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M.PHIL. - BIOTECHNOLOGY

Scheme of Examination

S.No.	Paper Code	Name of Paper	Max. Marks	Duration
1.	M.PhilBT 111	Biostatistics	100	3 Hrs.
2.	M.PhilBT 112	Modern Molecular Biology	100	3 Hrs.
3.	M.PhilBT 113	Plant & Animal Biotechnology	100	3 Hrs.
4.	M.PhilBT 114	Dissertation	100	
Total			400	

Paper - I

Biostatistics (M.PhilBT 111)

Maximum Marks: 100 Times Allowed: 3 Hrs.

Unit – I

Research – Definition, Importance and Meaning of Research, Characteristics of Research, Types of Research, Steps in Research, Identification, Selection and Formulation of Research Problem, Research Questions, Research Design, Formulation of Hypothesis, Review of

Literature.

Unit – II

Sampling Techniques: Sampling theory, Types of Sampling, Steps in Sampling, Sampling and Nonsampling error, Sample Size, Advantages and limitations of Sampling.

Collection of Data: Primary Data, Meaning, Data Collection Methods, Secondary Data, Meaning, Relevance's, Limitations and Cautions.

Unit – III

Statistics in Research – Measure of Central Tendency, Dispersion, Skewness and Kurtosis in Research.

Hypothesis – Fundamentals of Hypothesis Testing, Standard Error, Point and Interval Estimates,

Important NonParametric Tests: Sign, Run, Kruskal, Wallis tests and MannWhitney Test.

Unit – IV

Parametric Tests: Testing of significance Mean, Proportion, Variance and Correlation, Testing for Significance of Difference between Means, Proportions, Variances and Correlation Coefficient. Chisquare tests, ANOVA One way and two ways.

Research Report: Types of Reports, Styles of reporting, Steps in drafting reports, Editing the final draft, Evaluating the final draft.

Ref. books:

- 1 Statistical Methods by S.P. Gupta.
- 2 Research Methodology, Method and Techniques by C.R. Kothari or by Santosh Gupta.

Paper – II

Modern Molecular Biology (M.PhilBT 112)

Maximum Marks: 100 Times Allowed: 3 Hrs.

Unit – I

Genome Organization in prokaryotes: Viral genome, bacterial genomes, genome size, content and complexity, clusters and repeats, overlapping genes, pseudogenes. Genome organization in eukaryotes: Eukaryotic genomes, chromosome structure and DNA

sequence organization, organization of genes in chromosomes, genes, repetitive interrupted DNA, chromatin remodeling.

Unit – II

Molecular mechanism of gene regulation: Regulation of gene expression in prokaryotes, regulation of gene expression in eukaryotes, promoters, enhancers, silencers and insulators, posttranscriptional and posttranslational events, DNAprotein interactions.

Unit – III Cellular signaling and trafficking: Cell signaling and signal transduction, protein trafficking, protein localization and molecular chaperones. Cellular physiology and molecular biology of specialized tissues: Molecular biology of cancer and ageing, molecular and genetic control of apoptosis, mechanism of HIV infection.

Unit – IV Genomics and proteomics: Cloning a genome, genome sequencing, sequence comparisons and alignment, data mining for gene hunting, useful tools and websites on the internet for genome sequencing, gene arrays, comparative genomics, proteomics, metabolomics, pathway analysis.

Ref. books: T.A. Brown, Frief Fielder, Primrose.

Paper – III

Plant & Animal Biotechnology (M.PhilBT 113)

Maximum Marks: 100

Times Allowed: 3 Hrs.

Unit – I

Gene delivery method in intact and cultured tissues and cells, Agrobacterium, Ti-Plasmid,

cointegration and binary vectors, viral vectors, direct DNA uptake, microinjection delivery, use of 35S and other promoters, genetic markers, use of reporter genes. Techniques for production of transgenic plants resistant/ tolerant to herbicides; pathogens, pests and abiotic stresses (drought, salt, frost), transgenic plants for production of molecules of commercial importance.

Unit – II Mycorrhiza; its importance in agriculture and forestry, plant diseases; general account, predators, parasites, insects, viruses, antagonistic fungi and bacteria, biological control of pests and diseases of crop plants, biopesticides, insecticidal activated compounds of botanicals.

Unit – III Embryo transfer technology, principles and application, production of transgenic animals; pig, sheep, goat and cows, Techniques and applications of gene therapy, vector engineering, strategies of gene delivery, gene replacements/ augmentation, gene corrections, gene editing, gene regulation and silencing.

Unit – IV Aquaculture and marine biotechnology sex reversal in fish, sterile fish culture, transgenic fish, carp production systems; marine and fresh water pearl oyster culturing, shrimp farming, formulation of feeds, cell culture based vaccines.

Ref. books: P.K. Gupta, Ian Freshney.