## PART-II
## SECTION-I

Q.No.2 (a) Briefly explain lipids. What are some major types? what are their functions?

### Lipids:

Lipids are a group of biomolecules that are insoluble in water. but soluble in organic solvents. They plays crucial roles in various bodily functions.

### Major types of lipids:

Some of the major types of lipids are as follow:

### 1- Fatty acids:

The simplest type of lipid, made up of long chains of carbon atoms with hydrogen attached. Fatty acids are used for energy storage and are the precursor for other lipids.

They are divided into saturated and unsaturated fatty acids, which differ in whether they have double bonds

between their carbon atoms.

## 2. Phospholipids:

It contains a phosphate group, they form cell membranes and aid in cellular transport.

## 3. Sterols:

It includes cholesterol, essential for cell membrane structure and harmone production.

## 4. Cholesterol:

A type of lipids that travels through the body as a lipoprotein. The two main types of cholesterol are high are as follow:

i- High Density Lipoprotein (HDL)
ii- Low density lipoprotein (LDL).

## 5. Glycolipids:

Lipids with a carbohydrate attached by a covalent bond. Glycolipids help maintain the stability of cell membranes.

## Functions of Lipids:

Some of the functions of lipids are as follow:

### 1. Energy storage:

Fats and oils store energy for our body, helping us move, think and function.

## 2- Cell protection:

Phospholipids and cholesterol help from the outer layer of our cells, keeping them strong and healthy.

## 3- Harmone Production:

Cholesterol is used to make harmones that help regulate our body's functions.
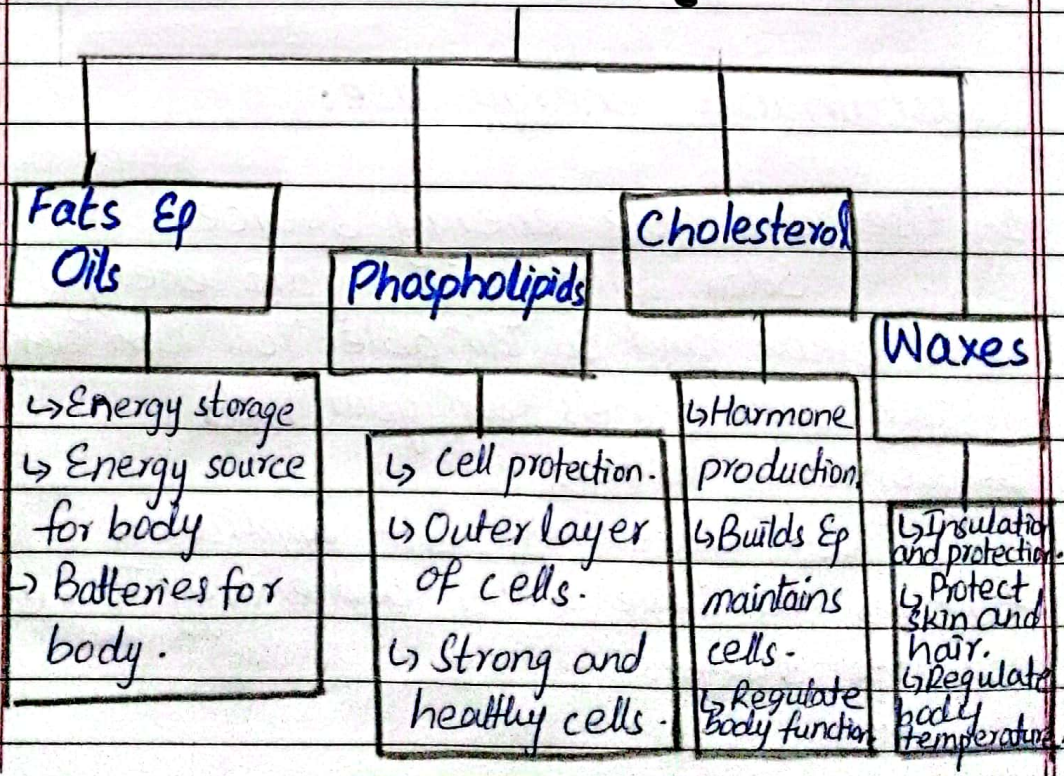
## 4- Insulation and protection:

Fats and oils help regulate our body temperature and protect our organs.

