

SAMINA AWAN

Batch : 67

Question: 2

A What is dengue? Give a brief account of its causative agents and its symptoms.

a. Dengue:

Dengue is a viral illness transmitted primarily by Aedes mosquitoes, particularly Aedes aegypti. It is prevalent in tropical and subtropical regions.

b. Causative agents of dengue

(i) Virus:

Dengue is caused by the dengue virus (DENV), which belongs to the flavivirus genus.

(ii) Transmission:

The virus is transmitted to humans through the bites of infected mosquitoes. It can also be transmitted from mother to child during childbirth or through blood transfusion, although

These milder are less common.

c. Symptoms Of dengue:

Symptoms usually appear 4-10 days after being bitten by an infected mosquito and can include:

- a. High fever
- b. severe headache
- c. joint and muscle pain
- d. Nausea and vomiting
- e. Rash
- f. Fatigue
- g. Mild bleeding

In some cases, dengue can progress to severe dengue (previously known as dengue hemorrhagic fever), which can lead to serious complications like plasma leakage, organ impairment, and potentially death.

b. Explain dark matter and dark energy.

Dark Matter:

Dark matter is a mysterious form of matter that does not emit, absorb, or reflect light making it invisible and detectable only through its gravitational effects on visible matter.

Role in Universe

Structure formation:

Dark matter plays a crucial role in the formation of galaxies and galaxy clusters. It acts as gravitational scaffold around which visible matter gathers.

Cosmic Microwave background:

Observations of the cosmic microwave background radiation provide evidence for dark matter through its influence on the early universe structure.

b) Dark energy:

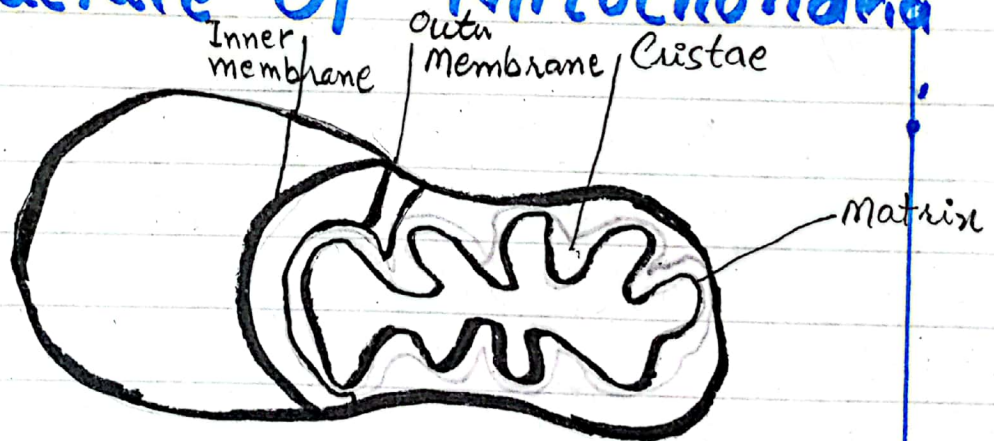
Dark energy is a form of energy that permeates all of space and is thought to be responsible for the accelerated expansion of the universe.

C. Discuss structure and function of mitochondria. How is it the powerhouse?

Mitochondria:

Mitochondria are universally present in the cytoplasm of animals and plants. They appear as minute granules, vesicles, rodlets in shape. Each mitochondria is approximately about 0.2 to 1.0 μm in diameter and 1-2 μm long.

Structure Of Mitochondria



Mitochondria are double-membraned organelles found in most eukaryotic cells. They have the following structures:

- (i) Outer Membrane, Inner membrane
- (ii) Intermembrane space
- (iii) Cristae
- (iv) Matrix

Function of Mitochondria:

- 1) ATP production
- 2) Regulation of Metabolism
- 3) Apoptosis
- 4) Calcium storage
- 5) Heat production

It is considered a power house of the cell. It is the main site of production of ATP, which is vital for cellular functions and energy metabolism. In addition, it converts energy from nutrients into a usable form of (ATP). It also maintains cellular homeostasis.

d. what are covalent bonds? Explain types along with elaborating structures

Covalent Bond:

Covalent bonds are present in covalent compounds. which are formed by mutual sharing of electrons between both non-metals. It can be defined as;

"such type of bond which is formed through mutual sharing of electrons is called as covalent bond."

