

Question : 2

a- What is circulatory system?
Describe the role of human heart
in circulation of blood?

Human physiology is the scientific study of various functions of the human body in its normal state. Although various different human organ systems are often studied as separate entities, in reality, they all interact with each other and work together to keep the human body functioning. Following are the major systems of the body.

- 1- Circulatory System
- 2- Respiratory System
- 3- Digestive System
- 4- Urinary System
- 5- Immune System
- 6- Nervous System
- 7- Musculoskeletal System
- 8- Reproductive System

Topic of our discussion is

Circulatory System

The circulatory system is made up of the vessels and the muscles that

help and control the flow of the blood around the body. This process is called circulation. The main parts of the system are the heart and blood vessels.

Circulatory system main components

- 1- Systematic circulation
- 2- Pulmonary circulation

Human Heart

The heart, a muscular organ located in the chest cavity, serves as the central pump of the circulatory system. It is responsible for generating the force needed to propel blood throughout the body. The human heart has four chambers. The upper two chambers, the right and left **atria**, are receiving chambers for blood. The lower two chambers, the right and left **ventricles**, are the powerful pumping chambers.

- Systematic circulation

This circuit takes oxygenated blood from the left side of the heart to the body. When the blood returns to the right side of the heart, it

it is deoxygenated, as the oxygen has been mostly used by the muscles and organs in order to make energy.

> Pulmonary circulation

This circuit takes deoxygenated blood from the right side of the heart to the lungs where it is oxygenated. It then returns this newly-oxygenated blood to the left side of the heart where the cycle begins again.

Human Heart in Blood Circulation

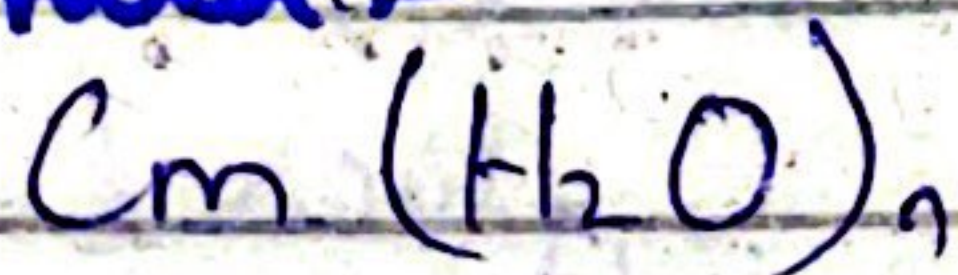
The human heart acts as a powerful pump that circulates blood throughout the body, supplying oxygen, nutrients and removing waste products. Its coordinated contractions and the structure of its chambers and valves enable the efficient flow of blood, ensuring the proper functioning of the circulatory system.

17

b- What are the carbohydrates? Give its classification?

Carbohydrates are the human body's key source of energy, providing 3.9 calories of energy per gram. When carbohydrates are broken by the body, glucose is produced. Carbohydrates are organic compounds, these comprise of only carbon, hydrogen and oxygen.

Formula:-



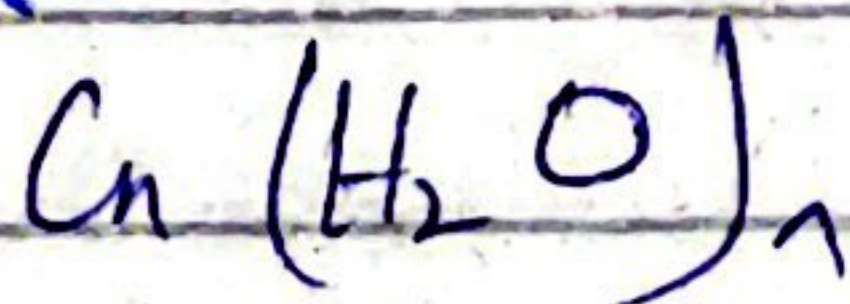
Classification

Carbohydrates are classified into simple carbohydrates (monosaccharide, oligosaccharides) and complex carbohydrates (polysaccharides).

1- Monosaccharides

From Greek mono = one and sakkaron = sugar. Monosaccharides are often called simple sugars. They are the simplest sugars and cannot be hydrolyzed.