## 5- Signalling and communication:

Lipids help our cells communicate with each other, facilitating signalling and response.

Types & functions of lipids are as follow:

### Flow Chart.

```
                    Lipids
      ┌──────────┬──────────┬──────────┐
  Fats &                                Cholesterol
  Oils        Phospholipids                      Waxes
```

| Fats & Oils | Phospholipids | Cholesterol | Waxes |
|---|---|---|---|
| → Energy storage | | → Harmone production | |
| → Energy source for body | → Cell protection. | → Builds & maintains cells. | → Insulation and protection. |
| → Batteries for body. | → Outer layer of cells. | → Regulate body function | → Protect skin and hair. |
| | → Strong and healthy cells. | | → Regulate body temperature. |

Q.No.2.(b). Enlist a few measures for energy conservation and its sustainable use?

### Energy conservation measures:

1- Turn off lights, electronics, and appliances when not in use:
  This saves energy and reduces waste.

2- Use energy-efficient light bulbs:
  LED bulbs use less energy and last longer.

3- Adjust thermostat settings:
  Lower the temperature in winter and raise it in summer to save energy.

4- Use power strips:
  Plug electronics into power strips and turn off the strip when not in use.

5- Insulate homes and buildings:
  Proper insulation helps reduce heat loss in winter and heat gain in summer.
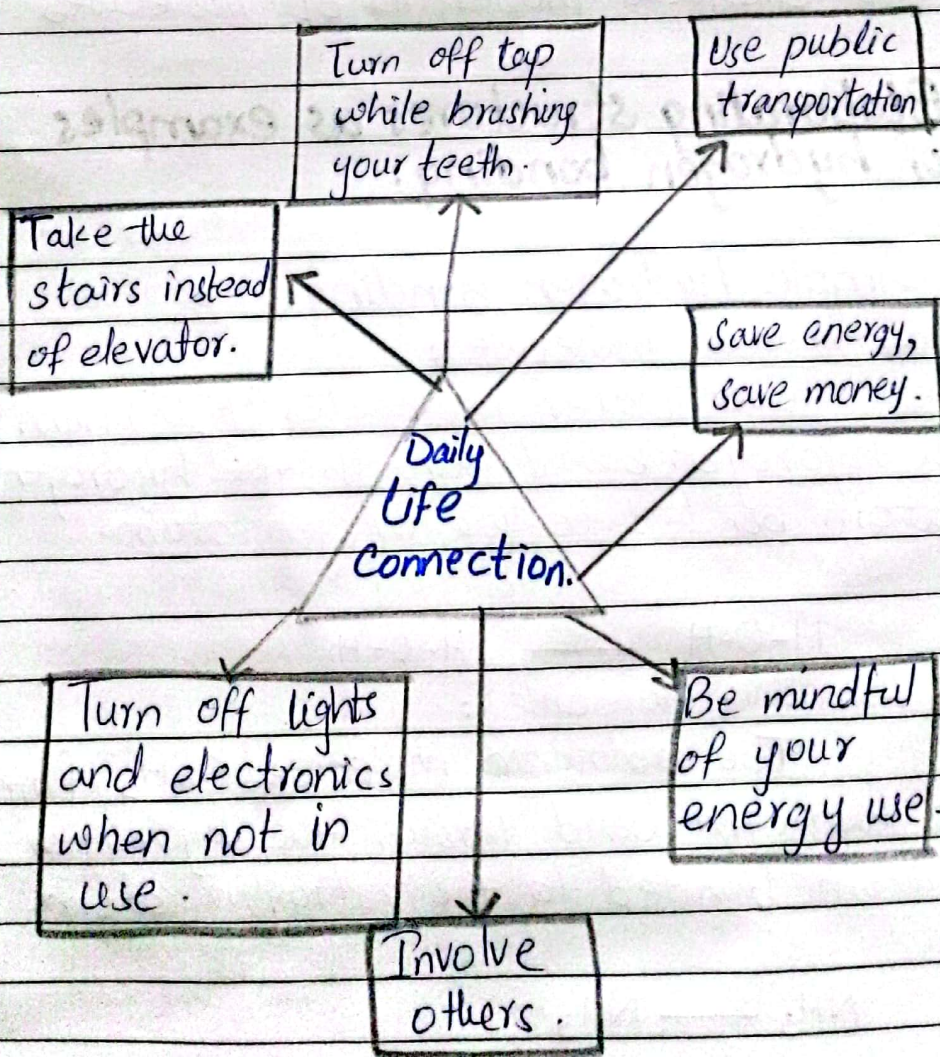
### Sustainable energy use:

1- Use renewable energy sources:
  Solar winds and hydro energy are clean and sustainable. You can even install solar panels on your roof.