The bonds in O_2 is an example of covalent bond.

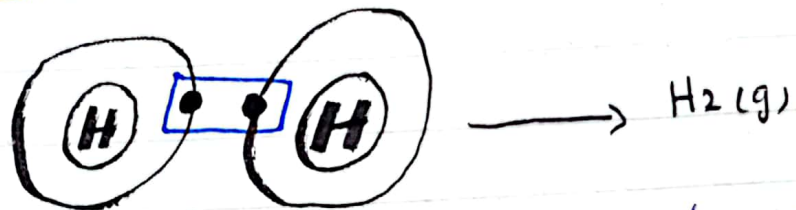


Mutual sharing of electrons between oxygen atoms result in covalent bond in O_2 .

Types of Covalent bonds:

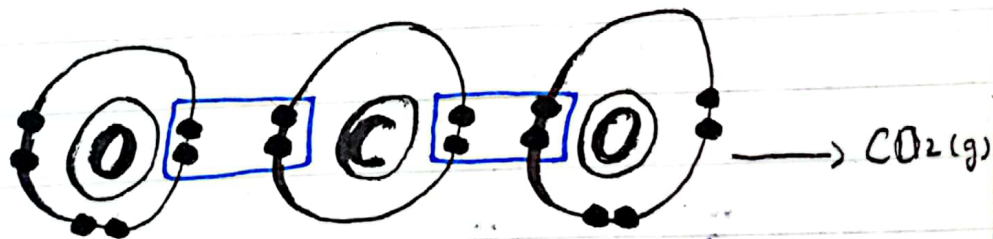
Covalent bonds can be characterised based on the number of shared electrons pairs and the nature of atoms. There are three types of covalent bonds defined as:

(i) Single Covalent bond



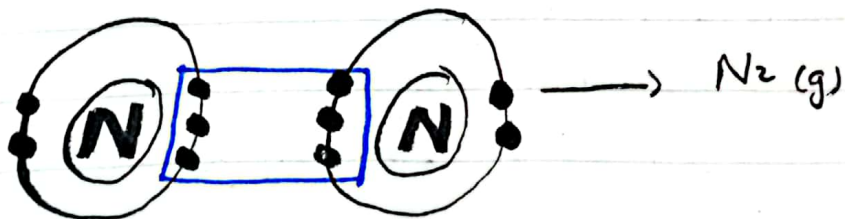
It contains one pair of shared electrons. (e.g. H₂)

(ii) Double Covalent bond



It contains two pairs of shared electrons. (e.g. CO₂)

(iii) Triple Covalent bond



It contains three pairs of shared electrons. (e.g. N₂)

