UNIT - II
MICROBIOLOGY

2.1. INTRODUCTION

SYNOPSIS

- The study of invisible organisms is called **Microbiology**
- These organisms can be observed only with the help of **Microscope**
- **Algae**, **Fungi**, **Protozoa**, **Bacteria** and **Viruses** fit into this size and hence they are considered as **Microorganisms.**
- Some **algae** and **fungi** are **macroscopic** and yet they are studied by Microbiologists.
- Microbiology may be defined not only in terms of the size, but involves the techniques like **isolation**, **culturing**, **sterilization** etc., as suggested by **Roger Stainer.**
- Techniques used for successful isolation and growth of microorganisms are **Sterilization** and **artificial nutrient media**.

Occurence and distribution

- Microorganisms are **Ubiquitous.**
- Microorganisms which can tolerate extreme alkaline conditions are **Alkalophilic / Alkalophilies**
- Microorganisms which can tolerate extreme salt concentrations are **Halophilic / Halophilies**
- Microorganisms which can tolerate extreme acidic conditions are **Acidophilic organisms/ Acidophilies**

IMPORTANCE OF MICROBIOLOGY

- Microorganisms decompose dead organisms and enrich soil with rich nutrients by recycling elements like carbon, hydrogen, phosphorus sulphur, nitrogen etc.
- Many microorganisms produce antibiotics that help in combating various infectious diseases. For example, the antibiotic **Penicillin** was discovered by **Alexander Fleming** from *Penicillium notatum*. similarly **Streptomycin** was obtained from *Streptomyces grieseus* by **Waksman**.
- Certain microorganisms are also used as bio-control agents (**bioinsecticides**).
- Mircrobes help in commercial production of various enzymes, amino acids, vitamins, organic acids etc.
- Modern dairy industry is dependent on the microorganisms as they produce various dairy products by natural fermentation process. *Lactobacillus* genus is a very important bacterium useful in dairy industry.
- Microbes not only help in sewage disposal but are also used in mining industries.
- They are perfect organisms suitable for various gene transfer experiments.
- Under exomicrobiology, possibility of life on other planets is being found out by culturing various microorganisms that can withstand extreme environmental conditions.
- Biogas is produced by the microbial activity
- Biogas is a mixture of gases.
- Bt cotton has toxic genes of *Bacillus thuringiensis*.

EXERCISE

Note: For all Assertion (A) and Reason (R) Questions, identify the correct answer from the choices given below.

1. A and R are correct and R is the correct explanation of A

2. A and R are correct but R is not the correct explanation of A

3. A is true but R is false

4. A is flase but R is true

LEVEL - I

1. Who defined microbiology not only in terms of size of its objects but also in terms of the techniques that are used for their culture?
   1. Anton Van Leewenhoek 2. Roger Stanier
   3. Robert Koch 4. Louis Pasteur

IMPORTANCE OF MICROBIOLOGY

LEVEL - I

2. 'Penicillin' was discovered by
   1. Waksman 2. Alexander Fleming
   3. Roger Stanier 4. Robert Koch
3. Waksman discovered the antibiotic called
   1. Penicillin 2. Bacitracin
   3. Streptomycin 4. Colicin
4. Which of the following bacteria is useful to control butterfly caterpillers?
   1. *Agrobacterium tumifaciens*
   2. *Penicillium notatum*
   3. *Bacillus thuringiensis*
   4. *Streptomyces griseus*