2- Conserve water:
  Use water-efficient appliances and fixtures to save water and energy. Take shorter showers.

3- Use public transport or bike:
            Reduce fuel consumption and air pollution. Try carpooling or using public transport.

4- Recycle and reuse:
            Reduce waste and conserve natural resources. Recycle paper, plastic and glass.

5- Support energy-efficient policies:
            Encourage governments and organizations to promote energy conservation.

## Some examples from daily life:

| Turn off tap while brushing your teeth. | Use public transportation |

Take the stairs instead of elevator.

Save energy, save money.

**Daily Life Connection.**

| Turn off lights and electronics when not in use. | Be mindful of your energy use. |

Involve others.

**Q.No. 2.** (c) What is hydrogen bonding? Give elaborating structures as examples?

### Hydrogen bonding:

Hydrogen bonding is a type of intermolecular force that arises between molecules that have a hydrogen atom bonded to a highly electronegative atom, such as oxygen, nitrogen, or fluorine. This bond is relatively weak compared to covalent bonds but plays a crucial role in determining the physical and chemical properties of molecules.

### Elaborating structures as examples of hydrogen bonding:

#### Simple hydrogen bonding:
↳ Water molecules:

Two water molecules ($H_2O$) from a hydrogen bond through the hydrogen atom bonded to the oxygen atom.

$$H-O-H \;\text{——}\; H-O-H$$

↳ Ammonia molecules:

Two ammonia molecules ($NH_3$) form a hydrogen bond through the hydrogen atom bonded to the nitrogen atom.

$$NH_3 \;\text{——}\; NH_3$$

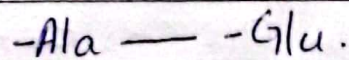#### Hydrogen bonding in biological molecules:

↳ DNA:
Two nucleotide bases (adenine and thymine) form a hydrogen bond through the nitrogenous base pairs.
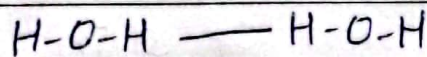
A — T

↳ Proteins:
Two amino acids residues (alanine and glutamic acid). form a hydrogen bond through the carboxyl and amino groups

-Ala — -Glu.

## Hydrogen bonding in solids and liquids:

↳ Ice:
Two water molecules form a hydrogen bond through the hydrogen atom bonded to the oxygen atom in ice.

H-O-H —— H-O-H

Two ethanol molecules form a hydrogen bond through the hydroxyl group.

$CH_3CH_2OH$ — $CH_3CH_2OH$.

Q.No. 2 (d) Discuss the nervous system of the human body?

**Nervous system:**
The nervous system is a complex

network of nerve cells, or neurons, that transmit and process information through electrical and chemical signals. It plays a crucial role in controlling the body's functions, regulating emotions, and enabling thinking, movement and sensation.

## Structure of the nervous system:
### 1. Central nervous system (CNS):
The central nervous system (CNS) is the part of the nervous system that integrates, processes, and coordinates all the sensory information received from the body and the environment. It consist of the brain & spinal cord.

It control the voluntary movements, regulation of body functions, processing of sensory information, learning and memory, and transmission of signals.

### 2. Peripheral nervous system (PNS):
The peripheral nervous system (PNS) is the part of the nervous system that connects the central nervous system to the & rest of the body.

It consists of nerves that transmit signals between the central nervous system and the peripheral organs, muscles, and glands.

### 3. Nerves:
Nerves are bundles of specialized cells called neurons that transmit signals between the CNS and

the peripheral organs, muscles and glands.

## 4. Neurons:

Neurons also known as nerve cells, are the basic building blocks of the nervous system. They are specialized cells that transmit and process information through electrical and chemical signals.

## 5- Glial·cells:

Glial cells, also known as glia or neuroglia, are non-neuronal cells that provide support and maintenance functions for neurons.

## Function of the nervous system:

### 1. Control and coordination:

It regulates body functions, such as movement, sensation, and reflexes.