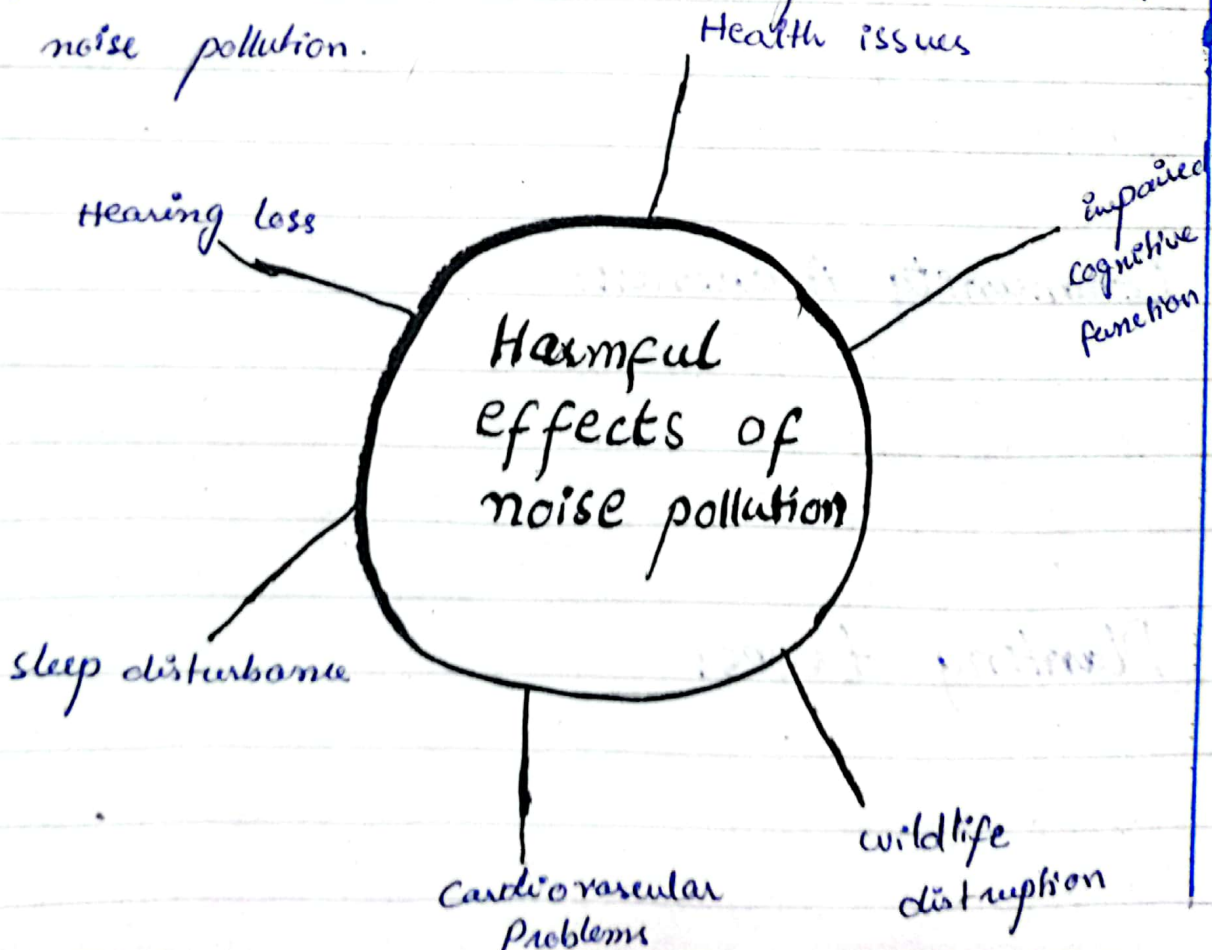
Question: 4

- a. What is noise pollution? Give its harmful effects and ways to curb.

Noise pollution:

"Noise pollution: A silent killer"

Noise pollution refers to excessive or harmful levels of noise in the environment, often stemming from transportation, industrial activities and urban development cause a noise pollution.



Ways to Curb noise pollution:

(i) noise barriers:

Install sound walls along highways and railways to block noise from reaching residential areas.

(ii) Regulations:

Enforce noise control laws to limit excessive noise from construction, traffic and industrial sources.

(iii) Soundproofing:

Encourage soundproofing measures in buildings, such as double-glazed windows and insulation.

(iv) Community Awareness:

Educate the public about the impacts of noise pollution and encourage quieter practices in neighborhoods.

