

## PART. II (SECTION -1)

### Question: 2

a) "Dengue"

Dengue is a viral infection transmitted to human through the bites of infected mosquitoes called Aedes.

⇒ Symptoms:

High fever, severe headache, pain behind the eyes, joints and muscles, rash and mild bleeding.

In extreme cases, dengue can progress to Hemorrhagic fever or dengue shock syndrome which are threat to life.

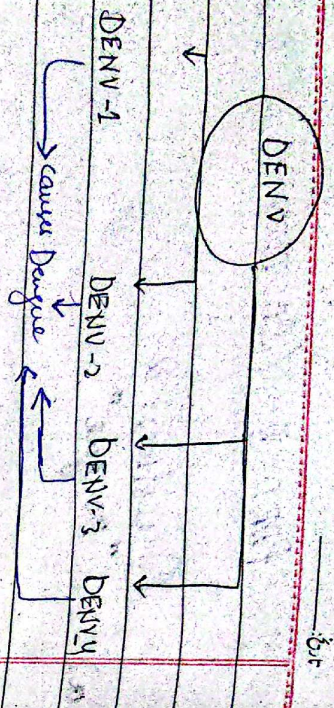
⇒ Treatment:

Not specified, preventions and managing symptoms soon so far.

⇒ Causative agents:

Dengue viruses (DENV): Flavivirus genus in the Flaviviridae family, are the causative agents which further are classified into 4 types (serotypes)





## b) Dark matter and dark energy:

→ Dark matter:

is a mysterious form of matter that does not emit, absorb or reflect light, making it invisible and undetectable through traditional astronomical observations (like light and radio waves) - its existence of dark matter is based on gravitational effects on visible matter such as stars and galaxies. The observations show that galaxies rotate faster than expected based on visible mass alone and galaxy clusters display gravitational forces which can't be explained without additional unseen mass.

It makes up 27% of the universe, dark matter's exact nature is still undefined.



## ⇒ Dark energy:

It is a mysterious form of energy thought to be accelerated expansion of the universe. While dark matter pulls galaxies together with its gravitational forces, dark energy seems to work in the opposite direction, pushing space apart, causing galaxies to move away from each other at an increasing rate. Dark

energy is estimated to make up 68% of the universe, dwarfing the contributions of dark matter (27%) and ordinary matter (5%).

A theory suggests it might be related to the Cosmological Constant term used by Einstein to explain static universe. Which represents an energy density inherent to empty space itself. However, theory suggests, it could be a dynamic field <sup>with</sup> varying time ~~and~~ over space. an "Quintessence" The distant supernova

and cosmic microwave have helped to conclude dark energy exist but origin is understood.

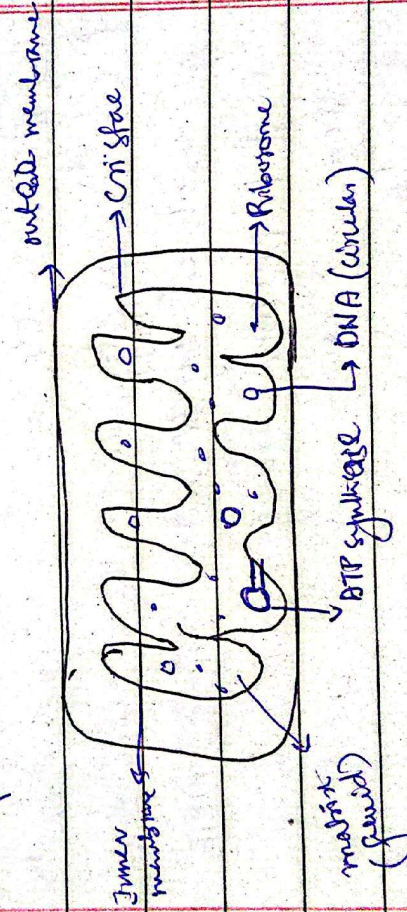
supply of "energy"  
The ATP is generated



c)

## Mitochondria

It is a double membraned organelle of the cell. It has self-replicating ability. It varies cell to cell. Two cellular respiration takes place in the mitochondria which results the synthesis of Adenosine triphosphate (ATP) which is called the energy currency of cell. That's the reason it is called the power house of the cell.