### 2. Sensation and perception:

It interprets sensory information from the environment.

### 3. Movement and voluntary actions:

It control voluntary movements, such as walking, talking and writing.

### 4. Emotions and behavior:

It regulates emotions, motivation and behavior.

### 5. Cognition and thought:

It enables thinking, learning and memory.

## Divisions of the nervous system:

## 1. Somatic nervous system:
It controls voluntary movements and sensations.

## 2. Autonomic nervous system:
It regulates involuntary functions, such as heart rate, digestion, and respiration.

## 3. Sympathetic nervous system:
It prepares the body for "fight or flight" responses.

## 4. Parasympathetic nervous system:
It promotes relaxation and restoration.

## Disorders and diseases of the nervous system:
1. Stroke: Damage to the brain due to interrupted blood flow.
2. Epilepsy: Seizure disorders.
3. Migraines: Headaches caused by abnormal nerve activity.

---

Q.No.4.(a).

### Answer.

Hepatitis:
Hepatitis is the viral infection that affects the liver, causing inflammation and damage.

There are several types of hepatitis, including hepatitis A, B, C, D, and E.

## Causes of hepatitis:

**1. Viral infection:**
   Hepatitis is primarily caused by viral infections, such as hepatitis A, B, C, D, and E.

**2- Contaminated food and water:**
   Consuming contaminated food and water can spread hepatitis A & E.

**3- Blood transfusions:**
   Receiving contaminated blood transfusions can spread hepatitis B & C.

**4- Sharing needles:**
   Sharing needles or syringes can spread hepatitis B and C.

## Symptoms of hepatitis:

1. **Fatigue:** feeling tired and weak.
2- **Loss of appetite**Decreased appetite.
3- **Nausea & Vomiting:**feeling queasy and vomiting.
4- **Abdominal pain:** Pain in upper right abdomen.
5. **Yelowing of Skin and eye:** Jaundice.
6- **Dark urine:** Urine colour changes.
7- **Pale stool:** Stool colour changes.

## Prevention of hepatitis:

1. **Vaccination:** Get vaccinated against hepatitis A and B.
2- **Needle exchange:** Use of needle exchange programs.
3- **Cleanliness:** Maintain good hygiene, especially when handling food and water.

4- **Avoid sharing:** Avoid sharing personal items such as razors and toothbrushes.

5- **Healthy lifestyle:** Maintain a healthy life style, including a balanced diet and regular exercises.

Preventing hepatitis requires a combination of individual and community efforts. By practicing safe habits, getting vaccinated, and seeking medical attention if symptoms occur, we can reduce the risk of hepatitis and its complications.

___

## Q.No.4 (C).

### Answer.

### Fertilizers:

Fertilizers are substances added to soil to promote plant growth and increase crop yield. They provide essential nutrients such as nitrogen, phosphorus, and potassium, which are essential for plant development.

## Types of fertilizers:

### 1- Organic fertilizers:

It derived from natural sources, such as animal waste, plant waste, and microorganisms

## 2- Inorganic fertilizers:

Inorganic fertilizers are synthetic or chemically manufactured fertilizers that provide essential nutrients to plants. They are made from inorganic materials, such as minerals and chemicals, and are often manufactured through industrial processes.

Both types have their advantages and disadvantages. Organic fertilizers promote soil health and sustainability; while inorganic fertilizers provide quick nutrient availability. A balanced approach, combining both types, can optimize plant growth and minimize environmental impact.

=====

## Q.No.4.(d)

### Answer.
### Anatomy of a human tooth:

The anatomy of a human tooth consists of several layers and structures that work together to perform various functions.

### External structure:

1. **Enamel:** The hard, outermost layer that protects the tooth from decay and damage.

2. **Cementum:** A thin layer of bone-like tissue that covers the root of the tooth and helps anchor it to the jawbone.

3. **Dentin:** The layer beneath the enamel, making up the bulk of the tooth.

## Internal structure:

1. **Pulp chamber:** The soft, innermost layer containing nerves, blood vessels, and connective tissues.
2. **Root canal:** The narrow, hollow space inside the root of the tooth.
3. **Apex:** The tip of the root.

## Features:

1. **Cusps:** The pointed peaks on the chewing surface of molars and promolars.
2. **Fossa:** The small depressions on the surface of teeth, used for anchoring nearby teeth.
3. **Gingiva:** The gum tissue that surrounds and supports the teeth.

