

(a) Explain the difference between Middle Latitude Cyclones and Tornadoes.

(Section - A)

a) Middle Latitude cyclones vs

Tornadoes

i) Middle latitude cyclones are twistors ^{one} the low air-pressure of air circulating systems in a circular direction

ii) These are ~~fast~~ in There are basically their depth, approximat under 1 km of ely covering hundreds distance of miles

iii) They result in heavy They are more rain fall, thunder windy storms and lightening

iv) They bring flash Here the loss floods and incur is a bit low huge economic loss

v) They erupt from They mostly found bays and 30° & 60° in plains or latitude straight landscapes.



(b) What is natural radioactivity? How it is different from the artificial radioactivity?

b) Natural Radioactivity

A natural spontaneous process of emitting alpha (α), beta (β) and Gamma (γ) particles along with hazardous gases. It occurs when a nuclei of radioactive element becomes unstable due to reaction inside nucleus. Uranium-235, Potassium-40 and Carbon-14 are best examples of natural radioactivity found in nature.

Artificial Radioactivity

The process called artificial because scientists hit proton and neutron against an stable nuclei of a radioactive element. So that it creates enough energy and it is used for making missile weapons and domestic energy.

The best examples of artificial radioactivity is Plutonium-239 and Uranium-235. conducted in nuclear reactors.

(c) What are the advantages and limitations of renewable energy resources?
Briefly explain the prospects of non-conventional energy resources in Pakistan.

c) Advantages of Renewable Energy Sources:

- These are re-filled by nature automatically.
- They do not emit green house gases such CO , SO_2 , CO_2 ; therefore, they do not affect environment.
- They help economy by reducing imports of coal, oil and gas.
- They generate huge employment because there are many plants needed for them.

Limitations of Renewable Energy Resources:

- They are costly to be acquired.
- They are vulnerable to natural disasters.
- They incur handsome cost of maintenance.
- Requiring large land and energy storage.

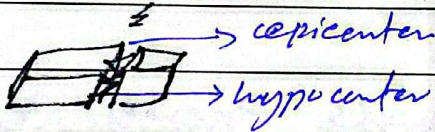
Prospect of non-conventional Energy Resources in Pakistan:

- Solar Energy
- Thermal (Geo) Energy
- Wind Energy
- Hydro power
- Biomass
- Nuclear energy
- Tidal energy

(d) World largest earthquake was assigned a magnitude of 9.5 by the United States Geological Survey on 22 May 1960 in southern Chile Valdivia. What do you know about earthquake? Also explain shallow-focus and deep-focus earthquakes.

D) Earthquake

Earthquake is a sudden to and fro movement in the crust of earth. It occurs due to the emission of energy from seismic waves. It also occurs because of clash in tectonic plates residing inside the earth crust. The origin from the trembling movement erupts is called hypocenter and when it reaches to the earth surface, it ~~is~~ is called epicenter.



Shallow Focus: when the depth of waves is less than 60 km, it is called shallow focus. It does not lead to much destruction on the surface.

Deep Focus: when depth reaches to 200 km or more, it is called that deep focus. It can create absolute destruction on the surface.

(a) What is meant by transpiration? Explain in detail the significance of leaf structure in the process of transpiration.

Section - A

Q:1

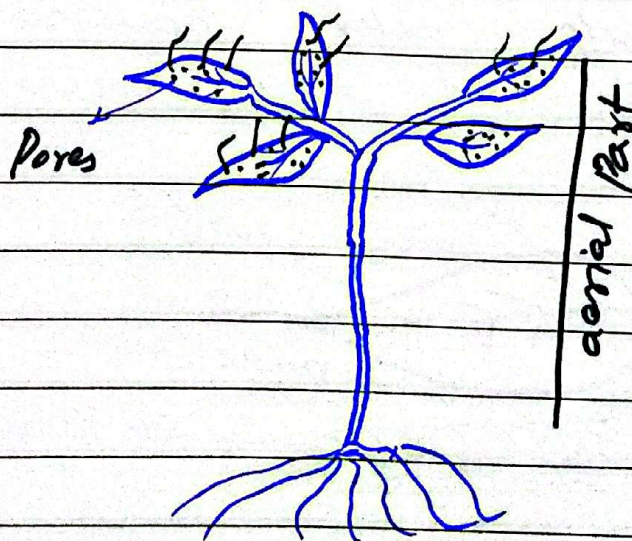
a)

Meaning of Transpiration:

Transpiration is a process in which plants remove excess water from their aerial parts such as stomata, cuticle and lenticles.

