

## **Detailed Reduced Syllabus of PGZO for June 2021-Dec 2021 TEE**

### **PAPER—I (100Marks)**

#### ***Group A (1/2): Structure and functions of chordates***

- 1.0 Origin of chordate
- 2.0 The nature of vertebrate morphology
- 3.0 Origin and classification of vertebrates
- 4.0 Vertebrate integument and its derivatives
- 5.0 General plan of circulation in various groups
- 6.0 Respiratory system
- 7.0 Skeletal system

#### ***GroupA (2/2):Structure and function of nonchordates***

- 1.0 Organization of coelom
- 2.0Locomotion
- 3.0Nutrition and Digestion
- 4.0Respiration
- 5.0Excretion

#### **GroupB:(1/2)Taxonomy**

- 1.0 Definition and basic concepts of biosystematics and taxonomy
- 2.0 Trends in biosystematics—concepts of different conventional and newer aspects
- 3.0 Dimensions of speciation and taxonomic characters

#### ***GroupB (2/2):Biodiversity and Conservation***

- 1.0Themeanings of biodiversity
- 2.0Threatsto species diversity
- 3.0Values and ethics of biodiversity
- 4.0Global pattern of biodiversity
- 5.0Theories of biodiversity variations
- 6.0 Regional and National approaches to conservation of Biodiversity - mega biodiversity countries and biodiversity of hot spots of India

**PAPER—II(100Marks)**

**GroupA:(1/2) Ecology**

- 1.0 Ecology of population
- 2.0 Population growth
- 3.0 Life history strategies
- 4.0 Predation
- 5.0 Competition and niche theory
- 6.0 Mutualism

**GroupA(2/2):Environmental Biology and Toxicology**

- 1.0 Environmental factors and their impact on physiological processes
- 2.0 Individual and its interaction with environment
- 3.0 Environmental laws and ethics

**GroupB(1/2):Ethology**

- 1.0 Introduction
- 2.0 Innate behaviour
- 3.0 Neural and hormonal control of behaviour
- 4.0 Genetic and environmental components in the development of behaviour
- 5.0 Communication
- 6.0 Ecological aspects of behaviour
- 7.0 Social behaviour
- 8.0 Reproductive behaviour

**GroupB (2/2): Evolution**

- 1.0 Concepts of evolution and theories of organic evolution with an emphasis on Darwinism
- 2.0 Neo-Darwinism
- 3.0 Quantifying genetic variability
- 4.0 Molecular population genetics
- 5.0 Genetics of speciation

**PAPER—III(100 Marks)**

**GroupA(1/2):Animal Physiology**

- 1.0 Aims and scope of comparative physiology
- 2.0 Thermoregulation
- 3.0 Communication among animal
- 4.0 Adaptation

### **GroupA(2/2):Biochemistry**

- 1.0:-Glucose catabolism *via* EMP and MMP pathways; TCA cycle, 2 oxidation of saturated and unsaturated fatty acids. Catabolism of phenylalanine, purine; deamination, transamination, transdeamination
- 2.0:-Biological oxidation with special reference to oxidative phosphorylation
- 3.0: -Active transport - characteristics, mechanism and significance. Excitation - exocytosis coupling molecular mechanism of muscular contraction. Biosynthesis of i) urea ii) saturated fatty acid iii) glutathione, iv) norepinephrine v) epinephrine vi) serotonin vii) melatonin and viii) brief outline of prostaglandin synthesis; gluconeogenesis, glycogenesis
- 4.0: -Specific activity of enzyme: enzyme-substrate complex,  $K_m$  and its derivation for a single substrate enzyme reaction. Allosteric modulation of enzyme activity, covalent modification of enzyme activity, isozyme, ribozyme, rate-limiting enzyme
- 5.0:-Metabolic profile of adipose tissue

### **GroupB(1/2):Cytogenetics**

- 1.0 Biology of chromosomes
- 2.0 Sex chromosomes, sex determination and dosage compensation in *C.elegans*, *Drosophila* and Humans
- 3.0 Imprinting of genes, chromosomes and genomes
- 4.0 Somatic cell genetics
- 5.0 Human cytogenetics
- 6.0 Cytogenetic implications and consequences of structural changes and numerical alterations of chromosomes
- 7.0 Genome analysis
- 8.0 Linkage map, cytogenetic mapping

### **GroupB (2/2): Molecular Biology**

1. History and scope of molecular biology
2. DNA replication
3. Transcription
4. Post-transcriptional modification in RNA
5. Translation
6. Recombination and repair

**PAPER—IV (100Marks)**

**GroupA :Basic physical and chemical principles**

1. Energetics
2. Chemicalthermodynamics
3. Idea of chemical bonds
4. Nuclearhazards

**GroupB:LaboratoryCourse**

*1. Majordissection*

- a) Reproductive system in grasshopper and *Acatina*
- b) Urinogenetalsystem,olfactoryapparatusintilapia
- c) Arterial,autonomicnervoussysteminmouse

*2. Minordissections*

- a) Nephridia and spermatheca of earthworm
- b) Otolithand pituitarygland intilapia