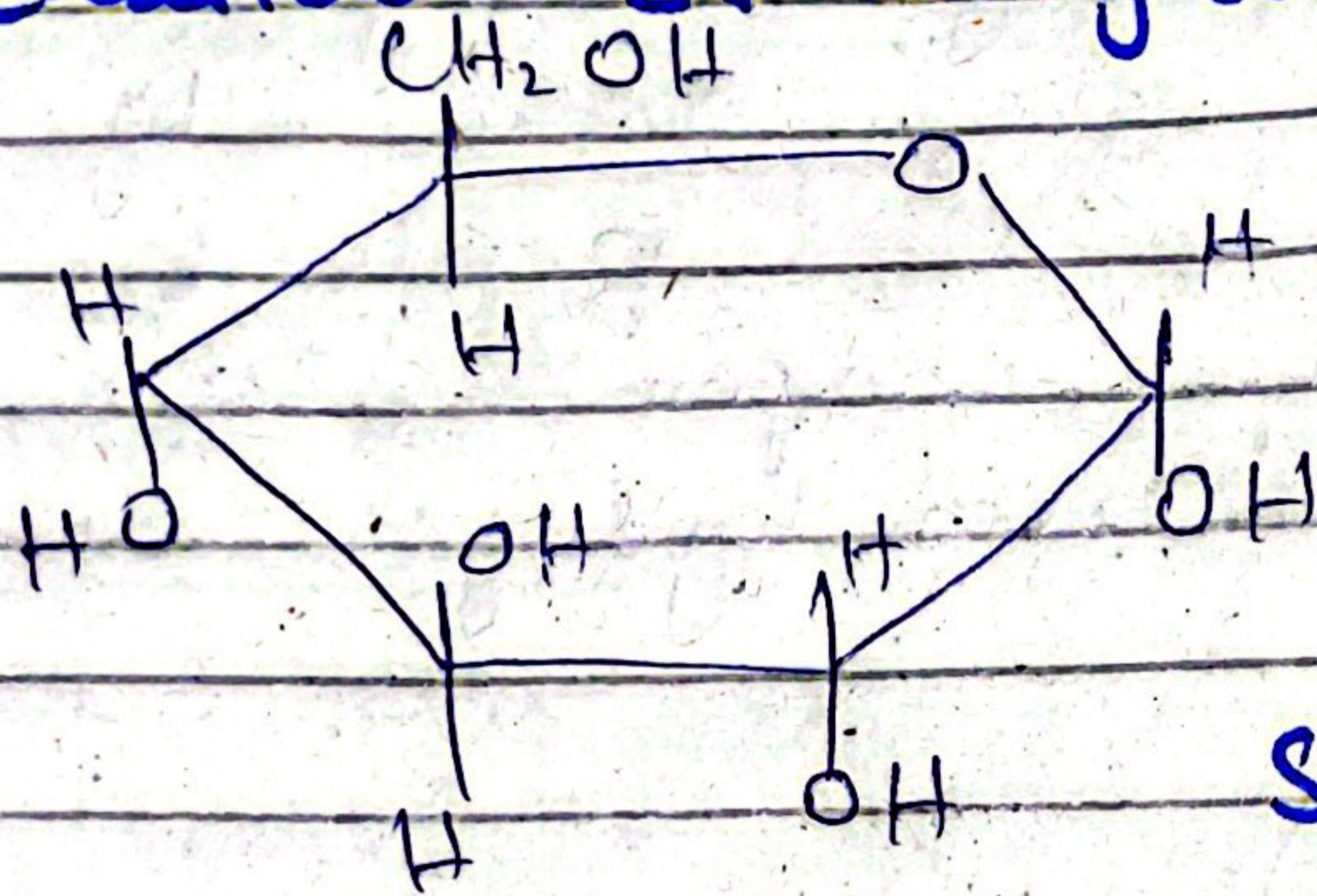
Formula



Examples of monosaccharides

- Glucose
- Galactose
- Fructose

2. Oligosaccharides or oligosaccharoses



Structure of glucose

In greek, Oligo means few. Oligosaccharides are compound sugars that yield 2 to 10 molecules of the same or different monosaccharides on hydrolysis. If yielding 2 molecules of monosaccharides on hydrolysis is known as a disaccharide, and the ones yielding 3 or 4 monosaccharides are known as trisaccharides and tetrasaccharides, respectively and so on.

