

SHAHEED MAHENDRA KARMA VISHWAVIDYALAYA,
BASTAR, JAGDALPUR (C.G.)

Syllabus for Ph.D. Entrance Examination

PAPER-I

(RESEARCH METHODOLOGY)

1. Basic concept of research problem

- Rationale of research
- Identification of research problem
- Research objective
- Types of research- fundamentals/applied/action/quantitative/qualitative

2. Review of literatures

- Primary source
- Secondary source
- Searching e-resources, using research engines
- Searching database
- Writing literature review

3. Methods of research

- Concept and formulation of hypothesis
- Survey method
- Experimental method (variable, designs)
- Historical methods
- Content analysis

4. Sampling of data

- Concept of sampling
- Probability sampling techniques
- Non probability sampling techniques
- Sampling error

5. Collection of data

- Primary data generation
- Secondary data collection
- Methods of data generation/collection- by experiments, questionnaire, interview schedule, focus groups etc.

6. Analysis of data

- Statistical analysis techniques
- Qualitative analysis techniques
- Application of computer in research data analysis

7. Reports preparation

- Structure and component of research report
- Organization of data

- Indexing of journal and research output
- Citation, reference, bibliography
- Copyright, plagiarism, originality of research work

8. Research ethics

- Ethics in research
- National and International regulations/law/ethics related to research on human, Animals and Environments

PAPER-II

(BIOTECHNOLOGY)

UNIT-I

Structure and Function of Biomolecules: Structure of atoms, molecules and chemical bonds. Composition, structure and function of biomolecules (carbohydrates, lipids, proteins, nucleic acids and vitamins. Principles of biophysical chemistry (pH, buffer, reaction kinetics, thermodynamics, colligative properties).

Cellular Organization: Cell wall and cell membrane: Structure and function, Structural organization and function of intracellular organelles, Organization of genes and chromosomes, Cell division and cell cycle, Microbial Physiology

UNIT-II

Fundamental Processes: DNA replication, repair and recombination, synthesis, processing and regulation, Protein synthesis, processing and degradation, Control of gene expression at transcription and translation level.

Inheritance Biology: Chromosomal and extrachromosomal inheritance, Genes and mutations, Genetic analysis, Human genetics, Quantitative genetics, Structural and numerical alterations of chromosomes.

UNIT-III

Cell Communication and Cell Signaling: Cell signaling, Cellular communication, Innate and adaptive immune system, Host pathogen interaction, Host pathogen interaction, Cancer

Microbial Diversity and Metabolism: Bacteria, Archea and their broad classification; Eukaryotic microbes: Yeasts, molds and protozoa; Viruses and their classification; Molecular approaches to microbial taxonomy and phylogeny. Glycolysis; Pentose-phosphate pathway; Entner Doudoroff pathway; Glyoxalate pathway; The citric acid cycle; Fermentation.

UNIT-IV

Bioinformatics and Computational Biology: Major Bioinformatic Resources, Basic Concepts of Sequence Analysis, Gene annotation, Molecular Modelling and Dynamics, Classification and comparison of protein 3D structures, Classification and comparison of protein 3D structures, Drug design, Systems Biology

Biochemical Engineering and Industrial Biotechnology: Thermodynamics in Biological Systems, Bioprocess Engineering and Technology, Enzymes and microbial technology, Downstream processing in biotechnology, Bioprocess Plant Design, Metabolic Engineering and Synthetic Biology

UNIT-V

Plant Biotechnology: Plant culture media and growth regulators, Clonal propagation, Organogenesis, Somatic hybridization, protoplast fusion and culture. Plant transformation:

Vector design, marker-free technology; transformation methods, Functional characterization of plant genes bioinformatics tools for plant functional genomics, Metabolomics studies.

Methods in Biology: Molecular Biology Techniques, Biophysical Methods, Microscopic techniques, Histochemical and Immunotechniques, techniques used in Nanotechnology.

IMPORTANT NOTE

There will be a total of 50 multiple choice questions (MCQs) for each of the two papers. Paper-I will focus on Research Methodology and Paper-II will cover specific Subject.

Each question in both papers carries 1 mark and will have a total of 50 marks for each paper. The duration for solving each paper is 1 hour. Students must appear for both Paper-I and Paper-II as specifies for the entrance. After completion and submission of Paper-I, the question Paper-II will be provided to the students.

Scheme:

Paper-I Research Methodology

Number of questions- 50 MCQs covering whole syllabus

Maximum Marks- 50

Duration- 1 hr

Paper-II Biotechnology

Number of questions- 50 MCQs covering whole syllabus

Maximum Marks- 50

Duration- 1 hr