

## Paper-I: Recent Advances in Life Sciences & Research Methodology

### UNIT-I:

Basic and applied research, Literature survey and collection, Identification of the problem, Setting up of objectives, Experimental design, standardization of protocols, Annual report preparation, Thesis writing, Research paper and Review article writing, Project writing. Research ethics, Plagiarism

### UNIT-II:

Biochemical techniques: Extraction, isolation, purification, Identification and characterization of Proteins, Quantification of carbohydrates, Extraction of lipids, Enzyme kinetics –Enzyme assay, activity, turn over, yield. Measurement of pH: Use of indicators, Sterilization techniques, Media Preparation. Centrifugation techniques-Principle and applications of Centrifugation.

### UNIT-III:

Microscopy – Principle, types, and applications of Microscopy.  
Chromatography: Principle, types and applications of chromatography  
Spectrophotometry–Principles and applications of Visible, UV spectrophotometry, IR, NMR, AAS.  
Electrophoresis–Principle, types and applications of electrophoretic techniques  
Isotopes–Scintillation counter, Gamma ray counter, Radioactive decay, Measurement and Units of radioactivity, safety measurements, Disposal of radioactive wastes.

### UNIT-IV:


Biostatistics – Sampling methods, Sample collection, Mean, Median, Mode, Tabulation of data, Graphical representation of data, correlation, regression, Chi-square test, Student t-test, Test of significance, ANOVA Software used in Biostatistics.

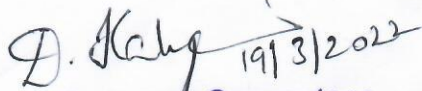
### UNIT-V:

Computational Biology: Microsoft office- word, excel and powerpoint presentation, Graphical representation of data using EXCEL and sigma plot.  
Bioinformatics: BLAST, Protein database, Intellectual property rights (IPR), property rights and Patenting (IPP).

### Texts and References:

1. Research methodology of biological science – by N. Gurumani
2. Fundamentals of Biostatistics – by Khan & Khanum
3. Biophysical chemistry: principles and techniques – by Upadhyay
4. An Introduction to Practical Biochemistry by Keith Wilson and John Walker
5. Molecular Cloning: A Laboratory Manual by Joseph Sambrook and David W. Russell Publish ed by Cold Spring Harbor Laboratories Press

  
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 19/3/2022  
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# Model papers:

ADIKAVI NANNAYA UNIVERSITY, RAJAHMUNDRY

School of Life and Health Sciences

Pre-PhD Examinations w.e.f. 2022

Model paper for Paper- I: Recent Advances in Life Sciences & Research Methodology

Duration: 3 hour

Max Marks: 100M

ALL Questions carry equal marks

5X20=100M

Answer ALL the questions

## UNIT-I

- 1) Write about experimental design and standardization of protocols for research work. Add a note on identification of research problem?  
(or)
- 2) Write briefly about the thesis writing and Project writing?

## UNIT-II

- 3) Differentiate disinfection and sterilization. Write about the role of various instruments used to create sterile condition for cell and tissue culture. Add a note on Media preparation?  
(or)
- 4) Write in detailed about Enzyme assay, activity, turnover yield. Add a note on Enzyme kinetics?

## UNIT-III

- 5) Write in detail about radioactive decay. Measurement of radioactivity, safety measurements and disposal of radioactive wastes?  
(or)
- 6) Define Chromatography? Write about Principle, types, and applications of Chromatography?

## UNIT-IV

- 7) Write about graphical representation of data. Add a note correlation and regression?  
(or)
- 8) Describe about tabulation and graphical representation of data. Add a note on ANOVA?

## UNIT-V

- 9) Write about the various applications of Bioinformatics in Biology?  
(or)
- 10) Write in detail about IPR & IPP?

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Adikavi Nannaya University: Rajamahendravaram

Department of Zoology

Pre-Ph.D. Examination Syllabus (2021-2022 Batch)

**Paper-II: Chick Embryology and Early Brain Development**

**Unit-I:** Early development of chick embryo & Nervous system: Cleavage, Gastrulation, Neurulation: Primary and Secondary neurulation, Tissue architecture of the nervous system in Chick: Cerebrum and Cerebellum, Differentiation of neural tube, neurons and neural crest cells. Anatomical and functional Organization of chick brain: Formation of Three-Part, Five-part Brain in Chick, Formation of Flexures, Out-pocketing's of the Brain. Embryonic induction in brain development of Chick.

