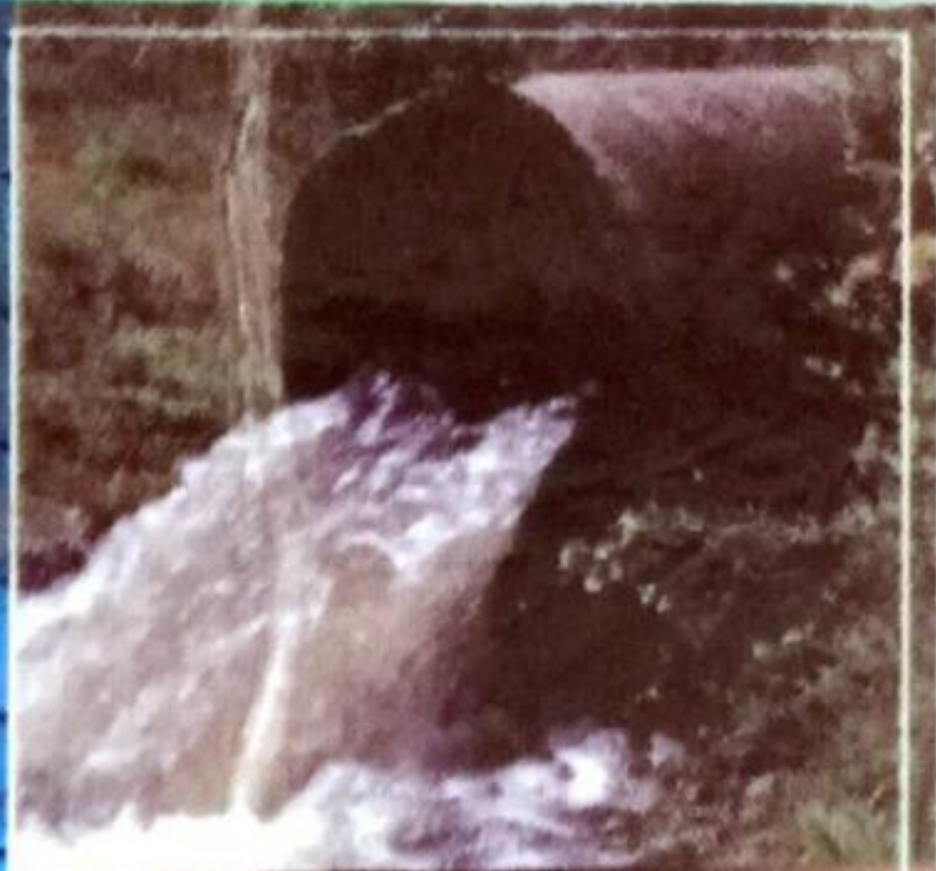


MODERN'S

ZOOLOGY

PAPER-I : ENVIRONMENTAL BIOLOGY

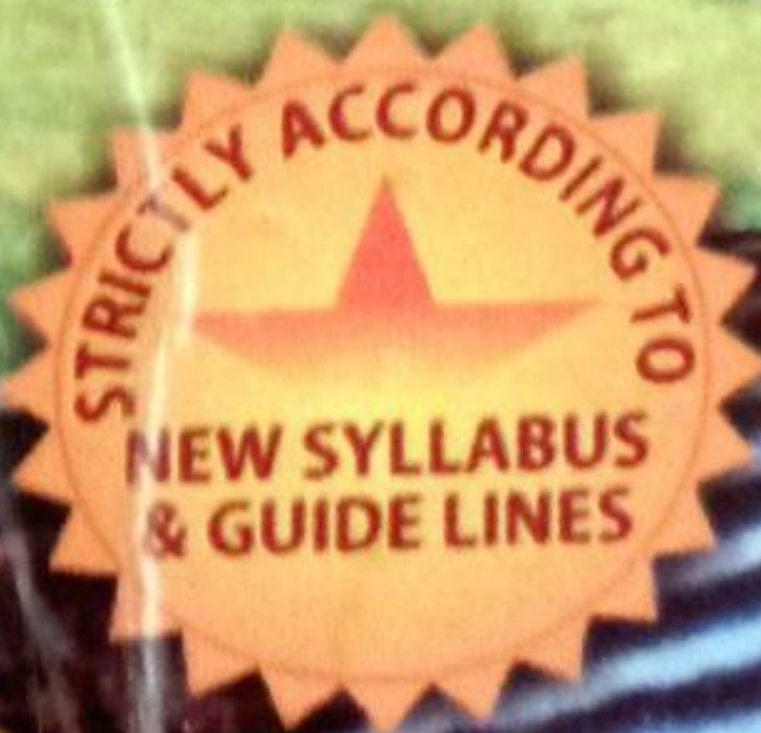
PAPER-II : EVOLUTION AND DEVELOPMENTAL BIOLOGY



B.Sc. PART-III (K.U./C.D.L.U.)

