

PhD Entrance Syllabus

Structure of the PhD Entrance Test (100 Marks)

Section A: Aptitude and Reasoning – Common to all candidates (50 Marks)

Section B: Subject-Specific (Plant Pathology) (50 Marks)

Section A: APTITUDE & REASONING (Common to ALL)

Unit-1: Verbal Reasoning

Navigating Directions and Mastering Distances, Blood Relations, Logical Puzzles and Problem Solving- Floor Based, Month and Year Based. Seating Arrangements - Circular, Linear, Decoding the Code- Letter Coding, Number Coding, Letter and Number Coding.

Unit-2: Number System

Mastering Quick Calculations, BODMAS Simplified, Exploring Numbers and Division Rule, Unit Digits Decoded, Unlocking Divisibility and Counting Zeroes, "Mastering LCM and HCF: Foundations of Factorization, Uncovering Factors, Exploring Remainders.

Unit-3: Arithmetic Ability-1

Percentages - Fraction, Decimal, Percentage Change, Concept of 'By' and 'To', Product Constancy, All About Averages, Profit & Loss Essentials, Articles, False Weight, and Discount Insights - Discount, Simple Interest: Calculations and Applications, Compound Interest: Calculations and Applications, Relationship between SI and CI.

Unit-4: Arithmetic Ability-2

Ratio, Proportion, Partnership, Problems on Ages, Time and Work - Concept of Efficiency, Smart Work with Time and work, Negative Work, Chain Rule, Pipes and Cisterns, Time, Speed & Distance, Problems based on Trains, Problems based on Boats and Streams.

Unit-5: Critical Reasoning

Analogy and Classification, Sequence and Series Logic, Syllogisms - Types of statements, Venn diagrams using statements, Method to solve problems Two Statements and Two Conclusions, EITHER-OR Conclusions, Four Statements and Two Conclusions.



Section:B Plant Pathology Syllabus for Ph.D Entrance Examination

I. History and Principles of Plant Pathology

Milestones in phyto pathology with particular reference to India. Major epidemics and their social impacts. Historical developments of chemicals, legislative, cultural and biological protection measures including classification of plant diseases. Physiological specialization, Koch's postulates. Growth, reproduction, survival and dispersal of plant pathogens. Factors influencing infection, colonization and development of symptoms.

II. Physiological and Molecular Plant Pathology

Altered metabolism of plants under biotic and abiotic stresses. Molecular mechanisms of pathogenesis: elicitors, recognition phenomenon, penetration, invasion, primary disease determinant. Enzymes and toxins in relation to plant disease. Mechanisms of resistance, Structural and Biochemical defense mechanisms. R-Genes, Phytoanticipins. Phytoalexins. PR proteins, Hydroxyproline rich glycol proteins (HRGP). Antiviral proteins. SAR and ISR. HR and active oxygen radicals. Elementary genetic engineering. Management of pathogens through satellite, antisense - RNA. Ribozymes, coat protein, RNA interference, plant bodies, hypovirulence, cross protection. Useful genes and promoters, plant transformation techniques, bio safety and bioethics.

III. Mycology

Classification of fungi (According to the Classification – Kirk et al., 2008). Life cycles of important phytopathogenic fungi. Economic mycology, edible fungi and entomogenous fungi. Mycorrhizal associations. Cell organelles, their morphology, functions and chemical composition.

IV. Plant Bacteriology

Identification and classification of bacteria. morphology, ultra structure and chemical composition of prokaryotic cell in relation to function. Growth curve, nutrition and auxotrophic mutants. Resting cells in elementary bacterial genetics and variability: transformation, conjugation, transduction. Biology of extra chromosomal elements: plasmid borne genes and their expression. Bacterio phages: lytic and lysogenic cycles. Prokaryotic inhibitors and their mode of action. Economic uses of prokaryotes. Morphology, biochemical characteristics, reproduction and life cycle of phyto plasma and other fastidious prokaryotes.

V. Plant Virology

Nature, composition and architecture of viruses and viroids. Properties of viruses. Nomenclature and classification of viruses. Variability in viruses. Satellite viruses and satellite RNA. Mycoviruses and baculo viruses. Assay of plant viruses including biological, physical, chemical, serological and molecular methods. Conventional and biotechnological techniques used in detection and diagnosis. Behaviour of viruses in plants including infection, replication and movement. Histo pathological changes induced by viruses in plants, inclusion bodies. Transmission of viruses: virus - vector relationships.