25th National Level Microbiolympiad (Silver Jubilee Event)

SYLLABUS FOR First Year (Beginner level)

1. **History and scope:** History & scope of Microbiology, Biotechnology; contribution of pioneers, Modern developments of Microbiology

2. **Microbial Diversity:** Diversity of the living world (Five kingdom, Three domain classification). Structure and General characteristics of Virus (Virion, viriods and prion), bacteria, archaea, fungi, algae, and protozoa, Environmental significance of Microorganism

3. **Microscopy:** Magnification, resolution, NA, Light microscopy; biological staining, Smear preparation, concept of stain, simple and differential staining

4. **Microbial techniques:** Pure culture techniques; Isolation, cultivation, cultural, biochemical characterization

5. **Control of microorganisms:** Sterilization, disinfection, aseptic techniques, terminology of Microbial Control, The Rate of Microbial Death, Actions of Microbial Control Agents, **Physical Methods of Microbial Control:** Heat, Filtration, Low Temperatures, High Pressure, Desiccation, Osmotic Pressure and ionizing and non-ionizing radiation
   Chemical Methods of Microbial Control: Disinfectant, sanitizer, principles of Effective Disinfection, Types of Disinfectants, and mode of action

6. **Basic structures and characteristics Microbes:** Cell (Prokaryotic and Eukaryotic); general characteristics of viruses, bacteria, algae, protozoa, fungi and archaebacteria; The Size, Shape, and Arrangement of Bacterial Cells

7. **Anatomy of Microbes: Anatomy of prokaryotic cell:** Glycocalyx, Flagella, Axial Filaments, Fimbriae and Pili, Cell Wall (Composition and Characteristics of Cell Walls and the Gram Stain mechanism, atypical Cell Walls), Plasma (Cytoplasmic) Membrane, The Nucleoid, 70S Ribosomes Cytoplasmic inclusions and Endospores
   Anatomy of Eukaryotic cell: Flagella and Cilia, Cell Wall, Plasma (Cytoplasmic) Membrane 80S Ribosomes, Cell Organelles – Nucleus, Endoplasmic Reticulum, Golgi Complex, Lysosomes, Vacuoles, Mitochondria, Chloroplasts

8. **Microbial growth and reproduction**: Growth, reproduction, growth curve, Generation Time growth measurement (Direct Measurement of Microbial Growth • Estimating Bacterial Numbers by Indirect Methods), the Requirements for Growth, Physical Requirements, Chemical Requirements, Culture Media, Chemically Defined Media, Complex Media, Special Culture Techniques, Selective and Differential Media, Enrichment Culture technique, concept of pure Cultures

9. **Chemistry of microbes:** chemical elements; structure of atom and molecules, preparation of molar, molal, normal and percent solutions; Water, concept of pH and buffers, Types of chemical reaction

10. **Basic Techniques of Microbiology** – Staining (Monochrome, Negative, Gram, Acid fast), Practical aspects of Isolation techniques, Motility Detection, Isolation techniques of bacteria and fungi, Biochemical tests (H2S production detection, IMViC, Fermentations and Assimilations test, weighing balance, pH meter, refrigerator, Spectrophotometer, Autoclave, Hot air oven, Anaerobic Jar

Celebrating 25 Years of Excellence in Microbiology

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