are hundreds tens unit

$$x + y + z = 15 \quad \text{--- (1)}$$

$$y + z = 12 \quad \text{--- (2)}$$

$$z - y = 2 \quad \text{--- (3)}$$

$$z = y + 2 \quad \text{--- (4)}$$

Add value of z from equation (4) into equation (2).

$$y + (y + 2) = 12$$

$$2y + 2 = 12$$

$$y = 5, \quad z = 5 + 2, \quad z = 7$$

Add $y = 5, z = 7$ into equation (1)

$$x + 5 + 7 = 15$$

$$x = 15 - 12$$

$$x = 3.$$

Thus, the number is 357

b. Solution:

Ratio of slices $2:3:4$ sums as $2+3+4=9$

Each part represents $18/9 = 2$ slices

Small pizza = $2 \times 2 = 4$ slices

Medium pizza = $2 \times 3 = 6$ slices

Large pizza = $2 \times 4 = 8$ slices

⇒ weight of a total pizza

$$18 \times 40 = 720 \text{ grams}$$

⇒ Price per slice of small pizza

$$320 \div 4 = 80 \text{ Rs/slice}$$

So,

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$$\text{Medium Pizza Price} = 80 \times 6 = 480 \text{ Rs}$$

$$\text{Large Pizza Price} = 80 \times 8 = 640 \text{ Rs}$$

$$\text{Total Pizza Price} = 320 + 480 + 640$$

$$= 1440 \text{ Rs.}$$

$$\text{Thus Total Price} = 1440 \text{ Rs}$$

$$\text{Total weight} = 720 \text{ grams}$$

c. Answer

According to formula

$$\text{Radius} = \frac{\text{Diameter}}{2}$$

$$\text{So, } R = \frac{6}{2} = 3 \text{ cm}$$

$$\text{Circumference} = 2\pi r$$

$$= 2\pi(3)$$

$$= 6 \times 3.14 = 18.84$$

$$= 18.85 \text{ cm}$$

$$\text{Area} = \pi r^2$$

$$= 3.14(3)^2$$

$$= 9 \times 3.14$$

$$= 28.27 \text{ cm}^2$$

d.

13, 24, 46, 90, 178, _____

5, 6, 9, 14, 21, _____

$$6 - 5 = 1, \quad 9 - 6 = 3, \quad 14 - 9 = 5,$$

$$21 - 14 = 7$$

$$\text{Next difference} = 7 + 2 = 9$$

$$\text{Next number} = 21 + 9 = 30$$

Q7

a. Answer

IQ

↳ Intelligent Quotient

↳ It is used to measure

mental abilities like logic,

reasoning and problem

solving.

EQ

↳ Emotional Quotient

↳ EQ measures emotional

intelligence and inter-personal

skills.

b. Solution:

let age of Aman now = x .

After 20 yrs : $x + 20$

$$\text{10 yrs back} = x - 10$$

$$\text{As } x + 20 = 10(x - 10)$$

$$x + 20 = 10x - 100$$

$$120 = 9x$$

$$x = \frac{120}{9}$$

$$x = 13.33$$

Aman's current age is 13 yrs and 3 months.

c. Solution

$$\frac{1}{40} + \frac{1}{60} = \frac{3}{120} + \frac{2}{120}$$

$$= \frac{5}{120} = \frac{1}{24}$$

Time to complete task together = 24 mnts.

$$\begin{aligned} \text{Peter} &= 40 \text{ min} \\ &= 2 \times 2 \times 2 \times 5 \times 3 \\ &= 120 \text{ mnts} \end{aligned} \quad \text{John} = 60$$

$$\begin{array}{r|l} 2 & 40, 60 \\ \hline 2 & 20, 30 \\ \hline 2 & 10, 15 \\ \hline 5 & 5, 15 \\ \hline 3 & 1, 3 \end{array}$$