(v) Planting trees:

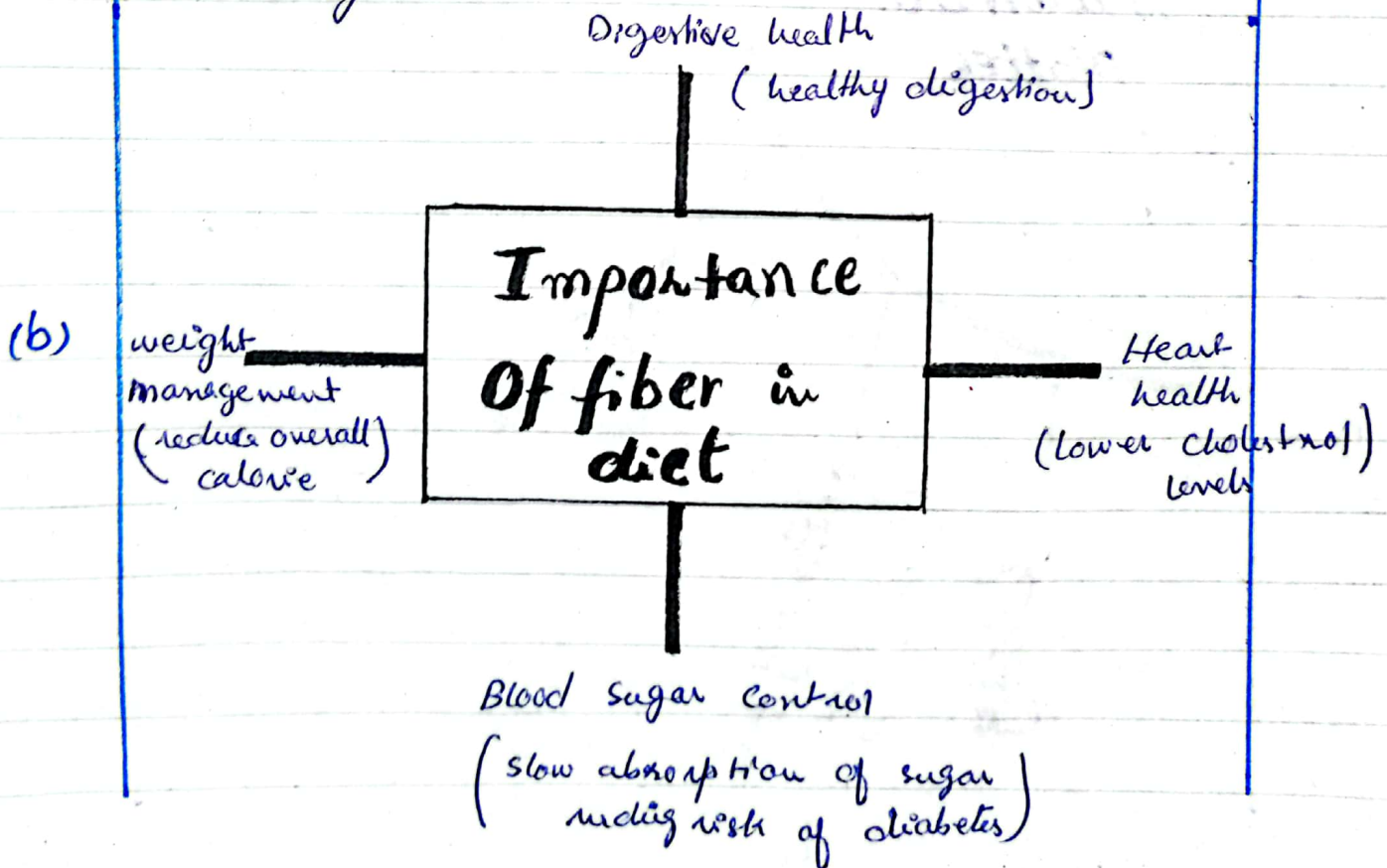
Planting trees on roads side areas, which help to reduce sound by changing their behavior.

b. What is the importance of fibers in diet? How would be a platter of food considered balanced?