**PAPER—V(100Marks)**

**GroupA: Laboratorycourse**

1. Identificationand analysisofterrestrialandaquaticcommongroups
2. Estimation ofprimaryproductivityof apond
3. Estimationof dissolveO<sub>2</sub>and dissolve CO<sub>2</sub>, alkalinityand hardness of waterbodies
4. MeasurementofsoilpHandorganic carbon
5. Toxicitytest- LC<sub>50</sub>/LD<sub>50</sub>determination

**GroupB:Laboratorycourse**

1. Chromosome preparations from polytenechromosomes of *Drosophila*
2. Handlingof*Drosophila*,chromosomemapping,*Drosophila* genetic crosses
3. DNA isolation from blood.
4. Determination of unknown proteins by Lowry's method

**PAPERVI: (100marks)**

**GroupA :Quantitative Biology & Biotechnology**

**QuantitativeBiology :**

1. Basicmathematics:exponential functions
2. Biostatistics:generalprincipals
3. Presentation& summarizingdata, probability distribution and their properties

4. Statistical inference and estimated hypothesis testing, sampling theory
5. Correlation & regression

**Biotechnology:**

1. Principles of assay of DNA, RNA, Western, Southern, Northern blotting
2. Fluorescence microscopy, confocal microscopy, scanning & transmission microscopy (working principle & application)
3. Detection of apoptotic cell by comet assay, nuclear lamin assay, caspase activation, cytochrome C release assay, Annexin V assay
4. Elementary idea of cryotechniques
5. Molecular separation techniques- TLC, Ion exchange, SDS-PAGE, Affinity, HPLC
6. Immunological techniques
7. Application of fluorochrome for antigen localization, flow cytometry, FACS

**Group B: Immunology & Microbiology**

1. Overview of immune system, components of immunity, innate & adaptive immunity
2. Cells & organs of immune system
3. Antigenicity & immunogenicity: immunogen properties, adjuvant, epitope, hapten
4. Complement system, MAC mediated lysis
5. Structure of MHC (elementary idea)
6. Structural diversity of immunoglobulin
7. Elementary concept of invertebrate immunity

**PAPER VII: (100 Marks)**

**Group A: Developmental Biology**

1. Differentiation of primordial germ cell & structure of mature gamete in *Drosophila*. Role of polyplasm, influence of *oskar* gene, effect of grandchildness mutation
2. Composition of semen, seminal protein, accessory reproductive structure of *Drosophila*
3. *In vitro* & *in vivo* capacitation of mammalian sperm
4. Role of fertilizin & ZP protein in fertilization
5. Role of nurse cell & follicular cell in yolk production in *Drosophila*
6. Significance of totipotency & pluripotency of cells during animal development
7. Role of maternal effect gene, segment polarity gene, zygotic gene, homeotic gene in development of *Drosophila*
8. Elementary idea of stem cell & its importance

**Group B: Endocrinology, Cell & Tissue Structure, Function**

1. Hormone as messenger & their role in metabolic regulation

2. Thyroid hormone biosynthesis & function
3. Anterior pituitary structure, hormone & function
4. Adrenal cortical hormone, biosynthesis & function
5. Biosynthesis & function of epinephrine & nor-epinephrine
6. Biosynthesis of sex steroid hormone
7. GH hormone
8. Biomembrane
9. Basic mechanism of cell signaling pathway

**PAPER VIII: (100 Marks)**

**Group A: Parasitology & Public Health**

1. Introduction: Public health & parasites
2. Vectors and their importance in transmission of parasites
3. Biology and importance of *Entamoeba histolytica*, *Naegleria*, *Acanthamoeba*, *Giardia*, *Leishmania*, *Ancylostoma*, *Xenopsylla*, *Rhipicephalus*, *Pediculus*, *Phlebotomus*, *Glossina*, *Anopheles*, *Culex*, *Aedes*
4. Epidemiology: classification, epidemiology of malaria, kala-azar, filariasis
5. Zoonosis and its significance
6. Antigenic variation: molecular basis and diversity in parasites
7. Structure and functional expression of antibody, other various types of body cells and organs in immune response

**Group B: Agricultural Entomology & Aquatic Resource Management**

1. Diversity, structure and functions of insects with reference to their pest status
2. Life history, population structure and management of insect pests
3. Non-insect pests of agricultural products
4. Aquatic resource
5. Culture of aquatic organisms
6. Fish culture
7. Prawn culture

***PAPERIX :(100marks)***

***GroupA : Review/Dissertation &Seminar***

***GroupB:LaboratoryCourse(DevelopmentalBiology& Immunology)***

1. Studies of activated chick egg of different hours
2. Studies of egg & sperm of mice or grasshopper
3. Identification of thymus, bursa, spleen
4. Antigen-antibody reaction by blood group test

***PAPERX : (100marks)***

***GroupA :Laboratory Course (Endocrinology, Cell & Tissue Structure)***

1. Staining & identification of different endocrine tissues
2. Identification of stages of estrous cycle in rat
3. Identification of different blood cell types

***GroupB:LaboratoryCourse (QuantitativeBiology&Biotechnology)***

1. Correlation, regression, ANOVA
2. Gel electrophoresis of serum protein
3. Analysis & interpretation of southern, northern & western blotting from gel photograph