The mitochondria is called as power house of the cell because it produces the most of the cells supply of adenosine triphosphate. The ATP is generated through a



For the initial 10-15 minutes

which includes some steps

in synthesis

Thymidine (Thymine) is an essential amino acid from food & water

The pyrimidate is a precursor of DNA and also a precursor of RNA

Low cellular level (Thymine) is a result of unbalanced synthesis

Pyrimidate is a product of the de novo synthesis and carbon source

(CO<sub>2</sub>) is important for synthesis and is supplied by chloroplasts called C<sub>3</sub> and C<sub>4</sub> which carry it to the rest of the plant

C<sub>3</sub> pathway (C<sub>3</sub> pathway) and C<sub>4</sub> pathway (C<sub>4</sub> pathway)

These are the main pathways for the synthesis of pyrimidate in the plant

When the plant is under stress, the synthesis of pyrimidate is inhibited

but the pathway is not blocked

in a way that prevents the synthesis of pyrimidate

but thymine is still synthesized

in the plant

in the plant

in the plant

in the plant



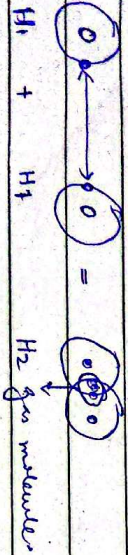
## d) Covalent Bonds:

like chemical bonds formed by sharing of electron pairs between atoms are called covalent bonds. These bonds occur between non-metal atoms having similar electronegative properties which is a tendency of an atom to attract electrons. By sharing electron each atom of covalent bond can achieve a stable electron configuration often resembling to noble gases.

→ types and structure of covalent bonds.

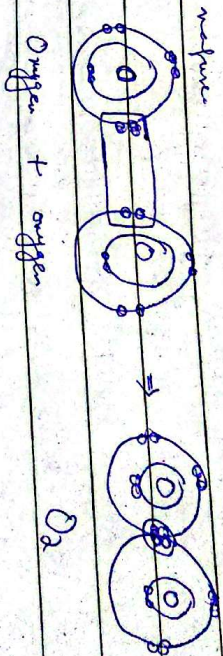
### 1- Single covalent bonds:

When two atoms share a single pair of electron (2 electrons). There are generally longest and weakest covalent bonds.



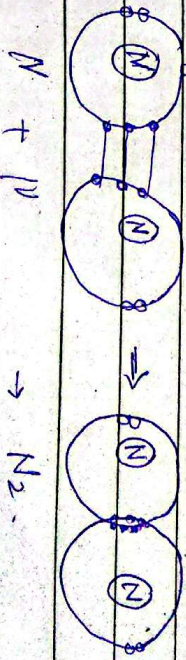
### 2- Double covalent bonds:

When 2 ~~or~~ ~~more~~ atoms share double pair of electrons (4 electrons) with each other. It occurs between a non-metal or a non-metal and a metalloid. It is stronger in bonding nature.

