VIJAYANAGARA SRIKRISHNADEVARAYA UNIVERSITY, BALLARI

Syllabus for
Ph.D Entrance Examination in
Botany

(With effect from Academic Year 2023-24)

Department of Studies in Botany
Vijayanagara Sri Krishnadevaraya University,
Jnana Sagara Campus Ballari-583105
Karnataka, India

Part A: Research Methodology

Unit– I

Introduction, current trends, current area focus, objectives of scientific research. preparation of research report, components of a scientific research article, reading and understanding a research articles. presentation skills. topic selection: problem identification; criteria for prioritizing problems for research. literature survey. data analysis and statistical analysis. thesis writing and manuscript preparation.

Unit– II

the functions of a research design, the theory of causality and the research design summary of selecting a study design differences between quantitative and qualitative study designs study designs in quantitative research study designs based on the number of contacts study designs based on the reference period study designs based on the nature of the investigation other designs commonly used in quantitative research

Unit III

Selecting a method of data collection differences in the methods of data collection in quantitative and qualitative research major approaches to information gathering collecting data using primary sources observation, interview, the questionnaire. Constructing a research instrument in quantitative research

Unit IV

How to write a research proposal the research proposal in quantitative and qualitative research contents of a research proposal preamble/introduction the problem objectives of the study hypotheses to be tested study design the setting measurement procedures ethical issues sampling analysis of data structure of the report problems and limitations appendix work schedule summary

Part B: Core syllabus in BOTANY

Unit I

Plant Systematics: Introduction, ICBN, the importance of herbarium, flora writing, monographs/ revisions, preparations of a dichotomous key, field notes, taxonomy about anatomy, embryology, chemotaxonomy, cytology. *in situ* conservation – protected areas, biosphere reserves, national parks, sanctuaries, and sacred groves. *ex-situ* – conservation, botanical gardens, gene banks, medicinal conservation parks, herbal gardens, Molecular taxonomy: identification of molecular markers, RFLP, RAPD, AFLP. DNA Libraries: Construction of genomic library, cDNA Library.

Unit-II

Natural Products and drug discovery: Biosynthetic pathway of important secondary metabolites. Chemoprospective studies of natural compounds for anticancer, antidiabetic, antihepatitis B, and antimicrobial properties. Extraction, processing, composition, and uses of essential oils. Separation, Purification, and identification of phytocompounds using chromatography and spectroscopy techniques.

Unit-III.

Biomolecules- Protein – isolation, metods of purification- dialysis salting out, pH precipitation and solvent precipitation. Classificatiomn of protein based upon solubility, structure and function with examples. Biological roles of protein. Peptide bond, Plant peptids-peptide pytohormones with signaling roles in non defence functions: Peptide indole-3- acetic acid, phytosulphokine-CLAVATA3(CLV3) and CLE, POLARIS.Peptide phytohormonewith signaling roles in defence systemin, cell wall hydroxyprolin–rich glycopeptides. Defence peptides: Hevein, AMPs, α- & β-thionin, Ÿ- Thionin, Lipid transfer protein (LTPs), Cyclotides, Snakin 1.

Unit IV

Regulation of gene expression in Prokaryotes and Eukaryotes: An Overview, Operon concept: Lactose metabolism (An inducible gene system) and tryptophan Operon (repressible system) in *E. coli*. Transcription - Promoters, Enhancer, transcription factors, transcription termination and anti - termination. DNA methylation, RNA processing - Capping, polyadenylation, splicing-spliceosome and ribozyme. Translation- Structure and composition of ribosomes in prokaryotes and eukaryotes, Role of RNA in protein synthesis, RNA polymerases

Unit V

R-DNA Technology: Introduction, Enzymes used in genetic engineering Nucleases : Restriction enzymes, (R E) Nomenclature of RE, Mode of Action of REs. DNA ligase, Kinase, Klenow fragment, Reverse transcriptase, Alkaline Phosphatases, Terminal Deoxynucleotide transferace, T4 Ligase. Cloning Vectors: Plasmids; Nomenclature and Classification, PBR-322, PUC Plasmid

Unit-VI

Blotting techniques: Introduction, Southern Blotting, Northern blotting, western blotting. DOT blotting techniques, Plaque/Colony blotting technique. DNA Libraries: Construction of genomic library, c-DNA Library. 14 hours Polymerase Chain Reaction: Introduction, principle involved in PCR, components of PCR, basic reaction, different types of PCR (Inverse PCR, Anchored PCR, RT-PCR) Applications of PCR). Molecular Markers: Restriction fragment length Polymorphism (RFLP), Amplified fragment length polymorphism (AFLP), Random Amplified Polymorphic DNA (RAPD), Simple sequence repeats (SSR)

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22/12/2023
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