

Past-II Section-I

Answer to Q. No. 2

a. **Dengue, its causative agents and its symptoms**

Introduction

Dengue is a mosquito-borne, viral disease. It is also called "break bone" or "dandy fever". It is caused by the mosquito *Aedes Aegypti* which transmits dengue viruses among people. Some of the major symptoms of dengue are: High fever, headache, muscles and joints pain, nausea and vomiting.

Causative agents of Dengue

Dengue can be caused by any one of four types

of dengue viruses

↳ DEN-1

↳ DEN-2

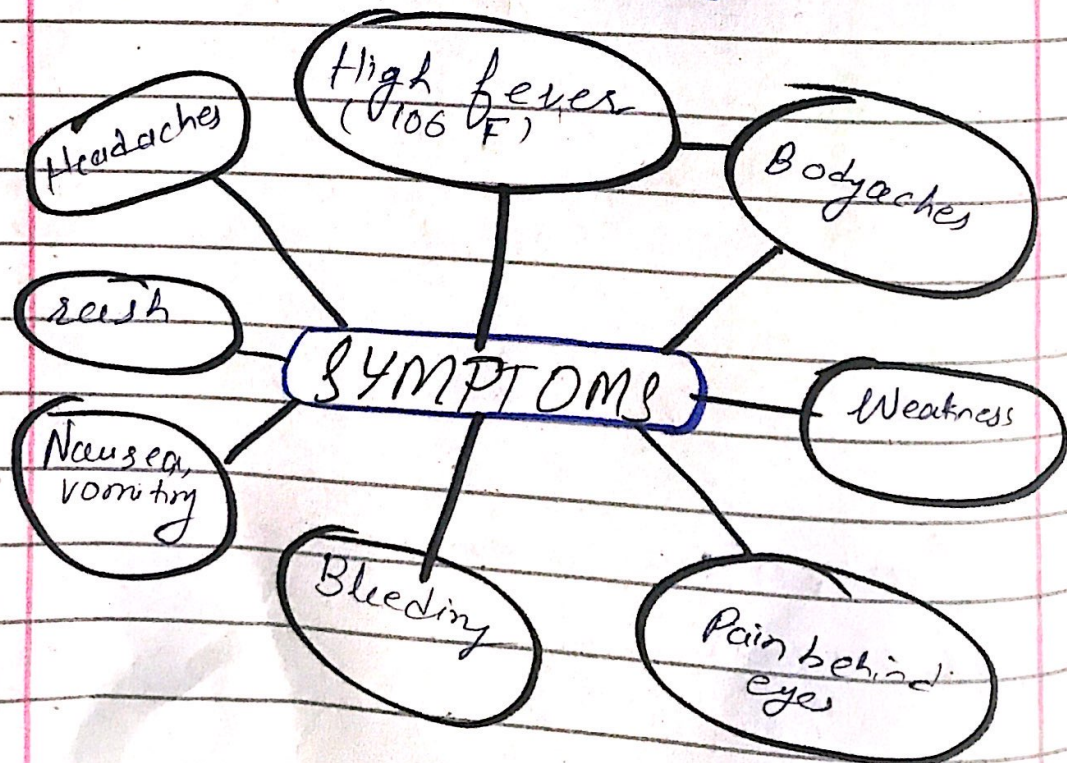
↳ DEN-3

↳ DEN-4

These are called serotypes which are a group of microorganism within same species

The biggest causative agent of dengue is *Aedes Aegypti*.

Symptoms of Dengue



Rise of dengue in Pakistan, and prevention

These days dengue is at rise affecting many people. It can be prevented by: insecticides, monitoring and surveillance of vectors and proper covering of bodies.

Conclusion

To sum up, dengue is a harmful disease which can disrupt the health of people. Proper preventive measures must be taken to stay safe.

b. Dark matter and Dark energy

Introduction

Dark matter and dark energy are two mysterious components that make up about 95% of the universe.

Dark Matter

Dark matter is an invisible, non-luminous form of energy that does not emit, absorb or transmit electromagnetic radiation.

How can dark matter be seen?

It is invisible to telescopes. However, its presence can be inferred through its gravitational effects on visible matter.

Key Characteristics

① Invisible

As it does not interact with light

③ Collisionless

Particles interact only through gravity.

③ Non-baryonic

Not made up of ordinary matter or baryons

④ Cold

Moves slowly compared to light

Dark Energy

It is a mysterious component of energy driving the accelerating expansion of universe.
It causes cosmic expansion

Key Characteristics

① Negative pressure

It pushes the matter apart.

② Repulsive force

It has the power to counter gravity

③ Density

It remains constant despite expansion

Different-theoretical frameworks explaining dark energy

Some suggest it could be vacuum energy

Some suggest it could be phantom energy.

