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**Prog; Bs MLT 2nd Semester.** **Paper; Basic Microbiology**

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**Q1: Fill in the Blanks.**

**1.Microorganisms** are living things which individually are too small to be seen with naked eye.

2.The scientific study of algae is called **Phycology**

3.Diseases causing living organisms are known as **pathogen**

**4.Ribosomes** cell organelle is present both in prokaryotic and eukaryotic cell.

5.The power house of cell is known as **Mitochondria**

**6.binary fission** is the most common method of asexual reproduction in microbes.

7. Log period of bacterial growth is also known as **logarithmic increase** /**exponential growth.**

**8.Cellular respiration** phase of microbial growth is metabolically active and is for industrial purposes.

9.Shrinkage of cell's plasma membrane caused by osmotic loss of water is called **Plasmolysis**

10.For synthesis of cellular material nitrogen and sulfur is needed for **protein** synthesis.

**Q2: Write short notes on the following**

1. Mitochondria
2. Nucleus
3. Budding
4. Culture media
5. Growth factors

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**ANSWER NO 2**

1. MITOCHONDRIA;

- Mitochondria is also known is power house of cells
- Mitochondrion membrane bound organelle found in the cytoplasm of almost all eukaryotic cells.
- Generate large quantities of energy in the form of adenosine triphosphate (ATP)
- Mitochondria are typically round to oval in shape
- range in size from 0.5 to 10 μm.
- producing energy
- mitochondria store calcium for cell signaling activities, generate heat, and mediate cell growth and death.
- The number of mitochondria per cell varies widely;
- erythrocytes (red blood cells) do not contain any mitochondria,
- whereas liver cells and muscle cells may contain hundreds or even thousands.

➢ Nucleus;

- The nucleus is a membrane-bound organelle that contains genetic material (DNA) of eukaryotic organisms. As such, it serves to maintain the integrity of the cell by facilitating transcription and replication processes.
- It's the largest organelle inside the cell taking up about a tenth of the entire cell volume.
- This makes it one of the easiest organelles to identify under the microscope.

➢ Budding;

- Budding in biology, a form of asexual reproduction in which a new individual develops from some generative anatomical point of the parent organism.
- In some species buds may be produced from almost any point of the body,
- but in many cases budding is restricted to specialized areas.

- Culture media

  - Culture media is also known is growth media
  - A culture media is a special medium used in microbiological laboratories to grow different kinds of microorganisms.
  - A growth or a culture medium is composed of different nutrients that are essential for microbial growth

  - **Types of culture media**

  - These are classified into six types:

  - Basal media,

  - Enriched media,

  - Selective media,

  - Indicator media,

  - Transport media, and

  - Storage media

- Growth factors

  - Growth factors typically act as signaling molecules between cells.
  - Examples are cytokines and hormones that bind to specific receptors on the surface of their target cells.
  - They often promote cell differentiation and maturation, which varies between growth factors

Q3: What is bacterial growth? Discus different phases of bacterial growth

- **BACTERIAL GROWTH:-**

- Bacterial growth is proliferation of bacterium into two daughter cells, in a process called binary fission.
- Providing no event occurs, the resulting daughter cells are genetically identical to the original cell hance bacterial growth occurs.
- Both daughter cells from the division do not necessarily survive

- There are Four (4) phases of bacterial growth which is:-

1. Lag Phase.
2. Log Phase or Exponential Phase.
3. Stationary Phase.
4. Death Phase.

## Phases of Bacterial Growth:-

1. Lag Phase:-

This initial phase is characterized by cellular activity but not growth. A small group of cells are placed in a nutrient rich medium that allows them to synthesize proteins and other molecules necessary for replication. These cells increase in size, but no cell division occurs in the phase

2. Log Phase or Exponential Phase:-

After the lag phase, bacterial cells enter the exponential or log phase. This is the time when the cells are dividing by binary fission and doubling in numbers after each generation time. Metabolic activity is high as DNA, RNA, cell wall components, and other substances necessary for growth are generated for division.

3. Stationary Phase:-

The stationary phase is often due to a growth limiting factor such as the depletion of an essential nutrients and/ or the formation of an inhibitory product such as an organic acid. Stationary phase results from a situation in which growth rate and death rate are equal.

4. Death Phase:-

At death phase (decline phase) bacteria die. This could be caused by lack of nutrients, environmental temperature above or below the tolerance band for the species, or other injurious conditions.