Formulas

$C_n(H_2O)_{n-1}$ disaccharides

$C_n(H_2O)_{n-2}$ trisaccharides and

so on

three common disaccharides

Sucrose

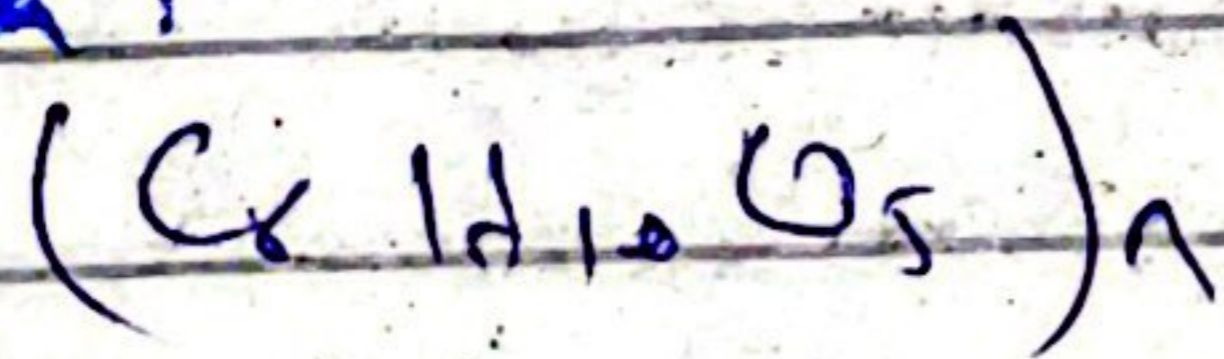
Lactose

Maltose

3- Polysaccharides

In greek Poly means many. Polysaccharides are compound sugars and yield more than ten molecules of monosaccharides on hydrolysis. They are further classified depending on the type of molecules produced as a result of hydrolysis.

Formula:



Examples:

Starch

glycogen

cellulose

pectic

c) What is water pollution? Describe its types and causes?

Any change or modification in the physical, chemical and biological properties of water that will have a detrimental consequence on living things is water pollution. Water pollution is the

Contamination of water bodies (eg lakes, rivers, oceans, aquifers and ground water), very often by human activities.

Types and causes

- 1- **Organic Matter** → Primary source are waste water and domestic sewage.
- 2- **Pathogens and microbial contaminants** primary source are domestic sewage, cattle and animal faeces.
- 3- **Nutrients** → primary sources principally runoff from agricultural lands and urban areas but also from some industrial discharge.
- 4- **Heavy Metals** → primary source are industries and mining sites.