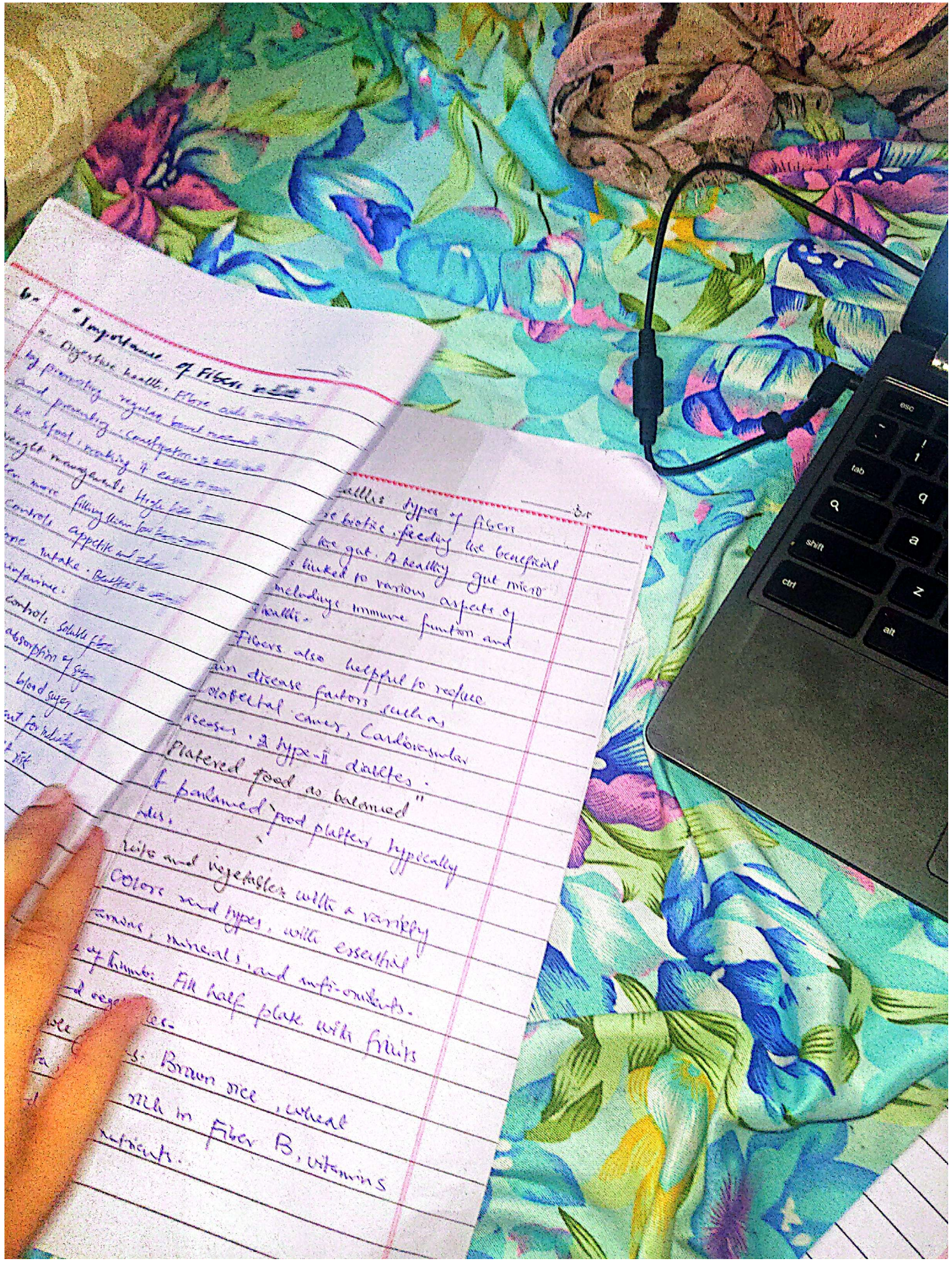


### 3- Triple covalent bonds

When two atoms share three pairs of electrons (6 electrons) to each other to complete its valence shell. It takes place between 2 non-metals or a non-metal and a metalloid. It is a weak or unstable bond with low bond length.







Importance of Fiber

Digestive health. Fiber aids in  
by promoting regular bowel movements  
and promoting satiety. It also  
helps in weight management. High fiber  
can more filling than low fiber.  
controls appetite and  
increases intake. Better to  
increase.

control: Soluble fiber  
absorption of sugar  
blood sugar level  
not for individuals  
at risk

soluble types of fibers  
are prebiotic, feeding the beneficial  
in the gut. A healthy gut micro-  
biome is linked to various aspects of  
health, including immune function and  
metabolism.

Fibers also helpful to reduce  
risk of disease factors such as  
diabetes, cardiovascular  
disease. "A type-II diabetes."  
Plated food as balanced"

Plated food as balanced"  
Fruit and vegetables typically

Color and vegetables with a variety  
of colors and types, with essential  
vitamins, minerals, and anti-oxidants.  
Fill half plate with fruits  
and vegetables.

Whole grains. Brown rice, wheat  
rich in Fiber B, vitamins  
and nutrients.



d) Covalent

the  
by sharing  
atoms  
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having  
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attract  
each  
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→ type

1- Size

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pair of

atoms

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## Question - 4

a) Noise pollution

The excessive harmful levels of noise in the environment that can adversely affect the human health, wild life and overall quality of life. The normal hearing frequency ranges from 20 Hz to 20,000 Hz (20 kHz) for young adults for a human being. Higher than this range <sup>of voice</sup> is considered as noise pollution for the human beings.

(Effects)

The noise pollution can cause harmful effects which are as follows:

a) health issues:

Hearing loss.

Sleep disturbances

Cardiovascular problems

Stress and Anxiety.

b- Cognitive impairment:

Learning Difficult

Decreased productivity.

c- Impact on wildlife:

Disruption of Communication.

