Swami Ramanand Teerth Marathwada University, Nanded

PET- Syllabus

Subject: **Zoology**

Section -B

1. Non Chordates

1. General Characters and classification up to class level of all phylum of non chordates.
2. *Plasmodium vivax* – Systematics, Historical background, Habit, Habitat, Geographical distribution, Structure, Life cycle & Pathogenicity.
3. Sycon –General morphology and Canal system.
4. Obelia – General Structure and Life History
5. *Fasciola hepatica*- Systematic position , Habit, Habitat, Structure ,Life cycle & Pathogenicity.
   Taenia solium – Systematic position, Habit, Habitat, Structure, Life cycle & Pathogenicity.
   Ascaris –Structure, Life cycle and Parasitic adaptations.
6. Leech –General Morphology, Digestive & Urinogenital system.
7. Prawn –Ext. Morphology, Digestive System, Respiratory System, Nervous System.
8. Star Fish –External Morphology & Water vascular system.
9. Hemichordata –General Characters, Classification & Affinities.

2. Chordates

1. General Characters & Classification.
2. Urochordata –Concept of retrogressive metamorphosis.
3. Scoliodon –Ext. Charactors, Digestive System, Respiratory system, Structure of Heart, Ventral aorta, Urinogenital system, Brain & Spinal Cord.
4. Parental Care in Amphibia , Neoteny.
5. Flight adaptation in Birds, Migration of Birds.
6. Rat –Ext. Characters, Digestive system, Respiratory System, Heart and Composition of Blood, Eye and Ear.

3. Cell Biology

1. Structure, Composition and functions of cell organelles –Plasma membrane, Endoplasmic reticulum, Golgi complex, lysosomes, Mitochondria, Ribosomes, Nucleus, Chromosomes.
2. Cell Division –Mitosis and Meiosis.

4. Developmental Biology

1. Gametogenesis –Spermatogenesis & Oogenesis.
2. Frog Embryology – Fertilization, Cleavage, Blastulation, gastrulation.
3. Chick Embryology –Extraembryonic membranes in chick.
4. Placentation in Mammals.

5. Genetics

1. Mendel's Law's of inheritance.
2. Interaction of genes –Complementary, Supplementary factors and duplicate genes.
3. Multiples alleles and inheritance of ABO blood groups in man.
4. Linkage and Crossing over.
5. Chromosomal methods of sex determination and Bridges ratio theory of genic balance.
6. Sex linked inheritance in Man –Colour blindness, Haemophilia.
7. Chromosomal mutation and gene mutation.
8. Human Genetics –Syndromes –Turner, klinefelters and Down's syndrome. Inborn errors of metabolism –Phenylketonuria, Alkaptonuria and Albinism
9. Structure of DNA & RNA.

6. Evolution

1. Theories of organic evolution –Lamarck, Darwin and DeVries
2. Evidences of organic evolution –Anatomical, Paleontological and Embryological
3. Evolution of Man

7. Ecology

1. Scope and Branches of Ecology.
2. Ecosystem –Types of Ecosystem.
3. Population ecology –Characteristics –Density, Natality, Mortality, Age Distribution.
4. Ecological adaptations – Aquatic, Fossorial, Desert, Volant.
5. Environmental Pollution –Sources and effects of water, air and soil pollution.
6. Energy resources –Conventional and non conventional energy resources.

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PET- Syllabus

Subject: Zoology

Unit – I

(A) **Invertebrate** : Structure and Function

1) Organization of Coelom: Coelomate, Acoelomate, Pseudocoelomate, Protostomia and Deuterostomia.
2) Locomotion: Pseudopodial, Flagellar and Ciliary movement.
3) Nervous System: Primitive Nervous System- Coelenterates and Echinoderms. Advanced Nervous System - Annelida and Arthropoda.

(B) **Vertebrate :** Structure and Function:

1) Origin and Concepts of Protochordates, affinities of Protochordates.
2) Classification of Vertebrates
3) Blood Composition and Functions, Origin and Structure of Heart and Aortic arches, Blood Pressure and Cardiac Cycle.
4) Evolution of Urinogenital system in vertebrates.
5) Nervous system : Central Nervous system, Peripheral Nervous system and Autonomous Nervous system.