(a) **Dietary fiber:**

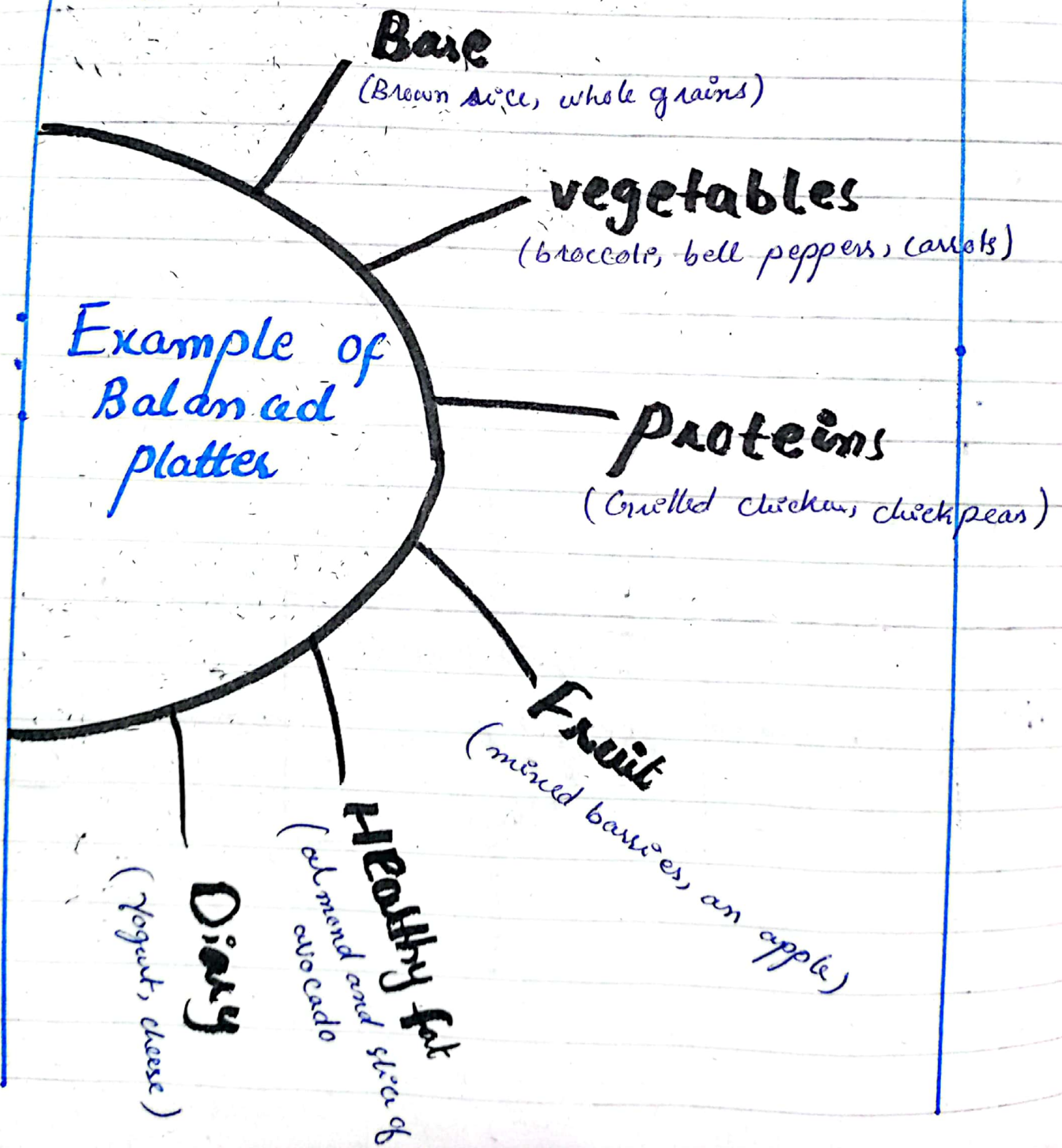
Dietary fiber or roughage is the portion of plant derived food that cannot be completely broken down by human digestive enzymes.

Dietary fibers are diverse in chemical composition and can be grouped generally by their solubility, viscosity and fermentability which affect how fibres are processed in the body.



(c) Platter of food:

A platter includes a variety of foods across all the categories, a balanced platter provides a comprehensive range of nutrients, promotes overall health, and supports a high fiber diet.



C. Elaborate drinking water quality and Standards.

"water is life, and clean water means health."

(a) Safe drinking water is essential for health sanitation, well-being. Contaminated water can lead to serious health issues, including gastrointestinal diseases, cholera, and other waterborne diseases.