Habitat loss.

d- Reduced life Quality:

Annoyance

Social Isolation.

e- Environmental effects:

Altered ecosystem.

Pollution Synergy.

⇒ Ways to curb Noise pollution:

a) Urban Planning: Developing buffer zones between zones of residential and noisy areas.

b) Noise Barriers: Installing sound barriers along with highways, railways, airports.

c) Regulations: Limiting noise from construction, industrial activities and transportation.

d) Public Awareness: Educating communities

about effects of pollution to reduce it.



## b- "Importance of Fibers in diet"

- a- Digestive health: Fibre aids in digestion by promoting regular bowel movements and preventing constipation. It adds bulk to the stool, making it easier to pass.
- b) weight management: High fiber foods are often more filling than low fiber options, which controls appetite and reduce overall caloric intake. Beneficial to weight loss and maintenance.
- c- Blood sugar control: Soluble fibres slow down the absorption of sugars, helping to regulate blood sugar levels. This is specially important for individuals with diabetes or those at risk of developing the condition.
- d- Heart health: Soluble fibre can help lower cholesterol levels by binding to cholesterol in the digestive system and removing it from body. It reduces the heart diseases.

a- Gut Health: types of fibers such as prebiotic, feeding the beneficial bacteria in the gut. A healthy gut microbiome is linked to various aspects of health including immune function and mental health.

Fibers also helpful to reduce certain disease factors such as colorectal cancer, Cardiovascular diseases, & type-II diabetes.

⇒ "Plated food as balanced"

A balanced food plate typically includes:

- (a) Fruits and vegetables with a variety of colors and types, with essential vitamins, minerals, and anti-oxidants.  
Rule of thumb: Fill half plate with fruits and vegetables.
- (b) Whole grains: Brown rice, wheat, pasta, oats rich in fiber B, vitamins and other nutrients.



d)

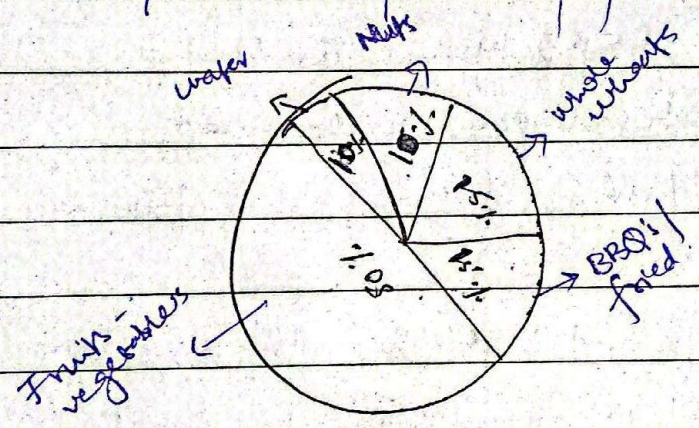
c) Protein sources. Plates with protein rich sources are good to diet.

d) Healthy fats. Fats are necessary for brain health and can help to reduce inflammation.

e) Dairy alternatives. Low fat or non fat dairy products to get calcium and vit. D for bone health.

f) Hydration: water or low caloric drinks

All of these food makes a balanced plate of food.



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## C- Drinking Water Quality and Standards

Drinking water quality and standards are essential for public health and safety. The quality of drinking water is determined by the physical, chemical and biological characteristics.

→ Physical — Chemical — Biological:

- clean.	pH → 6.5-8.5	Bacteria free,
- odorless,	All organic and	Pathogen free,
- tasteless	Inorganic substances	
- and high	dissolved totally	
turbidity indicates	in water.	
the quality of	Balanced <del>nutrients</del>	
pure drinking	Nitrates, phosphate	
water	other nutrients.	

Heavy metal free

(lead, mercury).

"This table indicates the quality of drinking water."



# 'Standards of water'

⇒ International Standards:

1- world health organisation (WHO) has provides guidelines for drinking water quality recommending acceptable limits for various contaminants and advising countries on best practices for water safety.

2- United Nations Children's Fund (UNICEF)

UNICEF along with WHO to promote safe drinking water, water access particularly in developing countries.

⇒ National standards: (Pakistan).

United States Environmental Protection Agency (EPA): sets enforceable standards under safe drinking water act (SDWA) has establish Maximum Contaminant Levels (MCLs) for various substances.

Primary — Secondary  
Standards