**Unit-II:** Cells of nervous systems Neurons, astrocytes, oligodendroglia, Schwann cells, microglia, ependymal cells. Neuron-structure and types, Passive membrane properties, information flow in neurons, compartments, spike initiation zone. Excitability, conductivity, Membrane potentials (Resting & Action), Nerve Impulse, Refractory period, Neuroglial cell interaction. Neuronal Signaling and Channels: Ion and Voltage-gated Channels. Sodium, Potassium & Calcium channels structure and function.

**Unit – III:** Neurotransmitters: Characteristics, types, synthesis and storage, agonists and antagonists. Regulation of neurotransmitter release. Serotonin (5-HT), (synthesis, storage, function and re-uptake), post-synaptic action of 5-HT, Development of the serotonergic systems in chick embryonic brain. Role of 5-HT in chick brain development. Serotonin gated ion channels; Dale's principle - drugs affecting their activities,

**Unit-IV:** Receptors: Iontropic and metabotropic receptors, auto and heteroreceptors. Receptors of Acetylcholine, GABA and Serotonin. 5-HT receptors: Classification, functions, role in early chick brain development- neurogenesis, neural migration, Neural communication: Synapses- Electrical and Chemical synapses, Nerve-muscle synapse. Signaling and plasticity. 5-HT1B receptor role in neurogenesis, neural cell adhesion, neural migration and neural communication. Synaptic plasticity- inhibition and excitation, Synaptic integration, Synaptic modulation. Pathophysiology and pharmacological role of 5-HT1B receptor.

**Unit-V:** Tissue Handling and preparation: Homogenization, Photographic scaling of Histological slides, Histology: Paraffin and Live Sectioning of developing Chick embryo, Synaptosomes-preparation, treatment and chick egg incubation methods, sample collection procedures. Immunohistochemistry. Techniques to determine neurogenesis, neural migration and neural communication (Neurexin protein assay) Spectrofluorimetric assay of serotonin, Ligand – receptor binding assay.

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Reference books :

1. The Development of Brain and Behaviour in the Chicken by Lesley Rogers
2. Atlas of Chick Development 3rd Edition Authors: Ruth Bellairs, Mark Osmond
3. Neurobiology. Shepherd, G.M. Oxford University press, London.
4. Basic Neurochemistry-G.J. Siegal, R.W. Albers, B.W. Agranoff, R. Katzman (1981) Little, Brown and company. Boston.
5. Introduction to Nervous system-T.H. Bullock, R. Cork, A. Granner (1977); W.H Freeman & Co.
6. Principles of Neural Science -E.R. Kandel and J.H. Schwartz. (1981); Elsevier/North Holland. NY. Oxford.
7. Mechanism of Drug Action on the Nervous System- M.A.B. Brazil, R.W. Ryall. (1979); cambridge University Press. Cambridge, London and New York.
8. The Bio Chemical basis of Neuropharmacology-J.R. Cooper, F.E. Bloom, &R.H. Roth. (1982); Oxford University Press, NY and London.
9. Principles of Neuro Psychopharmacology- Robert S. Feldman, Jerrold S. Meyer and Lind F. Quenzer. Sinauer Associates, Inc. Publishers. Sunderland. Massachusetts.
10. Alcock, J. Animal behaviour: An evolutionary approach. Sinauer Assoc., Sunderland, Mass. USA.
11. The Serotonin System History, Neuropharmacology, and Pathology Editors: Mark Tricklebank, Eileen Daly Paperback ISBN: 9780128133231
12. Serotonin Receptors in Neurobiology Edited By Amitabha Chattopadhyay

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Department of Zoology

Pre-Ph.D. Examination Model Question Paper (2021-2022 Batch)

**Paper-II: Paper-II: Chick Embryology and Early Brain Development.**

Time: 3 Hrs.

