

# **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 (Agricultural Entomology/Entomology) (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 Agricultural Entomology/Entomology

#### I. Insect Diversity, Systematics and Morphology

- **History and Evolution of Entomology**: Evolution of insects, their position in the animal kingdom.
- **Phylum Arthropoda**: Characteristics and structural features of Trilobita, Chelicerata, Mandibulata; Classes Arachnida, Crustacea, Chilopoda, Diplopoda, Hexapoda.
- Classification of Insects: Orders and important families with habits, habitats, and distinguishing features.
- Morphology: Body wall, segmentation, sclerites, sutures, coloration, head, antennae, mouthparts, thorax, wings (venation & modifications), abdomen, genitalia (Pterygota & Apterygota).

### II: Internal Anatomy, Physiology and Development

- **Embryology**: Embryonic & post-embryonic development, metamorphosis, ecdysis, larval & pupal types.
- **Internal Systems**: Digestive, circulatory, respiratory, reproductive, excretory, nervous, endocrine, and sense organs.
- **Nutrition**: Requirements of carbohydrates, proteins, amino acids, lipids, vitamins, and artificial diets.

### III: Insect Ecology and Pest Management Strategies

- **Ecology**: Abiotic & biotic factors, population dynamics, diversity indices, ecological niche, biogeography, adaptations to climate change, life table studies, pest outbreaks.
- **Biological Control**: Biocontrol agents (parasitoids, predators, pathogens), augmentation, conservation, success stories, biotechnology in biocontrol.
- Novel Pest Control Approaches: Semiochemicals, hormonal control, genetic methods, chemo sterilants, repellents, organic & precision agriculture.
- **IPM**: History, concepts, components, EIL/ETL, cropping systems, case studies, constraints and strategies.

## IV: Toxicology and Applied Pest Management

• Chemical Control: History, classification, modes of action (IRAC), formulations, toxicity evaluation (LD<sub>50</sub>, LT<sub>50</sub>), resurgence, resistance mechanisms and management.

- **Pesticide Residues**: Dynamics, analysis, environmental pollution, detoxification enzymes, Insecticides Act 1968, CIB & RC roles.
- **Application Equipment**: Types (sprayers, dusters, foggers, seed treaters, etc.), nozzle types, aerial applications, maintenance.

## V: Applied Entomology and Beneficial Insects

- Crop Pests and Management:
  - o *Field Crops*: Pests of cereals, pulses, oilseeds, fibre crops, sugarcane, tobacco.
  - o *Horticultural Crops*: Pests of vegetables, fruits, plantation crops, spices, protected cultivation.
  - o Stored Products: Storage principles, pest types, management strategies.
- **Vector Entomology**: Vector-pathogen interactions, transmission mechanisms, vector management, and climate impact.
- **Apiculture & Pollinators**: Bee species, products, management, enemies, pollination in crop production.
- **Sericulture**: Silkworm types, rearing, seed production, pests and diseases, value-added products.
- Lac Insects: Biology, host trees, cropping, enemies, harvesting.
- Useful Insects: Soil improvers, scavengers, food, medicines, bio-indicators.
- **Statistics & Computer Application**: Distributions, tests of significance, experimental designs (RBD, CRD, LSD), probit analysis, use of software (SPSS, SAS).