Ensuring high-quality drinking water is crucial for preventing these risks and promoting public health.

b) Standards for drinking water quality:

Various organisations set standards to ensure safe drinking water, including

a. WHO (World Health Organization):

(i) It provides guidelines on drinking water quality, focusing on health-based recommendations for various contaminants.

b. Environmental Protection Agency (EPA).

- (i) It established the safe drinking water Act (SDWA), which sets enforceable standards for drinking water quality. It regulates primary contaminants (those posing risks) and secondary contaminants (those affecting taste, odor or appearance).

(c) Drinking - water quality standards:

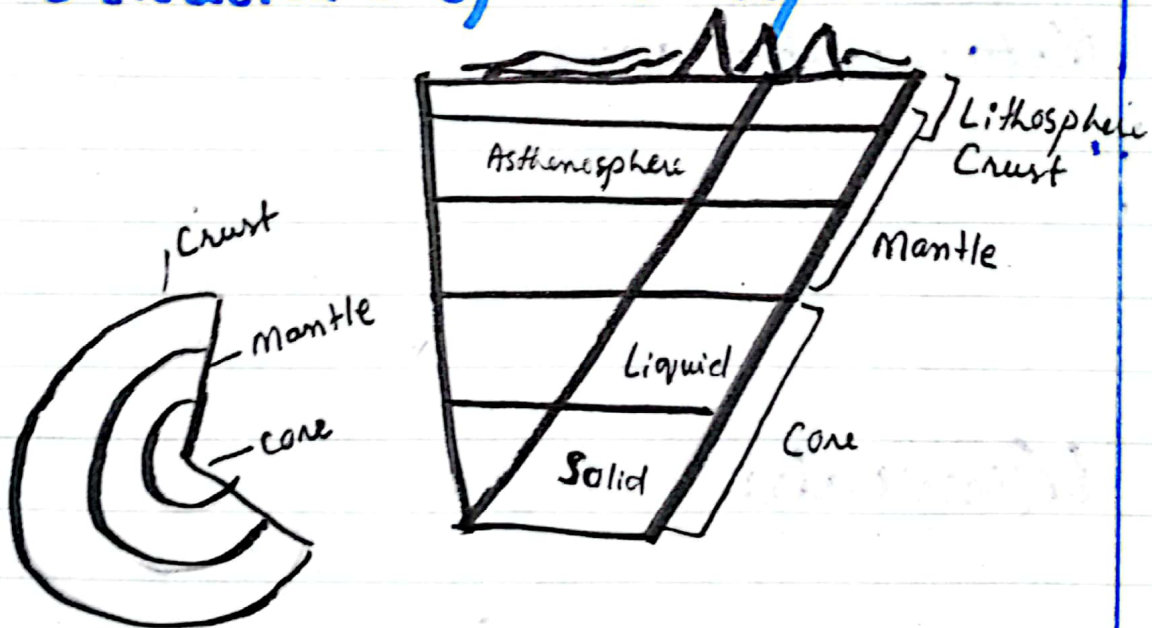
Parameters	WHO guidelines (mg/L)
1. PH.	6.5 - 8.5
2. Turbidity	5 NTU
3. dissolved oxygen	6.5 - 8 mg/L
4. nitrates	50.0 as N
5. Fluoride	1.5
6. chloride	250

d. Explain Lithosphere. what are rocks and minerals?

a. Lithosphere:

The lithosphere refers to the rigid outer layer of the Earth, encompassing the crust and the uppermost part of the mantle. It plays a crucial role in the Earth's geology and is essential for various geological processes.

b. Structure of Lithosphere:



c. Function:

- (i) Movement of tectonic plates
- (ii) Resource formation
- (iii) Soil formation

b. Rocks:

Rocks is any coherent, naturally occurring solid material consisting of one or more minerals. They are classified into three main types.

(i) Igneous rocks:

Formed from cooled magma.
(e.g; granite, basalt).

