Ph. D Written Test Format and Syllabus

BIOTECHNOLOGY, FACULTY OF SCIENCE

Ph.D. Admission Test Format

The written test consists of two parts.

1. Part A: Research Methodology	25 questions.
2. Part B: Biotechnology	25 questions

Part A: Research Methodology Syllabus

Research Fundamentals:

Meaning of research; objectives of research; characteristics of good research, Research problem: Identification, selection, and techniques for defining research problem, Research process, Research outcomes, Review of Literature, Hypothesis: Definition and Types

Types of Research:

Types of research, fundamental and applied research, qualitative and quantitative. Research Design: Types of research design – Exploratory, Descriptive, Casual Analytical

Sampling, Data Collection and analysis:

Types and sources of data: Primary and secondary, Methods of collecting data: questionnaire, interview, observation, case study, experiments etc., Sampling and sampling methods, characteristics of good sample, sampling techniques, Statistical Methods for Data Analysis: measures of central tendency and dispersion

Research Report:

Main body of report, abstract and keywords, Referencing styles and bibliography. Journal and author indexing

Ethics in Research:

Biasing: Definition and Types, Plagiarism -Definition and forms, IPR, copyright infringement, AI Generated Content

Part B: Biotechnology Syllabus

Cell Biology and Biochemistry:

Cell structure and function, membrane transport, organelles, cell signalling, cell cycle, cell death, aging, and senescence. Principles of pH, buffers, thermodynamics, biomolecules, metabolism, photosynthesis, respiration, enzymes, enzyme kinetics and inhibition, and the role of vitamins, minerals, and hormones. Nucleic acids proteins.

Molecular Genetics:

Chromosome organization, DNA replication, repair and recombination, RNA synthesis and processing, protein synthesis, gene expression and regulation. Mendelian and extrachromosomal inheritance, linkage, recombination, chromosome mapping, genetic disorders, pedigree analysis, and population genetics. genomics, proteomics

Microbiology and Immunology:

Microbial diversity, growth, nutrition, microbial genetics, host–pathogen interactions, infectious diseases, antibiotics, and resistance. Immune system, antigens, antibodies, antigen presentation, hypersensitivity, autoimmunity, immunodeficiency, vaccines, and immunotherapy.

Bioprocess Technology:

Fermentation, bioreactors, upstream and downstream processing, plant and animal tissue culture, transgenics, bioresource management, bioremediation, phytoremediation, and biosensors.

Bioanalytical Techniques:

Chromatography, centrifugation, microscopy, spectroscopy, electrophoresis, PCR, blotting, hybridization, DNA fingerprinting, sequencing, , microarray, ELISA, immunoblotting, and flow cytometry.