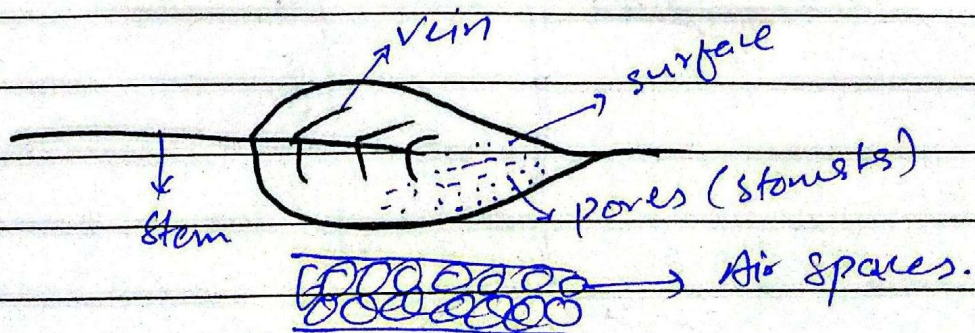
Stomata are the pores inside the leaf which help remove or stop water. Cuticle are also layers when leaves control water from day season. Lenticles are also type of openings by which breathing of gases takes place.

The process is called suction pull because of holding water or selecting water from small pores.



Significance of Leaf structure in Transpiration:

- i) **Stomata:** Stomata called sometimes stomas, are tiny pores in leaf which help evaporate or remove water vapours.
- ii) **Vein Network:** Leaf contains a network of veins by which water and food material is provided to different areas or parts of leaf.
- iii) **Thinness of Leaf:** Thinness of leaf is diffused pathways by which water rapidly comes out and remove it from the leaf.
- iv) **Air Spaces:** There are also air spaces in leaf made-up of mesophyll cell which help rapid removal of water.
- v) **Surface Area:** The large surface area of leaf also help water removed from pores and other spaces.



B) Digestion of Carbohydrates, Proteins and Fats in Human: Process

i) Carbohydrates: These are blocks of Sugars (steps)

Mouth: Saliva, the amylase enzyme breaks larger sugar packets in smaller ones.

↓
Stomach: stomach acid (HCL) stops saliva functioning (no digestion)

↓
Small Intestine: Here pancreatic enzyme amylase digests small sugar and turn them into Glucose

↓
Blood Stream: Glucose then transferred to the body by capillaries.

ii) Proteins: These are Acids

Mouth: Only the process of chewing

↓
Stomach: HCL (stomach juice) + Pepsin enzyme turn protein into peptides.

↓
Small Intestine: Here pancreatic enzyme, Trypsin breaks peptides in Amino acid

↓
Blood stream: These Amino Acids go through capillaries

iii **Fats:** These are oily and oily materials

Mouth: Just chewing of fatty oils



Stomach: Just mixing of oils



Small Intestine: Bile (Juice from Liver) breaks big drops of fats into small ones (Emulsification). Then, pancreatic enzyme, Lipase breaks droplets into Fatty acid or Glycerol.

Blood stream: These are transferred into blood ~~with~~ from Lymph.

(c) How a bacterial cell is different from a plant cell?

c)	Bacterial cell	Plant cell
i)	These are Prokaryotic cells and does not have 'Nucleus'	These are Eukaryotic and have Nucleus in the center.
ii)	These are flexible in size and having the size of (0.5-5) μm	These are big in size as compared to bacterial cells, they are rigid in shape and possess size more than 30 μm
iii)	They are "Heterotrophic" because they rely on others for food	They are "Autotrophic" and they make their own by "Photosynthesis".
iv)	They are not membrane attached molecules, because they are flexible and have no intersterial organelles.	They are membrane bounded and they have fixed shapes with nucleus on center and other organelles are around it.
v)	They have circular DNA	Their DNA is in ladder form.

(vi) NO large vacuole

Having a large vacuole.

(vii) Development via Binary fission

Their development happens with cell division.