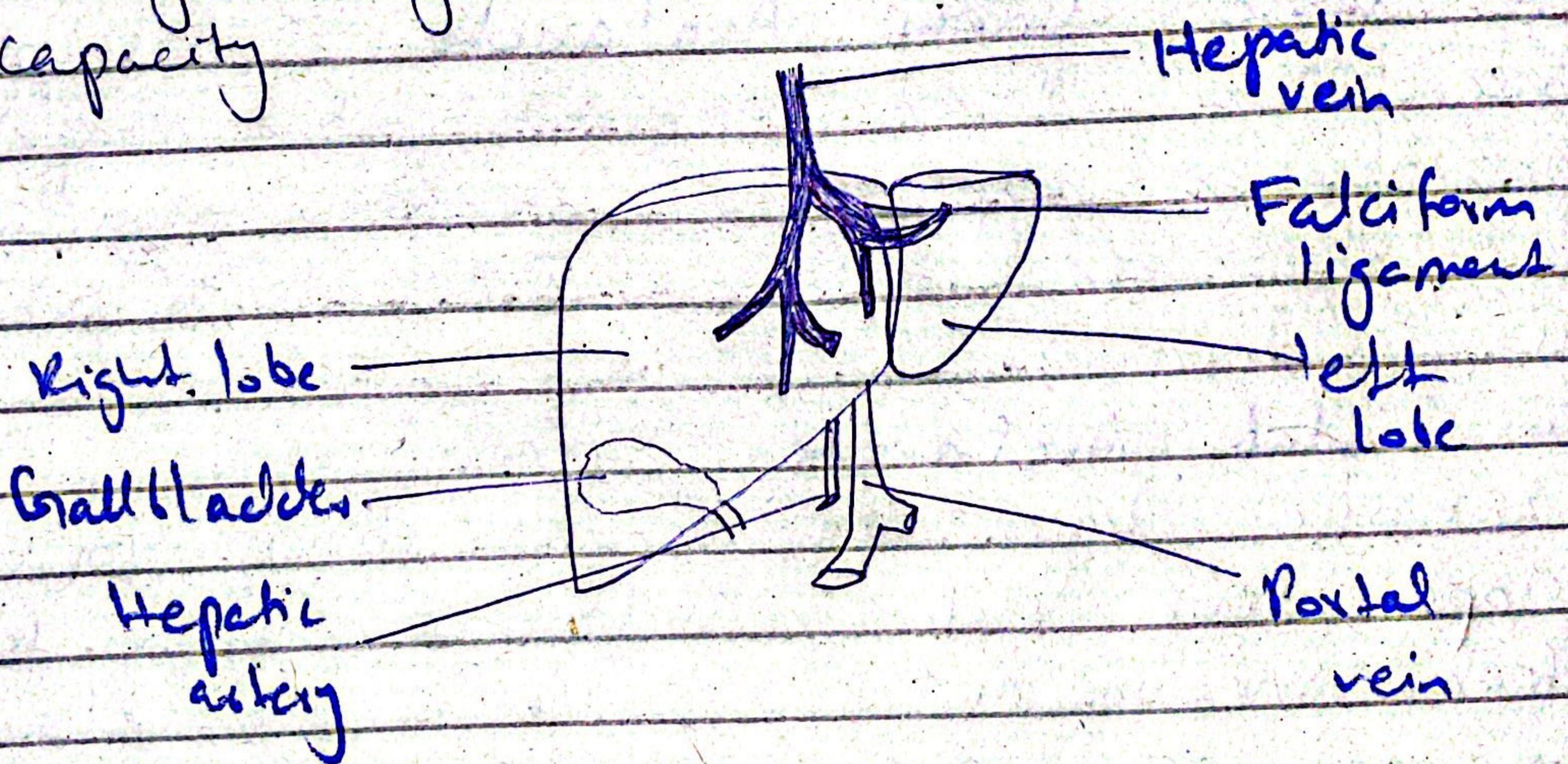
Causes

- 1 Industrial activities
- 2 Municipal and Domestic waste water
- 3 Agricultural practices
- 4 Mining Operations
- 5 Atmospheric Deposition

d- **Liver is the chief chemist of the body, Elaborate)**

Humans have five vital organs that are essential for survival. These are

The brain, heart, kidneys, liver and lungs. The liver is an abdominal glandular organ in the digestive system. It is located in the right upper quadrant of the abdomen, ~~under the~~ ~~diaphragm~~ under the diaphragm. The liver is a vital organ that supports nearly every other organ to some capacity.



The liver is the body's second largest organ (skin is the largest organ) according to the American Liver Foundation, weighing about 3 pounds (1.4 kg). It has four lobes and is a very soft, pinkish-brown organ. It contains several bile ducts.

Question : 5

a- Avalanche

An Avalanche is a sudden and often rapid mass movement of snow and ice down a mountainside due to gravity. The word avalanche was derived from the French word Avalance meaning descent.

Types of Avalanches

1- Loose Snow Avalanche → is simply loose snow that originates at a single point on a slope and gathers cohesion less snow on the surface of the pack as it descends.

2- Slab Avalanche → occurs when a cohesive layer of snow slides down a slope. Since slab avalanches often form from new snow and wind, they are referred to as wind slabs.

