

# Syllabus for UPSC Indian Forest Services Examination

## Zoology Paper II

The Scope of the Syllabus for optional subject papers for the examination is Broadly of the Honours Degree level i.e. A level Higher than the Bachelors Degree and lower than the Masters Degree. In the case of Engineering subjects, the level corresponds to the Bachelors Degree.

There will be no practical examination in any of the subjects.

### Optional Subjects

**Total number of questions in the question papers of optional subjects will be eight. All questions will carry equal marks. Each paper will be divided into two parts, viz. Part A and Part B, each part containing four questions. Out of eight questions, five questions are to be attempted. One question in each part will be compulsory. Candidates will be required to answer three more questions out of the remaining six questions, taking at least one question from each Part. In this way, at least two questions will be attempted from each Part i.e. one compulsory question plus one more.**

### Paper-II

#### Section-A

##### I. Cell Biology :

(a) Structure and function of cell and its organelles(nucleus, plasma membrane, mitochondria, Golgi bodies, endoplasmic reticulum, ribosomes and lysosomes), cell division (mitosis and meiosis), mitotic spindle and mitotic apparatus, chromosome movement.

(b) Watson-Crick model of DNA, replication of DNA, protein synthesis, transcription and transcription factors.

##### II. Genetics

a) Gene structure and functions; genetic code.

(b) Sex chromosomes and sex determination in Drosophilla, nematodes and man.

(c) Mendel's laws of inheritance, recombination, linkage, linkage-maps, multiple alleles, cistron concept; genetics of blood groups.

(d) Mutations and mutagenesis : radiation and chemical.

(e) Cloning technology, plasmids and cosmids as vectors, transgenics, transposons, DNA sequence cloning and whole animal cloning (Principles and methodology).

- (f) Regulation and gene expression in pro-and eu-karyotes.
- (g) Signal transduction; pedigree-analysis; congenital diseases in man.
- (h) Human genome mapping; DNA finger-printing.

### III. Evolution

- (a) Origin of life
- (b) Natural selection, role of mutation in evolution, mimicry, variation, isolation, speciation.
- (c) Fossils and fossilization; evolution of horse, elephant and man.
- (d) Hardy-Weinberg Law, causes of change in gene frequency.
- (e) Continental drift and distribution of animals.

### IV. Systematics

- (a) Zoological nomenclature; international code; cladistics.

## Section-B

### I. Biochemistry

- (a) Structure and role of carbohydrates, fats, lipids, proteins, aminoacids, nucleic acids; saturated and unsaturated fattyacids, cholesterol.
- (b) Glycolysis and Krebs cycle, oxidation and reduction, oxidative phosphorylation; energy conservation and release, ATP, cyclic AMP-its structure and role.
- (c) Hormone classification (steroid and peptide hormones), biosynthesis and function.
- (d) Enzymes : types and mechanisms of action; immunoglobulin and immunity; vitamins and co-enzymes.
- (e) Bioenergetics.

### II Physiology (with special refernece ot mammals)

- (a) Composition and constituents of blood; blood groups and Rh factor in man; coagulation, factors and mechanism of coagulation; acid-base balance, thermo regulation.
- (b) Oxygen and carbon dioxide transport; haemoglobin : constituents and role in regulation.

(c) Nutritive requirements; role of salivary glands, liver, pancreas and intestinal glands in digestion and absorption.

(d) Excretory products; nephron and regulation of urine formation; osmoregulation.

(e) Types of muscles, mechanism of contraction of skeletal muscles.

(f) Neuron, nerve impulse-its conduction and synaptic transmission; neurotransmitters.

(g) Vision, hearing and olfaction in man.

(h) Mechanism of hormone action.

(i) Physiology of reproduction, role of hormones and pheromones.

### III. Developmental Biology

(a) Differentiation from gamete to neurula stage; dedifferentiation; metaplasia, induction, morphogenesis and morphogen; fate maps of gastrulae in frog and chick; organogenesis of eye and heart, placentation in mammals.

(b) Role of cytoplasm in and genetic control of development; cell lineage; causation of metamorphosis in frog and insects; paedogenesis and neoteny; growth, degrowth and cell death; ageing; blastogenesis; regeneration; teratogenesis; neoplasia.

(c) Invasiveness of placenta; in vitro fertilization; embryo transfer, cloning.

(d) Baer's law; evo-devo concept.

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