Max. Marks: 100 M

**Answer the following. All questions carry equal marks.**

5x20=100M

1. Write about the process of neurulation and describe in detail the tissue architecture of cerebrum in chick.

Or

Discuss the anatomical and functional organization of developing chick brain.

2. Give the structure of a neuron and describe the information flow in neurons.

Or

Define channels and write their classification. Explain about gated sodium channel.

3. What are the characteristic features of a neurotransmitters? Add a note on synthesis and storage of any three neurotransmitters.

Or

Discuss in detail the role of serotonin in chick brain development.

4. Write an account on serotonin receptors. Explain the significance of 5-HT1B receptor in the early development of chick brain.

Or

“5-HT1B receptor is a hetero receptor and plays a significant role in synaptic modulation”. Justify.

5. Describe the methods of incubation of chick egg. Also mention about preparation of synaptosomes.

Or

Discuss various immunohistochemical techniques to determine the chick brain developmental processes.

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SCHOOL OF LIFE AND HEALTH SCIENCES

Pre Ph.D Examination Syllabus-2022

Paper – II: Toxicity of pesticides in Aquaculture & Research Methodology

**UNIT-I:**

Assessment of physico-chemical parameters of Soil, pH, Texture, Moisture, Soil temperature, Electrical Conductivity, Nitrogen, Phosphorous, Potassium, Soil organic matter, cation exchange capacity.

Water quality parameters – Total hardness, total alkalinity, Dissolved oxygen, Total dissolved solids, pH, salinity, BOD, COD, electrical conductivity, Major and Minor elements.

**UNIT-II:**

Synthetic pesticides and fertilizers used in Aquaculture. Formulations and mode of action of synthetic pesticides and fertilizers. Retention of pesticides in soil and water and their toxicity towards living organisms.

**UNIT-III:**

Organochlorines- chemistry, persistence and hazard classification, biochemical toxicity and effect on humans

Organophosphates – mechanism of action, potential source of human exposure, clinical effects

**UNIT-IV:**

Current issues, status and applications of Geographic Information system (GIS) to Aquaculture Remote Sensing Applications for soils

**UNIT-V:**

Techniques used for determination of pesticides in soil and water; Liquid chromatography (LC), Mass spectroscopy (MS), LCMS/MS, High resolution Mass spectroscopy (HRMS), Gas Chromatography (GC) HRMS.

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School of Life and Health Sciences  
Pre-PhD Examinations w.e.f. 2022

Paper – II: Toxicity of pesticides in aquaculture & Research Methodology

Duration: 3 hour

Max Marks: 100M

ALL Questions carry equal marks  
Answer ALL the questions

5X20=100M

UNIT-I

1. Write a detailed account on general physico-chemical properties of soil  
(or)
2. Write about the Major and Minor elements present in water and their significance

UNIT-II

3. Describe about the mode of action of synthetic pesticides and fertilizers  
(or)
4. Write about the retention of pesticides and fertilizers in soil and water and their toxic effect on living organisms.

UNIT-III

5. Write about biochemical toxicity and human health complications of Organochlorines  
(or)
6. Explain the mechanism of action of Organophosphates

UNIT-IV

7. Explain the GIS technology and its application  
(or)
8. Give a detailed account on remote sensing and its application in aquaculture

UNIT-V

9. Write about LCMS/MS technique  
(or)
10. Write about GC HRMS technique

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**ADIKAVI NANNAYA UNIVERSITY :: RAJAHMUNDRY**

Department of Zoology

Pre-PhD Course work syllabus

**Paper-II: Fish Diversity Studies and Research Ethics**

**Research Guide:** Dr. K. Ramaneswari, Dept. of Zoology Adikavi Nannaya University

(**Research Scholar** Mrs. S. Sarada; Regd No. 20204003)

**UNIT-I**

Biosystematics- Definition and basic concepts. Importance and applications of biosystematics. Procedures in taxonomy - Taxonomic collections. taxonomic keys. Types of taxonomy- Conventional types, Cytotaxonomy. Chemotaxonomy and Molecular taxonomy. Concept of Zoological Nomenclature.