SEMESTER-V

ASHOK SABHARWAL
DR. CHANDER SHEKHAR



go green with mbd

Syllabus

Zoology B.Sc.-III

SEMESTER-V

PAPER-I: ENVIRONMENTAL BIOLOGY

External Marks : 45

Internal Assessment : 05

Time allotted : 3 Hours

Note : *Nine questions are to be set in all and the candidates are required to attempt five questions including the compulsory question.*

1. *Question 1 is compulsory consisting of 10 parts (1.5 marks each) covering the entire syllabus. Answer to each part should not exceed 20 words.*
2. *Out of remaining eight, four questions are to be set from each of section A & B, possibly splitting them in parts. Candidates are required to attempt four questions, two from each section.*

SECTION-A

1. **Basic concepts of ecology** : Definition, Significance, Concepts of habitat and ecological niche.
2. **Factors affecting environment** : Abiotic factors (light-intensity, quality and duration); temperature; humidity; topography; edaphic factors; biotic factors.
3. Introduction to major ecosystems of the world.
4. **Ecosystem** : Concept, components, properties and functions; Ecological energetics and energy flow; food chain; food web; trophic structure; ecological pyramids and concept of productivity.
5. **Biogeochemical cycles** : Concept, reservoir pool, gaseous cycles and sedimentary cycles.

SECTION-B

6. **Population** : Growth and regulation.
7. Concept of biodiversity and conservation of natural resources.
8. Migration in fishes and birds.
9. Parental care in animals.
10. **Population interactions** : Competition, predation, parasitism, commensalisms and mutualism.
11. **Environmental Pollution** : Air, water, soil and management strategies.

PAPER-II : EVOLUTION AND DEVELOPMENTAL BIOLOGY

External Marks : 45

Time allotted : 3 Hours

Internal Assessment : 05

Note : Nine questions are to be set in all and the candidates are required to attempt five questions including the compulsory question.

1. Question 1 is compulsory consisting of 10 parts (1.5 marks each) covering the entire syllabus. Answer to each part should not exceed 20 words.
2. Out of remaining eight, four questions are to be set from each of section A & B, possibly splitting them in parts. Candidates are required to attempt four questions, two from each section.

SECTION-A : EVOLUTION

1. Origin of life.
2. Concept and evidences of organic evolution.
3. Theories of organic evolution.
4. Concept of micro, macro and mega-evolution.
5. Concept of species.
6. Phylogeny of horse.
7. Evolution of man.

SECTION-B : DEVELOPMENTAL BIOLOGY

8. Historical perspectives, aims and scope of developmental biology.
9. Generalized structure of mammalian ovum & sperm, spermatogenesis and oogenesis, fertilization, parthenogenesis, different types of eggs and patterns of cleavage.] 8
10. Process of blastulation and fate-map construction in frog and chick.] saved
11. Gastrulation in frog and chick upto the formation of three germinal layers.
12. Elementary knowledge of primary organizers.
13. Elementary knowledge of extra embryonic membranes.
14. Concepts of competence, determination and differentiation.
15. Concept of regeneration.

B.Sc. III ZOOLOGY PRACTICAL EXAMINATION

(To be conducted at the end of Semester-VI)

External Marks : 90

Internal Assessment : 10

Time allotted : 6 Hours

(Two sessions : M & E)

1. External morphology, identification marks, nature of damage and host of the following pests :

(i) **Sugarcane** : Sugarcane leaf-hopper, Sugarcane whitefly, Sugarcane top borer, Sugarcane root borer, Gurdaspur borer (any two).

(ii) **Cotton** : Red cotton bug

(iii) **Wheat** : Wheat stem borer

(iv) **Paddy** : Gundhi bug, Rice grasshopper, Rice stem borer, Rice hispa (any one).

(v) **Vegetables** : *Aulacophora faveicollis*, *Dacus cucurbitae*, *Tetranychus telarius*, *Epilachna* (any three).

(vi) **Pests of stored grains** : Pulse beetle, Rice weevil, Grain & Flour moth, Rust-red flour beetle, lesser grain borer (any three).