While others consider it quintessence (a dynamic field)

C. Structure and function of mitochondria, the powerhouse

Introduction

Mitochondria manufactures and supplies energy to cell. It differs in size and in different cells. It is only

present in eukaryotes. It is also called power house of cells.

Structure of Mitochondria

It is a filament shaped. It is bounded by two membranes:

Outer membrane

Inner membrane

Outer membrane is smooth.

While inner membrane has many infoldings called the cristae. Cristae has small knob-like structure F₁ particles (synthesised ATP)

Chemical composition of mitochondria

Mitochondrial membrane is composed of lipids and proteins

Mitochondrial matrix has large number of enzymes, 10 enzymes

organic and inorganic salts

It also contains DNA and Ribosomes.

It can also synthesize its own protein.

Function of Mitochondria

Function of Mitochondria depend on the cell type in which they are present

- ① The most important function is energy production
- ② Mitochondria help in building certain parts of blood and hormones like testosterone and estrogen
- ③ It helps in metabolic processes
- ④ It converts glucose into energy storage of calcium ions, and regulate proper concentration of calcium ions within the compartments of cell.
- ⑤ The liver cells mitochondria have enzymes that detoxify ammonia.

How is it the power-house?

It is the power house because it generates most of the cell's energy.

It converts chemical energy from nutrients into ATP.

It optimizes energy production through cellular respiration.

It adapts to changing energy demands.

d. Covalent bonds, types and structures.

Covalent bonds involve the sharing of a pair of valence electrons by two atoms. Such bonds lead to stable molecules if they share electrons in such a way as to create a noble gas configuration for each atom.

Types of Covalent Bonds

① Polar covalent bonds

In it, electrons are shared unequally, resulting in a partial positive and negative charge.

② Non polar covalent bonds

In this type of bonds, electrons are shared equally.

③ Coordinate covalent bonds

One atom donates both electrons in the shared pair.

④ Dative covalent bonds

It is similar to coordinate bonds, but with a donor-acceptor relationship.

Answer to Q. No. 4

a. Noise pollution, effects prevention (ways to curb)

Noise Pollution

It refers to excessive, unwanted or disturbing sounds (heard on ears) that harm human health, wildlife and environment. Noise pollution is also called sound pollution.

Effects of Noise Pollution

- ↳ Hearing Loss
- Sleep disturbances and fatigue
- Stress, anxiety, and depression
- Cardiovascular diseases
- ↳ Reduced cognitive performance

Noise pollution can also impact wildlife, resulting in habitat destruction and alterations in migration patterns.

Ways to curb noise pollution

- ↳ Establish noise regulation and standards
- Implement noise-reducing technologies
- Create quiet zones
- Banning noisy vehicles
- Use of noise-reducing machinery.
- Electric/hybrid vehicles
- ↳ Artificial intelligence-powered noise control

It is important to check noise pollution as it disturbs peace and disrupts health of humans and animals.

6. Importance of fibre...

Definition of Fibre

Fibre in diet is the part of food that ~~has no~~ cannot be digested. It has no food value, but it helps to move the waste through the digestive system. (Nicholas Horsburgh)

Sources of fibre:

fruits, vegetables, brown bread, whole grains etc

Importance of fibre in diet

① Promotes regular bowel movement

It prevents constipation, and reduce risk of hemorrhoids.

② Supports healthy gut bacteria

It fosters beneficial

microbes

③ Helps reduce bad cholesterol

It helps reduce LDL (bad) cholesterol.

④ Regulates blood sugar

It slows sugar absorption, and aids diabetes management

⑤ Supports immune function

Boosts immune system

Balanced platter of food

A platter of food will be considered balanced which contains variety of healthy foods; in other words, balanced diet.

Balanced diet refers to variety of foods in the right amounts

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A platter containing junk food does not have balanced diet

To eat balanced diet, one must avoid junk food, which is low in nutritional value. It is high in sugar/fat and low in fibre, protein, vitamins or minerals.

Platter containing balanced diet

has proteins, fats, water, carbohydrates, dietary fibres, mineral, and vitamins

Food Groups	Major sources
Carbohydrates	grains, potatoes
Dietary fibre	fruits, vgs.
Proteins	meat, eggs.
Fats	dairy, chocolate
Vitamins	sun, orange...
Minerals	liver, eggs, milk...

Balanced meal is important for energy, to grow muscles, to defend against diseases, and for overall health.

C. Elaborate drinking water quality and standards

There are different criteria for judging whether water is safe for drinking. They are: foul smell, bad taste, bad colour.

According to WHO, safe drinking water is that which does not pose significant threat to health.

To define water quality and standards, different aspects are taken into consideration.

① Microbial Aspects

Ensuring that water is free from harmful

microorganisms, such as bacteria, viruses and parasites

② Acceptability Aspects

Defining acceptable taste, odor, and appearance parameters.

③ Regulating the chemical concentration

chemicals like arsenic, lead and mercury.

