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Annexure 3

Syllabus for Written Test

(1) Molecular Basis of Inheritance: Search for genetic material and DNA as genetic material; Structure of DNA and RNA; DNA packaging; DNA replication; Central dogma; Transcription, genetic code, translation; Gene expression and regulation - Lac Operon; Genome and human genome project; DNA fingerprinting.

(2) Human Health and Diseases: Pathogens; parasites causing human diseases (Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, common cold, amoebiasis, ring worm); Basic concepts of immunology - vaccines; Cancer, HIV and AIDS; Adolescence, drug and alcohol abuse.

(3) Strategies for Enhancement in Food Production: Improvement in food production: Plant breeding, tissue culture, single cell protein, Biofortification, Apiculture and Animal husbandry.

(4) Microbes in Human Welfare: In household food processing, industrial production, sewage treatment, energy generation and as biocontrol agents and biofertilizers. Antibiotics; production and judicious use.

(5) Biotechnology - Principles and Processes: Genetic engineering (Recombinant DNA technology).Biochemistry, Animal cell culture, Basic and Applied Microbiology, Cell biology, Genetics and Molecular biology,Basics of Microbiology, basic microbial physiology, basic kinetic equations, microbial growth rate.

(6) Biotechnology and its Application: Application of Biotechnology in health and agriculture: Human insulin and vaccine production, gene therapy; Genetically modified organisms-Bt crops; Transgenic Animals; biosafety issues, batch and continuous processing, stoichiometry and reaction energetics, bioreactor.

(7) Ecosystem: Patterns, components; productivity and decomposition; energy flow; pyramids of number, biomass, energy; nutrient cycles (carbon and phosphorous); ecological succession; ecological services - carbon fixation, oxygen release.

(8) Environmental Issues: Air pollution and its control; water pollution and its control; agrochemicals and their effects; solid waste management; radioactive waste management; greenhouse effect and climate change; ozone layer depletion

(9) Bioinformatics and computational biology: Major Bioinformatics Resources, Database Searches, Sequence Analysis, Basic concepts, Scoring Matrix, Pairwise sequence alignments, Multiple sequence alignments (MSA), Application in Taxonomy and phylogeny, Comparative genomics, Structural Biology, Proteins, DNA & RNA secondary and tertiary structures, t-RNA tertiary structure, Classification and comparison of protein 3D structures, DNA microarray technology and data analysis, Programming in C and R language.