

Gujarat University
B.Sc. Microbiology Syllabus
Second Year B. Sc., Semester III
(Skill Enhancement Course)
Credits:02 (02 hrs/week, Total: 30 hrs)
Effective from June-2024
Paper Code: SEC-PMLS-236

Paper Name: Preparation of Microbiology Laboratory Solutions

Learning Outcomes:

1. Provides basic knowledge of solute, solvent and solution.
2. Provides basic skills of preparing different solutions useful in microbiology laboratory
3. Helpful to those who works or wants to work in the field of microbial chemistry, biochemistry, medical microbiology, industrial microbiology etc.

Unit: 1 Introduction to basics of solution preparation

Teaching hrs 10

- A. Structure of atom: Atom, Isotope, Molecule, Molecular weight, Equivalent weight
- B. Water as molecule: General properties of water
- C. Noncovalent Interactions in aqueous systems: Hydrogen bond, Hydrophilic and Hydrophobic interactions, Vander Waals interactions and Electrostatic interactions
- D. Definitions of basic terms: Solute, Solvent, Solution, Molarity, Normality, Molality, pH
- E. Glass wares/plastic wares used to prepare solutions: Volumetric flasks, Measuring Cylinder, Pipettes, Graduated Beaker, Conical flasks, Test tubes etc.
- F. General guidelines for preparation of solutions
- G. Types of solution and dilution: Normal Solution, Molar Solution, Percent Solution (W/V and V/V), Part dilution, Serial dilution (single and double), Buffer solution

Unit: 2 Practicals

Teaching hrs 20

1. Preparation of 100 ml of 0.1 N HCl solution
2. Preparation of 100 ml of 2.5 M NaOH solution
3. Preparation of 100 ml of 0.1 % Starch solution
4. Preparation of 100 ml of 0.9 % NaCl solution (Normal Saline)
5. Preparation of 100 ml of 60% ethanol from 95% pure ethanol
6. Preparation of part dilutions such as 1:2, 1:5, 1:10 of 0.5 % (or 1.0%) Methylene blue
7. Preparation of single serial dilutions such as 10^{-1} , 10^{-2} , 10^{-3} , 10^{-4} , 10^{-5} of 1.0 % Methylene blue
8. Preparation of double serial dilutions such as 10^{-2} , 10^{-4} , 10^{-6} , 10^{-8} , 10^{-10} of 1.0 % Methylene blue
9. Preparation of 100 ml of phosphate buffer (pH: 7.0)

References:

1. **Principles of Microbiology**, R. M. Atlas, 2nd Edition (Indian Edition) (2015) McGraw Hill Education (India) Private Limited, New Delhi, India
2. **Experimental Microbiology**, Volume-I, Rakesh Patel, Aditya Publication – Ahmedabad
3. **A hand book of Laboratory Solutions**, M. H. Gabb, W. E. Latchem, Print (2020) Scientific Publishers (INDIA)
4. **Chemistry Part- I**, NCERT Textbook for Class XII, Edition (2022).