(ii) Sedimentary rocks:

Formed from accumulation of sediments. (e.g; limestone, sandstone).

(iii) Metamorphic rocks:

Formed from existing rocks altered by heat, pressure, or chemical processes. (e.g; marble).

c. Minerals:

minerals are naturally occurring, inorganic solids with a definite chemical composition and crystalline structure. Examples include quartz, feldspar and mica.

Section: II

Question: 6

(a) Determine the "k" value if the arithmetic mean of 9, 8, 10, K, 12 is 15.

Solution,

Given numbers: 9, 8, 10, K, 12

Mean = 15

Formula: Mean = $\frac{\text{sum of numbers}}{\text{total count}}$

$$= 15 = \frac{(9 + 8 + 10 + K + 12)}{5}$$

$$= 15 \times 5 = 39 + K$$

$$= 75 = 39 + K$$

$$= K = 75 - 39$$

$$= \boxed{K = 36} \text{ Ans}$$

b)

Solution,

initial ratio: sugar : colored water
4 : 3

let initial quantities be $4x$ and $3x$

new ratio after adding 10 liters of
colored water: 4:5

$$4x : (3x + 10)$$

Equating ratios,

$$\frac{4x}{3x + 10} = \frac{4}{5}$$

$$\Rightarrow 20x = 4(3x + 10)$$

$$\Rightarrow 20x = 12x + 40$$

$$\Rightarrow 8x = 40$$

$$\Rightarrow x = 5 \quad \text{Ans}$$

initial sugar solution quantity = $4x = (4 \times 5)$
20 liters

C. Football volume

Formula: volume of sphere = $(\frac{4}{3}) \pi r^3$

$r = 12$ cm (radius)

$$\text{volume} = (\frac{4}{3}) \pi (12)^3$$

$$= (\frac{4}{3}) \times 3.14159 \times 1728$$

$$= \boxed{7.24} \text{ liters or cubic cm}$$

d. Given number -10, -8, 6, 40, 102, ?

Solution,

$$\begin{array}{cccccc} -10, & -8, & 6, & 40, & 102, & \underline{196} \\ \vee & \vee & \vee & \vee & \vee & \\ +2 & 2 & 34 & 62 & 94 & \end{array}$$

= 96 is the answer

Question: 7

a. solution,

Expressing $y\%$ of 20 in terms of x

Given, 20% of $x = y$

$$y = 0.20x$$

Now, find $y\%$ of 20:

$$\left(\frac{y}{100}\right) \times 20 = \frac{(0.20x)}{100} \times 20$$

$$= 0.04x$$

∴ $y\%$ of 20 is 0.04 of x .

b. solution,

finding P's Monthly salary

Let's P's salary = P, Q's salary =
Q. salary

From given,

$$\frac{P+Q}{2} = 5050 \quad (1)$$

$$\frac{Q+R}{2} = 6250 \quad (2)$$

$$\frac{P+R}{2} = 5200 \quad (3)$$

Adding (1) and (3), then subtracting (2):

$$P+Q+P+R - Q-R = 5050 + 5200 - 6250$$

$$2P = 4000$$

$$P = 2000$$

P's monthly salary is Rs. 2000

C. Coin toss possibilities

Solution,

$$\text{Total tosses} = 500$$

$$\text{Two heads} = 105$$

$$\text{One head} = 275$$

$$\text{no head} = 120$$

Possibilities,

$$P(\text{two heads}) = 105/500 = 0.21$$

$$P(\text{one head}) = 275/500 = 0.55$$

$$P(\text{no head}) = 120/500 = 0.24$$

Ans

d. Solution,

Let Jamie's current age = x

Jamie's dad's current age = $4x$

In 14 years Jamie's age = $x + 14$, Dad's age = $4x + 14$

According to the problem

$$4x + 14 = 2(x + 14)$$

simplifying

$$\leq 4x + 14 = 2x + 28$$

$$= 4x - 2x = 28 - 14$$

$$\leq 2x = 14$$

$$\leq x = 7$$

jane's current age = 7

jane's dad's current age = $4x = 28$

Ans