

**Microbiology 2<sup>th</sup> semester.**

**Microbial Taxonomy**

**Mid-term assignment paper.**

**INSTRUCTOR . Muhammad Sohail**

*Instruction; Write briefly and up to the point. All questions carry equal marks.*

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Q No 1 : What do you know about algae ? also classify Algae into different groups?

**ALGAE:**

Algae are simple plants that can range from the microscopic (microalgae), to large seaweeds (macroalgae), such as giant kelp more than one hundred feet in length. Microalgae include both cyanobacteria, (similar to bacteria, and formerly called “blue-green algae”) as well as green, brown and red algae. (There are more varieties of microalgae, but these are the main ones.)

Algae are very diverse and found almost everywhere on the planet. They play an important role in many ecosystems, including providing the foundation for the aquatic food chains supporting all fisheries in the oceans and inland, as well as producing about 70 percent of all the air we breathe.

**CLASSIFICATION OF ALGAE:**

Algae is classified into six groups

**1. Chlorophyta**

These are green algae having mitochondria with flat cristae, flagella, chloroplast, and zoospores. There are 9,000 to 12,000 species included in this category. The color of these species vary from yellowish green to dark green.

The majority are living in fresh water attached to rocks and wood. But some terrestrial and marine species are also found.

## 2. Chromophyta

This species is known for having chlorophyllide c(carotenoids), mitochondria with tubular structure cristae, zoospores, and biflagellate cells.

## 3. Cryptophyta

This division has all unicellular flagellates. 200 species are included in this category. For example Plagioselmis, Falcomonas, Rhinomonas, Teleaulax, and Chilomonas.

## 4. Rhodophyta

These are mostly photosynthetic and filamentous, some are parasitic as well. There are almost 6,000 species included in this category. For example Corallina, Gracilaria, Kappaphycus, Corallina, Chondrus, Gelidium, Bangia, Palmaria, Porphyra, Polysiphonia, and Rhodymenia.

## 5. Dinoflagellata

They are usually unicellular with both photosynthetic and heterotrophic types having 1,500 species. They are called Dinoflagellates because they have two dissimilar flagella and are also have the characteristic of both plants and animals. For example Alexandrium, Dinophysis, Gymnodinium, Peridinium, Polykrikos, Noctiluca, Ceratium, Gonyaulax

## 6. Euglenophyta

They are usually unicellular, photosynthetic and some are heterotrophic. Their chlorophyll is stored outside chloroplasts. There are 1,000 species in this category. For example Eutreptiella, Phacus, Euglena, and Colacium.

Q No 2 : What are viruses ? how will you classify viruses into different groups ?

## **VIRUSES:**

Viruses are microscopic parasites, generally much smaller than bacteria. They lack the capacity to thrive and reproduce outside of a host body.

## **CLASSIFICATION OF VIRUSES:**

Viruses are classified into four groups based on shape: filamentous, isometric (or icosahedral), enveloped, and head and tail. Many viruses attach to their host cells to facilitate penetration of the cell membrane, allowing their replication inside the cell.

Q No 3 : Classify Fungi into different groups ? also write some names of fungi present in every group ?

## **CLASSIFICATION OF FUNGI :**

Fungi are usually classified in four divisions: the Chytridiomycota (chytrids), Zygomycota (bread molds), Ascomycota (yeasts and sac fungi), and the Basidiomycota (club fungi). Placement into a division is based on the way in which the fungus reproduces sexually.

### **1.Chytridiomycota**

Chytridiomycota (Chytrids) may have a unicellular or multicellular body structure; some are aquatic with motile spores with flagella; an example is the Allomyces. Zygomycota (conjugated fungi) have a multicellular body structure; features include zygospores and presence in soil; examples are bread and fruit molds

### **2.ZYGOMYCOTA**

Zygomycota (conjugated fungi) have a multicellular body structure; features include zygospores and presence in soil; examples are bread and fruit molds.

### **3.ASCOMYCOTA**

Ascomycota, also called sac fungi, a phylum of fungi (kingdom Fungi) characterized by a sac-like structure, the ascus, which contains four to eight ascospores in the sexual stage.

#### **4.BASIDIOMYCOTA**

Bird's nest fungi and puffballs belong to basidiomycetes. Basidiomycetes are filamentous fungi composed of hyphae and reproducing sexually via the formation of specialised club-shaped end cells called basidia, that normally bear external meiospores (usually four). These specialised spores are called basidiospores

Q No 4 : Explain the structure and function of a prokaryotic cell in detail

#### **Prokaryotic Cell Structure**

The cell structure of prokaryotes can vary, but most organisms have several basic components. Prokaryotes have a cell membrane or plasma membrane that acts like a protective cover. They also have a rigid cell wall for added support and protection.

Prokaryotic cells have ribosomes, which are molecules that make proteins. Their genetic material is in the nucleoid, which is the region where DNA lives. Additional rings of DNA called plasmids float around the cytoplasm. It is important to note that prokaryotes do not have a nuclear membrane.

In addition to these internal structures, some prokaryotic cells have a pilus or flagellum to help them move. A pilus is a hairlike external feature, while a flagellum is a whiplike external feature. Some prokaryotes like bacteria have a capsule outside their cell walls. Nutrient storage can also vary, but many prokaryotes use storage granules in their cytoplasm.

#### **PROKARYOTIC CELL FUNCTIONS**

Prokaryotes lack an organized nucleus and other membrane-bound organelles. Prokaryotic DNA is found in a central part of the cell called the nucleoid. The cell wall of a prokaryote acts as an extra layer of protection, helps maintain cell shape, and prevents dehydration.