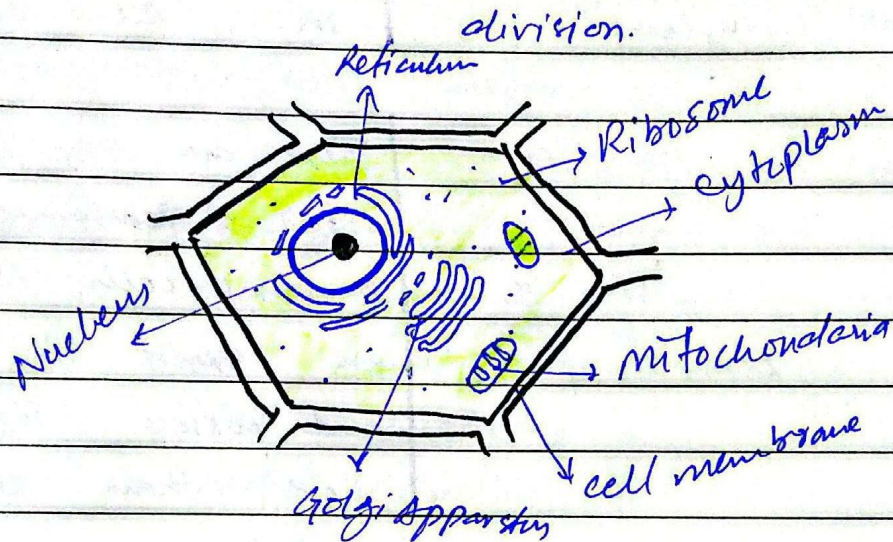


FIG-01: ~~Plant~~ Plant cell

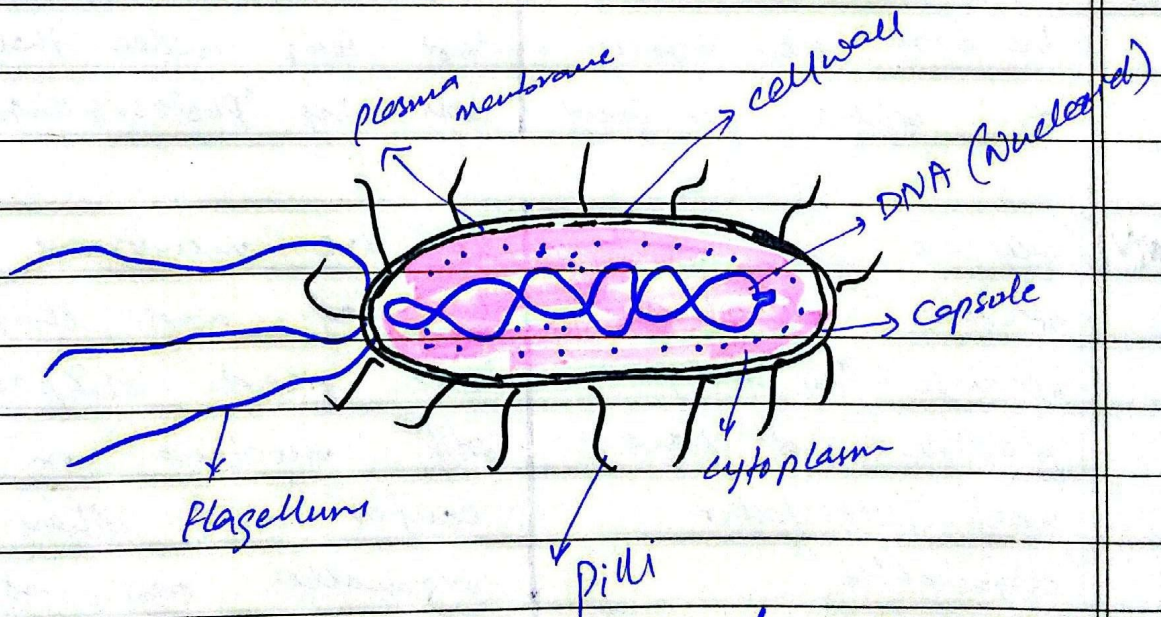


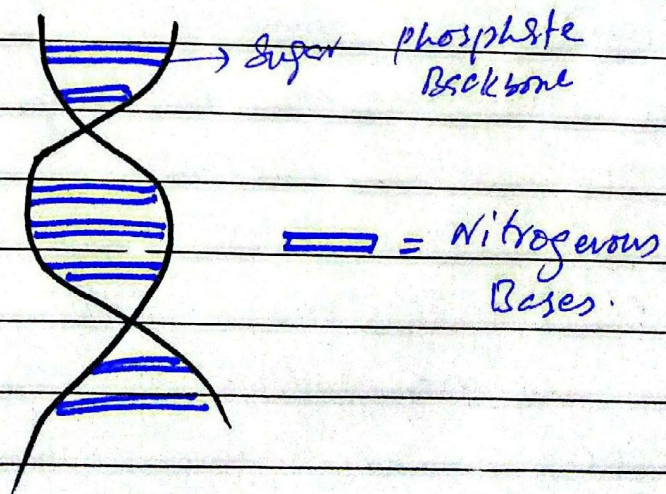
FIG: 02 Bacterial cell

D) i) DNA (Deoxyribonucleic Acid)

It is a type of nucleic acid that contains genetic instructions. It is made-up of monomers and nucleotides. DNA looks like ladder shape which is made-up of phosphate. There is hydrogen bonding between its bases.

Other features:

- DNA has deoxyribose sugar
- It is double stranded molecule called Adenine (A), guanine (G), cytosine (C) and thymine (T)
- The pairing takes place as AT & GC
- DNA is present in the nucleus.



ii) RNA (Ribonucleic Acid)

This molecule consists of "Ribose sugar" and have chains of chemical compounds called nucleotides. There are three types of RNA.

a. **rRNA**: A Ribosomal molecules helps in protein synthesis.

b. **mRNA**: It is created by DNA for the instruction of creating protein.

c. **tRNA**: It carries amino acids to mRNA

Other features:

a. These single stranded

c. same molecules as DNA, but difference in pairing; AU & C

d. RNA is genetic material of Bacteria & viruses.

e. RNA is found in cytoplasm and Nucleus.