Unit –II

Molecular Biology ;

1) Structure and Organization of Prokaryotic and Eukaryotic cells.
2) Membrane Structure and Function.
3) Structure of Gene and Nature of Genome, Regulation of gene expression in Prokaryotes and Eukaryotes.
4) DNA replication, Damage, Repair and Recombination.
5) RNA synthesis and Processing.

Unit – III

Economic Zoology :

1) Binomics, prevention and control of Protozoan Parasites- *Entamoeba histolytica*, *Trypanosoma*, Mosquito as a Vector for human diseases with reference to Malaria, Dengue, Chickengunya, Filaria and Control of Mosquitoes.
2) Vermiculture and Vermicomposting.

Unit – IV

Genetics and Genetic Engineering:

1) Mendels law of Inheritence.
2) Interaction of Genes and Modifying Genes.
3) Sex Chromosomes and Sex linked Inheritance.
4) Chromosomal methods of Sex determination.
5) Linkage and Crossing over.
6) Mutations.
7) Multiple alleles and Inheritance.

Human Genetics

1) Numerical abnormalities of human chromosomes and related syndromes.
2) Structural abnormalities of human chromosomes and related syndromes.
3) Human metabolic disorders.

Genetic Engineering

1)Introduction to recombinant DNA technology.

2)Enzymes used in DNA technology.

3)Cloning vectors – Plasmids, Phages, Cosmid.

4)Cloning Techniques – Isolation and purification of genomic and Plasmid DNA and RNA.

5)Application of recombinant DNA technology.

Unit – V

Gamete Biology and Animal Development

1) Spermatogenesis – Ultra structure of Mammalian sperm, Semen composition, Phases of spermatogenesis.
2) Oogenesis : Morphology of nature Ovum, phases of Oogenesis.
3) Fertilization : Pre and Post fertilization events, sterility in male and females, Types of sterility, causes and treatment of sterility.
4) Multiple ovulation and Embryo Transfer technology (MOET) – Invitro Oocycte maturation ,super ovulation, Invitro fertilization (IVF).

Unit – VI

Ecology, Ethology and Evolution :

1) Types of Ecosystems, Abiotic and Biotic factors.
2) Abiotic Environment: Liebigs law of minimum, Law of limiting factors, Shelfords law of tolerance.
3) Adaptation of limiting factors – Temperature and Water.
4) Population Ecology – Characteristics of population, Population growth, Population fluctuation and Equilibriam , Population regulation.
5) Ethology as a branch of biology, classification of behavioural pattern.
6) Animal Communication methods.
7) Reproductive Behaviour – Reproductive strategies, Courtship.
8) Origin of Life, Theories of organic evolution.

Unit – VII

Immunology :

1) Innate Immunity and Acquired immunity.
2) Immunoglobulins : Structure, Function and Classification.
3) Nature of Antigens and Super antigens – Epitope and haptens.
4) Antigen - Antibody interactions and their applications.
5) Hypersensitivity and their types.
6) Cytokines - Properties, structure and functions.
7) Hybridoma technology.
8) Immunodeficiency disorders and Autoimmune diseases.

Unit –VIII

Endocrinology :

1) Structure and histology of endocrine glands.
2) Hormones of female reproductive physiology.
3) Hormones of male reproductive physiology.

Unit – IX

Tools and Techniques for Biology :

1) Principle, working, mechanism and uses of Analytical instruments – Balance, PH Meter, Colorimeter, Spectrophotometer, Ultra centrifuge.
2) Microscopy – Principle and applications of light, Phase contrast, Fluorescence, Scanning and transmission electron microscopy.
3) Principles and mechanism of separation techniques in biology, Chromatography, Electrophoresis and High Performance Liquid Chromatography.

Unit – X

Environmental toxicology and pollution:

1) Introduction to Environmental toxicology.
2) Common Toxic Manifestations.
3) Toxic Metal pollutants.
4) Toxic gases pollutants.
5) Environmental Carcinogens
6) Air Pollution: causes, effects and global warming,
7) Water pollution.