

- Q) What are vaccines? Classify these and discuss DNA vaccines in detail. (5)
- a) What are causative organism and vector for dengue; enlist possible ways of prevention from dengue.
- b) What is hydrological cycle? Discuss its importance.
- c) Write a short note on Artificial Intelligence.

a) **Vaccines**

"A vaccine is a preparation that is used to stimulate the body's immune response against diseases."

(Centres for Disease Control and Prevention)

Classification of Vaccines.

Vaccines

↓
Live Attenuated
Vaccines

↓
These contain live
pathogens (bacteria
or viruses) that
have been weakened

↓
For instance, Chicken
pox vaccine

↓
Inactivated
Vaccines

↓
These contain
inactivated
or killed
pathogens.

↓
Polio vaccine
is one of
inactivated
vaccines

DNA Vaccines

DNA vaccines usually use engineered DNA to induce an immunological response in the host against pathogens.

For instance: Influenza vaccine, Hepatitis B vaccine.

Advantages

Effectiveness: These can provide long lasting immunity.

Safety: DNA vaccines do not possess pathogens. Thus, these are safe to use in any medical condition.

Cost-effective: These can be

generated in large volumes at a much lower cost.

Disadvantages

Target: These can only target proteinous pathogens.

Tolerance: Human body may produce tolerance against these vaccines.

Causing abnormalities: These vaccines may disrupt a normal cellular processes.

Dengue

"Dengue is a viral infection caused by the dengue virus (DENV)." (World Health Organisation)

Causative organism: Dengue Virus (DENV) causes dengue.

Vector = An infected mosquito namely - Aedes Aegypti

Symptoms:

1. High Fever
2. Headache
3. Skin rashes
4. Sore throat
5. Vomiting

Preventive Measures for Dengue.

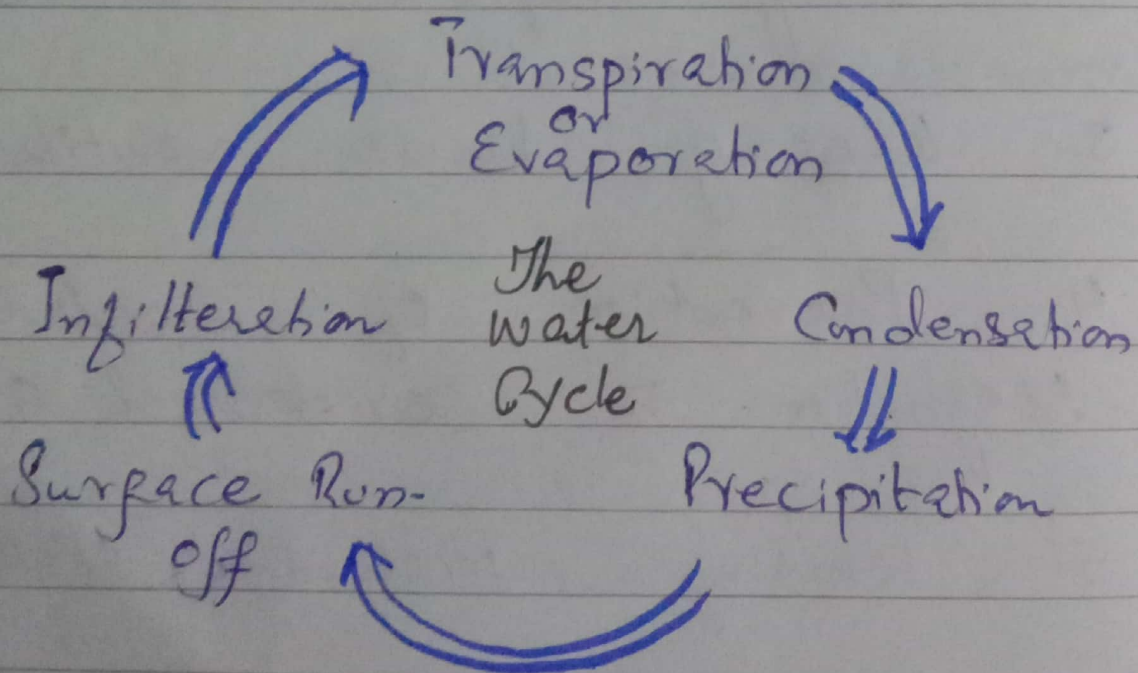
An infection of dengue may be prevented through -

- 1- Reduction of mosquito habitats.
- 2- Using mosquito repellents.
- 3- Keeping house ventilated.
- 4- Prevention of water stagnation in residential areas.
- 5- Wearing protective clothes.

Hydrological Cycle

A cycle which involves continuous movement of water on above or below of Earth's surface.

Steps of the hydrological cycle.



Transpiration and Evaporation:
Transpiration includes removal of water from plants into air.

While, evaporation is release of water into air by other objects.

2. Condensation: The evaporated water becomes cool in the air and condensed into clouds.

3. Precipitation: It is falling off the water on the earth through rain fall.

4. Surface Run-off: It is movement of water on the earth's surface in form of oceans, rivers, lakes etc.

5. Infiltration: It is taking in of water into shape of ground-water.

Importance of the cycle:

- 1// Availability: The cycle ensures the sufficient availability of water for living creatures.
- 2// Floods: Disturbances in precipitation causes floods on the earth.
- 3// Droughts: Inadequate precipitation results in droughts.
- 4// Movement of things: It moves things like sediments, nutrients, pathogens in and out of aquatic ecosystems.
- 5// Forms of water: The cycle ensures water changing from

one state to other.

For instance: in gaseous form (evaporation) to liquid form (precipitation)

d// Artificial Intelligence:

Artificial Intelligence is the ability of machines or computers to perform tasks based upon human intelligence.

Uses of Artificial Intelligence

1- Machine translations:

Computers can translate the languages.

For instance: Google translate.

2. Navigation: Computers help in navigation by giving informations like distance, location, traffic and so on. For instance: Google Maps.

3. Education: Artificial Intelligence is useful tool for education. For instance: Grammarly helps in grammer corrections.

4. Security: Through artificial intelligences homes, cars, cell-phones, laptops, offices and so on can be secured ~~through~~ by using smart locks.

5. Web Search: Artificial intelligence assist in web searching about any information.