3- Wet Avalanche

4- Powder Snow Avalanche

5- Debris Avalanche

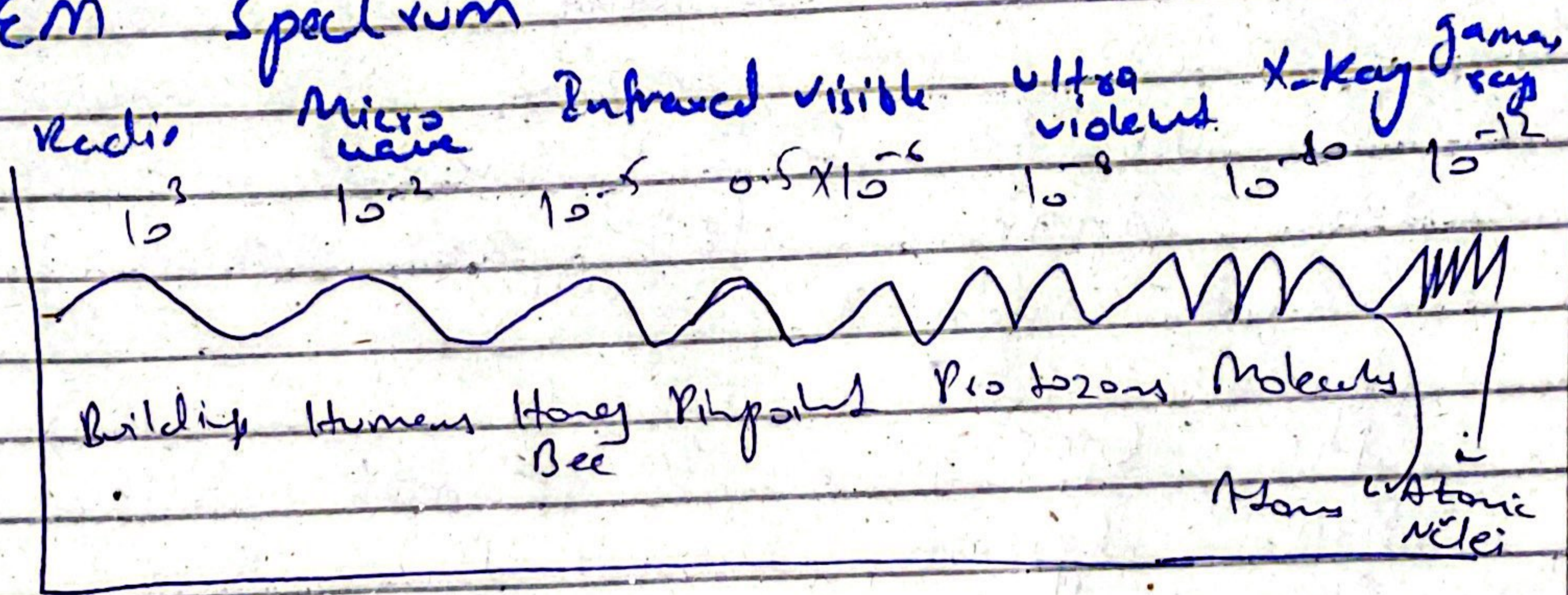
Examples

1954 Tseibishi avalanche in Japan, the 2008 Mount Everest avalanche, the 2019 Oso Landslide in Washington State (a debris Avalanche)

↳ EM Radiations

Electromagnetic (EM) radiation is a form of energy that is all around us and takes many forms, such as light rays, radio waves, microwaves, X-rays and gamma rays. Visible light is only a small portion of the EM spectrum, which contains a broad range of electromagnetic wavelengths.

→ EM Spectrum



→ Type

- Radio waves
- Micro waves
- Infrared waves
- visible waves
- ultra violet waves
- X-Rays
- gamma rays

(- What is GPS? How does it work?

The global Positioning System is a navigation system that allows land, sea and air borne users to determine their exact location, velocity and time 24 hours a day, in all weather conditions, from anywhere in the world.

The system provides critical capabilities to military, civil and commercial users around the world.

The U.S. Air force develops, maintains, and operates the space and control segments.

The GPS is a US owned utility. This system consists of three segments:

- > the space segment
- > the control segment
- > the user segment

d- Computer Buses

Computer Buses are communication pathways that allow different components of a computer system to exchange data and signals. They

provide a means for the central processing unit (CPU), memory, input/output devices and other peripherals to interact and transfer information.

Types

- 1- Address Bus
- 2- Control Bus
- 3- Data Bus
- 4- System Bus

CPU

CPU is also referred to as the brain of a computer. It is the primary component responsible for executing instructions and performing calculations in a computer system.

The CPU is composed of several key components.

- 1- Arithmetic Logic Unit
- 2- Control Unit
- 3- Registers
- 4- Cache

The CPU receives instructions and data from memory, performs calculations and logical operations on the data and then stores the results back into memory or

output them to the appropriate devices. It executes instructions in a sequential manner, following the control flow provided by the control unit.

(Section - B)

Question : 6

a)

Let assume

five years ago son age was $\Rightarrow x$

So, the father age was $= 3x$

Now son is 30 years old

$$30 - 5 = 25$$

$$3x = 25$$

$$x = \frac{25}{3}$$

$$x = 8.33$$

b)

$$10\% \text{ of } x = 1500$$

$$\frac{10}{100} \times x = 1500$$

$$x = \frac{1500 \times 100}{10}$$

$$n = 15000$$

c)

$$\begin{aligned} 6 \text{ numbers} &= 20 \\ 6 - n &= 20 \end{aligned}$$

d)

$$\frac{\text{Sum of six numbers}}{\text{Total numbers}} = \text{Avg}$$

$$\text{AM} = \frac{\text{Sum}}{\text{T.N}}$$

$$20 = \frac{\text{Sum}}{6}$$

$$\text{Sum} = 20 \times 6$$

$$\boxed{\text{Sum} = 120}$$

After removing one number

$$15 = \frac{\text{Sum}}{5}$$

$$15 \times 5 = \text{Sum}$$

$$\text{Sum} = 75$$

$$120 - 75 = 45$$

$\boxed{45}$ is the number