2. Stages of life history of silk moth and honey bee.

3. Identification of *Catla*, *Labeo rohita*, *L. calbasu*, *Cirrhinus mrigala*, *Puntius sarana*, *Channa punctatus*, *C. marulius*, *C. stariatus*, *Trichogaster fasciata*, *Mystus seenghala*, *M. cavasius*, *M. tengra*, *Callichrous pabola*, *C. bimaculatus*, *Wallago attu*, *Prawns*, *Crabs*, *Lobsters*, *Clams*, *Mussels & Oysters*.

4. Chemical analysis of pond water and soil for pH, dissolved oxygen, free CO₂, nitrates, phosphates and chlorides.

5. A study of the slides of fish parasites.

6. A study of the different types of nets, e.g., cast net, gill net, drift net and drag net.

7. A visit to lake/reservoir/fish breeding centre.

8. Adaptative modifications in feet and beaks of birds.

9. Preparation of permanent/temporary slides of developmental stages of frog/mosquito.

10. Study of permanent slides of WM of chick embryo (13-18h, 24-36h, 36-48h, 48-72h).

11. Window preparation and identification of stages of development in chick egg.

12. **Histology** : Preparation of permanent histological slides of testis, ovary, kidney, intestine, liver of rat (H and E staining).

**KUK-GUIDELINES / INSTRUCTIONS
FOR PRACTICAL EXAMINATION**

External Marks : 90

Internal Assessment : 10

Time allotted : 6 Hours

(Two sessions : M & E)

- | | | |
|--|---|-------------------------|
| 1. Chemical analysis of water / soil | : | 10 marks |
| 2. Identification and Classification of specimens (Eight) | : | 16 marks |
| 3. Ecological note on economically important specimen (two) | : | 8 marks |
| 4. Identification of histological and embryological slides with reasons of identification (Two); feet and beaks of birds | : | 8 marks |
| 5. Permanent preparation of histological slides | : | 18 marks (6,6,6) |
| (a) Section cutting and stretching.....6 | | |
| (b) Staining, mounting.....6 | | |
| (c) Identification & sketch.....6 | | |
| 6. Field report | : | 10 marks |
| 7. Practical note book | : | 8 marks |
| 8. Viva-voce | : | 12 marks |

Note : Field report to be submitted alongwith answer books.

Contents

PAPER-I : ENVIRONMENTAL BIOLOGY

SECTION-A

1. Ecology : Introduction and Basic Concepts 3 - 21
2. Environment : Abiotic and Biotic factors 22 - 45
- ~~3.~~ Ecosystem : Basic Concepts 46 - 71
- ~~4.~~ Biomes : Major Ecosystems 72 - 93
- ~~5.~~ Biosphere and Biogeochemical Cycles 94 - 108

SECTION-B

- ~~6.~~ Population : Growth and Regulation 111 - 139
- ~~7.~~ Biodiversity and Natural Resources 140 - 180
- ~~8.~~ Migration : Fishes and Birds 181 - 187
- ~~9.~~ Parental Care 188 - 195
10. Biotic Community and Population Interactions 196 - 236
- ~~11.~~ Environmental Pollution 237 - 280

PAPER-II : EVOLUTION AND DEVELOPMENTAL BIOLOGY

SECTION-A : EVOLUTION

- ~~12.~~ Origin of Life-I : Organic Compounds, Coacervates and Biomolecules 13 283 - 296
- ~~13.~~ Origin of Life-II : Prokaryotic and Eukaryotic Cells 9 297 - 306
- ~~14.~~ Organic Evolution-I : Evidences of Evolution 307 - 345
- ~~15.~~ Organic Evolution-II : Theories of Evolution (2/1) 346 - 370
- ~~16.~~ Types of Evolution : Micro, Macro and Mega-Evolution 7 371 - 377

- | | | |
|------------------------|----|-----------|
| 17. Concept of Species | 11 | 378 - 388 |
| 18. Phylogeny of Horse | 9 | 389 - 397 |
| 19. Human Evolution | 16 | 398 - 412 |

SECTION-B : DEVELOPMENTAL BIOLOGY

- | | | |
|--|----|-----------|
| 20. Historical Background of Developmental Biology | 7 | 415 - 417 |
| 21. Gametogenesis and Gametes | 18 | 418 - 435 |
| 22. Fertilization and Parthenogenesis | 14 | 436 - 449 |
| 23. Cleavage and Blastulation | 11 | 450 - 460 |
| 24. Development of Frog | 18 | 461 - 478 |
| 25. Development of Chick | 9 | 479 - 487 |
| 26. Embryonic Induction (Primary Organizers) | 8 | 488 - 495 |
| 27. Extra-Embryonic Membranes | 6 | 496 - 501 |
| 28. Competence, Determination and Differentiation | 8 | 502 - 506 |
| 29. Repair and Regeneration | 12 | 507 - 518 |