International Standards for drinking water

The pH level of water sources must be between 6.5 and 8.5 on a scale ranging from 0 to 14.

Drinking water crisis in Pakistan

Pakistan ranks 80th out of 81 countries in access to safe drinking water (UNDP)

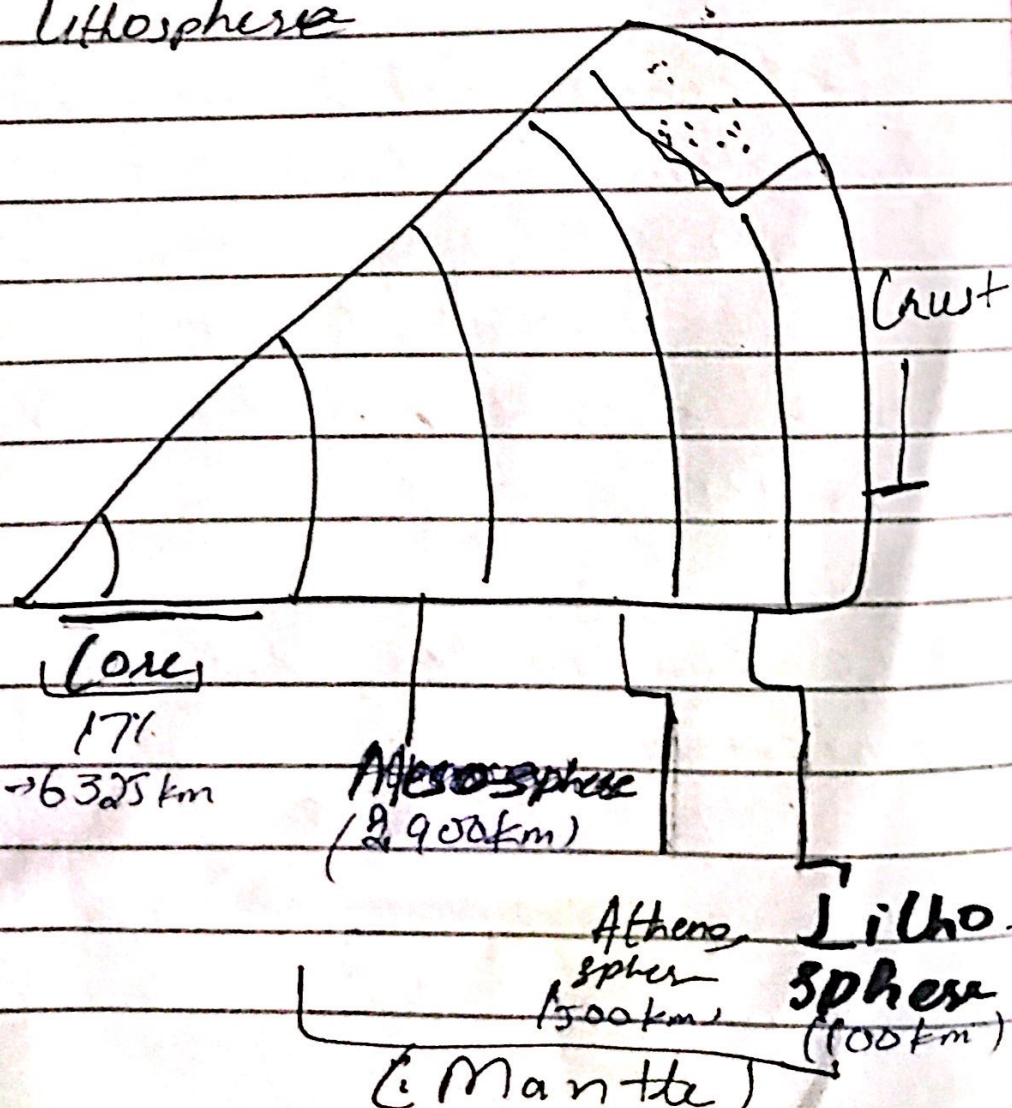
d. Lithosphere, rocks and minerals

Lithosphere is the outermost shell of solid earth made from rock

It consists of crust and upper mantle. It lies directly under the land surface and ocean floors

It consists of minerals, rocks, and tectonic plates.

Composition of earth and lithosphere



Rocks

Rocks are naturally formed mass of mineral matter, of organic and inorganic ^{origin,} matter, that forms planetary crust.

Types

① Igneous Rocks

Cooling and solidification of magmas. (e.g., granite, basalt etc.)

② Sedimentary

These are the result of ^{rock} minerals and grains (e.g., limestone, coal)

③ Metamorphic

Due to massive forces of heat and pressure, they are formed

Minerals

Naturally occurring inorganic solid that possesses an orderly internal structure and definite chemical composition

Characteristics of Minerals

- ① Occur naturally
- ② Inorganic
- ③ Solid
- ④ Definite chemical composition