## Functions:

1. **Biting and Chewing:** The enamel and dentin work together to withstand the forces of biting and chewing.
2. **Protection:** The enamel and cementum protect the tooth from decay and damage.
3. **Sensation:** The pulp chamber contains nerves that transmit sensations like hot, cold and pressure.
4. **Support:** The root and apex anchor the tooth to the jawbone.

Q.NO.7 (a).

### Answer.

Intelligence Quotient (I·Q) and Emotional Quotient (E·Q) are two distinct concepts that measures different aspects of human abilities.

## Intelligence quotient (I·Q):

I·Q is a measure of cognitive abilities, such as:

i- Reasoning and problem solving.

ii- Memory and learning.

iii- Verbal comprehension and vocabulary.

iv- Spatial reasoning and visual-spatial skills.

I·Q tests assess an individual's ability to process information, think logically, and solve problems. The results are usually standardized and compared to those of a large simple of people, with an average score of 100.

## Emotional Quotient (E·Q):

E·Q measures an individual's ability to:

i- Recognize and understand emotions in oneself and others.

ii- Regulate and manage emotions effectively.

iii- Empathize with others and develop strong relationships.

iv- Adapt to changing situations and challenges.

E.Q. assesses an individual's emotional intelligence, which is critical for personal and professional success.

## Differences:

1. **Cognitive vs emotional:** I.Q focuses on cognitive abilities, while E.Q focuses on emotional abilities.

2. **Objective vs. subjective:** I.Q tests are objective, while E.Q assessment are often subjective and rely on self-reporting or observer ratings.

3. **Measuring abilities:** I.Q measures intellectual abilities, while E.Q measures emotional abilities.

4. **Importance:** Both I.Q and E.Q are important, but E.Q is increasingly recognized as a critical factor in personal and professional success.

In ~~so~~ summary, I.Q and E.Q are two distinct concepts that measures different aspects of human abilities. While I.Q assesses cognitive abilities, E.Q assesses emotional abilities. Both are important, but E.Q is increasingly recognized as a critical factor in personal and professional success.

Q. No. 7 (C).

## Answer.

Soln:

Peter's rate of work = 1 lawn / 40 mins
John's rate of work = 1 lawn / 60 mins

combined rate of work = ?

Combined rate of work = Peter's rate of work + John's rate of work.

$$= \left(\frac{1}{40}\right) + \left(\frac{1}{60}\right)$$

$$= \left(\frac{3}{120}\right) + \left(\frac{2}{120}\right)$$

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

$$= \frac{1}{24} \quad \text{lawn per mins.}$$

So, together they can mow 1 lawn in 24 minutes.

---

Q. No. 7. (b).

## Answer.

Soln:

Let Aman's present age be = $x$.
10 years ago, Aman's age was = $x - 10$
After 20 years, Aman's age will be = $x + 20$

According to the problem, after 20 years Aman's age will be 10 times his age

10 years back.

$$x + 20 = 10(x - 10)$$
$$x + 20 = 10x - 100$$
$$x + 20 + 100 = 10x$$
$$x + 120 = 10x$$
$$120 = 10x - x$$
$$120 = 9x$$
$$\frac{120}{9} = x$$
$$\Rightarrow x = 13.33$$

So, Aman's present age is approximately 13.33 years.

Q.No. 7. (d)

## Answer.

Soln:

Let say the original number is $x$.
The correct calculation is $= x \times (5/3)$
The incorrect calculation $= x \times (3/5)$

To find the percentage error, we need to find the difference between the correct and incorrect calculation:

Correct calculation $= x \times (5/3)$
Incorrect calculation $= x \times (3/5)$

Difference $= x \times (5/3) - x \times (3/5)$
$$= x \times [(5/3) - (3/5)]$$
$$= x \times [(25 - 9)/15]$$

$$= x \times \left(\frac{16}{15}\right)$$

$$= \left(\frac{4}{3}\right) x$$

Percentage error = (difference / correct calculation) × 100

$$= \left[\frac{\left(\frac{4}{3}\right)}{\left(\frac{5}{3}\right)} - x\right] \times 100\%.$$

$$= \left(\frac{4}{5}\right) \times 100\%.$$

$$= 80\%.$$

So, the percentage error in the calculation is 80%.