Syllabus
for
Applied Microbiology (SCQP03)

Note:

i. *The Question Paper will have 75 questions.*
ii. *All questions will be based on Subject-Specific Knowledge.*
iii. *All questions are compulsory.*
iv. *The Questions will be Bilingual (English/Hindi).*

Applied Microbiology (SCQP03)

Microbiology

- History and scope of Microbiology
- Position and diversity of microorganisms in the living world
- Structure and organization of a bacterial cell
- Bacteriophages, viroid's, prions
- Biogeochemical cycles: Carbon, Nitrogen, Phosphorous and Sulfur
- General accounts of microbes in diverse environments
- Cultivation of microbes and Microbial growth curve
- Mechanisms of gene transfer
- Basic concepts of gene regulation
- Fermented foods and food-borne diseases
- Types of fermentations and fermenters
- Bio fertilizers and bio pesticides
- Microbial interactions
- Emerging infectious diseases

Cytology and Genetics

- Ultrastructure of plant and animal cell
- Cell cycle
- Mendel's laws and cytoplasmic inheritance
- Interaction of genes
- Linkage and crossing over
- Sex determination in plants and animals
- Modern concept of gene structure
- Mutations and mutagens

Biochemistry

- Proteins
- Enzymes
- Carbohydrates
- Lipids
- Nucleic acids and Genetic code

Applied Microbiology (SCQP03)

Physiology

- Water relations
- Cell Membrane
- Oxygenic and an oxygenic Photosynthesis
- Respiration: Aerobic, anaerobic and Fermentation

Biotechnology

- Vectors: Plasmid, lambda phage based, M13 based, Cosmids, BAC, YAC, expression vectors, Agrobacterium-based
- Tools and Techniques in biotechnology: Restriction enzymes, ligases, DNA
- Polymerases, PCR, Sangers method of sequencing, Southern blotting, Northern Blotting, DNA microarray, genomic and cDNA libraries, gene gun
- RDT based products

Biotechniques

- Chromatography
- Electrophoresis: Agarose gel, SDS -PAGE, IEF and 2D
- Microscopy
- Centrifugation
- Spectrophotometry

Immunology

- Cells and Organs of immune system
- Innate and Adaptive immune response
- Antigen and Antibody
- Complement system
- MHC
- Immunological techniques

Ecology

- Adaptations
- Population ecology
- Community ecology
- Ecosystem functions
- Ecological successions
- Environmental pollutions