Veer Narmad South Gujarat University

Udhna Magdalla Road, Surat

Ph.D. Syllabus For Entrance Examination

Subject: Microbiology **Faculty: Science**

Unit:1 Microbial diversity

Prokaryotic and Eukaryotic microbial cell structures, Characteristics, Habitat, Nutrition, Reproduction and Importance of Fungi, Water and Slime molds, Algae, Protozoa; History of virology, Position of viruses in biological spectrum Characteristics and Cultivation of bacteriophages, plant viruses, animal virus. Extremophiles.

Unit:2 Taxonomy Microorganims:

Taxonomy and classification; taxonomic ranks; Morphological, cultural and molecular identification; Bergy's manual past and present

Unit:3 Microbial physiology

Bioenergetics and metabolism, Glucolysis and metabolism; Symbiotic Nitrogen Fixation; anaerobic microbial metabolism; adaptation physiology; biochemistry of extremophiles

Unit:4 Genetics

Replication, transcription, transduction, plasmid, r-DNA technology, mutation, genetic code, gene regulation, recombination and repair, cloning in eukaryotic microorganisms, DNA fingerprinting, gene therapy, Principle and applications of genomics, proteomics, metagenomics.

Unit:5 Enzyme

Structure, mechanisms of enzyme action, metalloenzymes, investigation of active site structure, kinetics of enzyme catalysed reaction, enzyme inhibition kinetics, kinetics of multi-substrate enzyme catalysed reaction

Unit:6 Immunology and Clinical microbiology

Classifications of Antibodies, Characteristics of Ag; Ag x Ab reactions; MHC; T & B cell receptor; Attachment and entry of microorganisms into the body, encounter with the phagocytic cell; spread of microbes through the body; microbial strategies in relation to the immune response host and virus factors involved in pathogenesis.

Unit:7 Environmental microbiology

Microbial ecology and interactions; waste water treatment; biodegradation and bioremediation of pesticides, dyes and xenotic compounds; microbial transformation of heavy metals and bioleaching; biodesulfurization, biodeterioration; biofuels

Unit:8 Fermentation technology & Pharmaceutical microbiology

Screening and strain improvement, preservation of industrially improved strain, media design, industrial sterilization, types of fermentative process, fermentation economics, bioreactor design, mass transfer, bioprocess monitoring, industrial production of antibiotics; organic acids, amino acids, enzymes; microbial production of cheese, yogurt, wine. Microbiological assay, monitoring microbiological quality, microbiological aspects of pharmaceutical processing, microbiological auditing.

Unit:9 Bioanalytical techniques and instrumentation

pH meters, chromatographic techniques, centrifugation, PCR, Electrophoretic techniques, spectroscopic and XRD, biosensors, blotting procedures, Gene Sequencers

Unit: 10 Bioinformatics

databases: biological; nucleotide; protein; structure database; sequence based database search, multiple sequence alignments, phylogeny, secondary structure prediction, protein modelling, molecular docking, drug design.