**UNIT-II**

General characters and classification of fishes. Methods of Fish Identification. Systematics and Evolution in fishes

**UNIT-III**

Habitat and Ecological Niche. Lentic and Lotic waters; Physico-chemical characteristics of freshwater; Lacustrine biocoenosis; Ecological classification of freshwater biota; Productivity- Concepts of productivity, Biological and Organic productivity;. Stream fish ecology. Lake and Reservoir Fish ecology. Freshwater fish diversity.

**UNIT-IV**

Soil parameters: Soil texture, Soil reaction (pH), Organic carbon content, Carbon to Nitrogen ratio (C:N) and General nutrient status. Water quality parameters: Temperature, Dissolved Oxygen (DO), salinity, pH, Turbidity, Total alkalinity, CO<sub>2</sub>, Ammonia, Nitrite, H<sub>2</sub>S Biogeochemical cycles. Ecological Indices

**UNIT-V**

Research Ethics and plagiarism: Rules and guidelines for research publications. Code of Research Ethics. Authorship guidelines. Plagiarism policies of UGC and its software information. Information on UGC Care journals list

  
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**ADIKAVI NANNAYA UNIVERSITY  
RAJAHMUNDRY**

**Pre-Phd. Examination Syllabus-2022**

**Paper-II: Fish Systematics and Diversity Studies**

Time: 3hr

Marks: 100

All Questions carry equal marks

1a. Define Biosystematics. Explain its importance and applications.

Or

b. What are the different types of Taxonomy. Discuss.

2a. Give an account of the Evolution of fishes.

Or

b. Explain the methods involved in fish identification.

3a. Distinguish between Habitat and Ecological Niche.

Or

b. Explain the classification of fresh water biota with examples. Add a note on fish diversity

4a. Give an account of the methods for soil analysis.

Or

b. What is Organic Productivity? Explain.

5a. Explain the Hydrologic cycle. Add a note on its importance

Or

b. Discuss about the importance of Dissolved oxygen in aquatic ecosystems



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**SCHOOL OF LIFE AND HEALTH SCIENCES**  
**Pre Ph.D Examination Syllabus-2022**  
**G.Anjaneyulu Regd No. 20204004**

**Paper – II: Butterfly BioDiversity**

**UNIT-I**

Introduction - General classification of insects Silk moth - Honey bees and wasps - Bee wax - Royal jelly - Bee bread - Queen bee, Drone and worker - Bee poison – Honey - Butterflies and Moths - Body structure of lepidopteron (Morphology) - Antennae - Compound eye - Wings and Scales - Proboscis - Thorax – Abdomen life span.

**UNIT-II**

Insect life cycles - (a) Incomplete Metamorphosis - (b) Complete Metamorphosis - Life cycle of – Lepidoptera - Metamorphosis - Food plants – (a) Larval – (b) Adult

**UNIT-III**

Behaviors - Camouflage, Mimicry - Flying – (Mud-Puddling) - Basking - Patrolling and perching hill topping- adaptations in butterflies – signification of adaptation- Geography and climate – Hibernation. Adaptations in Butterflies -The Senses-Significance of Adaptation-Geography and climate- Hibernation

**UNIT-IV**

Ecosystem services - Pollination - Reduce Pollution - Biological Pest Control - Indicators of a healthy environment

**UNIT -V**

Conservation - Biodiversity and conservation status of Butterflies - Challenges in conservation - Threats to butterflies in an ecosystem - Habitat loss and fragmentation - Climate Change -Impact of logging on the richness and diversity of forest butterflies in India

**Texts and References:**

1. The book of Indian butterflies – Isaac kehimkar  
A naturalist's Guide to the Butterflies of India – Peter Smetacek
2. Modern textbook of zoology (Invertebrates) – R. L. Kotpal
3. Butterflies ecology and Evolution – Carol L.Boggs, Ward B, Watt, and Paul R. Ehrlich
4. Butterflies of India – Arun Pratap singh

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School of Life and Health Sciences  
Pre-PhD Examinations w.e.f.2022

Paper-II: Butterfly Bio Diversity

Duration: 3hour

MaxMarks: 100M

ALL Questions carry equal marks

5X20=100M

Answer ALL the questions

UNIT-I

1. *What are the general characteristics of insects and describe the importance of different insects?*

(Or)

2. *What is the Morphology of a butterfly? Explain it?*

UNIT-II

3. *What are the several popular butterfly species and their nectar plants?*

(Or)

4. *What is morphosis? Explain the complete life cycle of lepidoptra?*

UNIT-III

5. *What is the purpose of mud puddling? How do you make mud puddle for butterflies?*

(Or)

6. *What is Adoption? Explain the different types of the adoptive behavior of butterflies?*

UNIT-IV

7. *What is the ecological role of butterflies and Moths?*

(Or)

8. *Are butterflies indicator species? How butterflies are beneficial to the environment?*


UNIT-V

9. *Why is it important to conserve butterflies?*

(Or)

10. *What are the different reasons involved for decreasing butterflies?*

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SCHOOL OF LIFE AND HEALTH SCIENCES

Pre Ph.D Examination Syllabus-2022

Paper – II: Medicinal Plants in Management of *Diabetes mellitus* & Research Methodology

**UNIT-I**

Introduction - Metabolic Disorder Diseases

Diabetes: Types and causative Aspects.

Prognosis and complications- Macro vascular and micro vascular complications, hypo and hyperglycemia

**UNIT-II**

Type I & II Diabetes

Mature Onset of Diabetes (MODY) in children and adolescents, Gestational Diabetes Causes; Symptoms, and Prevention & Treatment

Management of diabetes mellitus- Physical and diet, Pharmacological approaches for treatment diabetes

**UNIT-III**

Ethnomedicine – definition, history and its scope, Importance of medicinal plants in India – role in human health care

Diagnosis and treatment of diabetes using ethnic medicine; *Aegle marmelos*, *Ficus benghalensis*, *Cyanodon dactylon*

**UNIT-IV**

Role of primary and secondary metabolites in plant growth, Development and Disease Management

Study of chemical properties and biological activities of Alkaloids, Flavonoids, Tannins, Phenols

**UNIT –V**

Methods for plant extraction: Extraction methods such as Maceration, Percolation, Super criticalfluid extraction, Distillation Methods, Soxhlet extractions

Techniques for characterization of plant compounds: UV & IR Spectroscopy, HNMR (ProtonNMR), CNMR , HPLC, TLC

**Texts and References:**

1. Ethnobiology – R.K.Sinha & Shweta Sinha – 2001. Surabhe Publications – Jaipur.
2. Tribal medicine – D.C. Pal & S.K. Jain 1998, Naya Prakash, 206, Bidhan Sarani, Calcutta – 700 006.
3. Contribution to Indian ethnobotany – S.K. Jain 1995, 3rd edition, Scientific publishers, P.B.No. 91, Jodhpur, India.
4. Herbs that Heal, Acharya Vipul Rao – Diamond Pocket Books, New Delhi
5. Organic chemistry – Morrison & Boyd – 11th edition along with the study guide.
6. Marion. J. Franz, MS RD LD, CDE,(2003), Diabetes & Complications, A core curriculum for Diabetes Education (Fifth Edition) – American Association of Diabetes Educators, Chicago, Illinois.

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Pre-PhD Examinations w.e.f. 2022

Paper – II: Medicinal Plants in Management of *Diabetes mellitus* & Research  
Methodology

Duration: 3 hour

Max Marks: 100M

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Answer ALL the questions

5X20=100M

UNIT-I

1. Write briefly about metabolic disease. Add a note on the classification, causative aspects  
*Diabetes Mellitus*  
(or)
2. Describe about the complications and treatment of *Diabetes Mellitus*

UNIT-II

3. Discuss about various pharmacological approaches for the treatment of *Diabetes Mellitus*  
(or)
4. Write a detailed account on symptoms, causes, prevention. Treatment and management of *Diabetes mellitus* in children and adolescents

UNIT-III

5. Write about the history, scope and significance of ethnomedicine in India  
(or)
6. Describe about various plants used as ethnic medicine in India and their significance

UNIT-IV

7. What are secondary metabolites of plants? Add a note on Write about their role in plant growth, development and disease management  
(or)
8. Describe about various methods for extraction of active compounds from medicinal

UNIT-V

9. Give a detailed account on various methods of plant extraction  
(or)
10. Explain briefly TLC and HPLC

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