



**PUNJAB PUBLIC SERVICE COMMISSION**  
**COMBINED COMPETITIVE EXAMINATION**  
**FOR RECRUITMENT TO THE POSTS OF**  
**PROVINCIAL MANAGEMENT SERVICE, ETC -2022**  
**CASE NO. 2C2023**

**SUBJECT: ZOOLOGY (PAPER-I)**

**TIME ALLOWED: THREE HOURS**

**MAXIMUM MARKS: 100**

**NOTE:**

- i. All the parts (if any) of each Question must be attempted at one place instead of at different places.
- ii. Write Q. No. in the Answer Book in accordance with Q. No. in the Q. Paper.
- iii. No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.
- iv. Extra attempt of any question or any part of the question will not be considered.

**NOTE:**

Attempt FIVE Questions in all. Select at least TWO Questions from each Section. Attempt in Urdu or English.

**SECTION-I**

- Q.No.1** (a) How protozoans maintain homeostasis?  
(b) Discuss symbiotic life style in protozoans. (10+10=20 Marks)
- Q.No.2** Describe various forms of canal systems and its significance in Porifera. (20 Marks)
- Q.No.3** Explain evolutionary relationship of three classes of Annelida in light of traditional and recent cladistics interpretation. (20 Marks)
- Q.No.4** (a) What are the different modifications of foot in Mollusca?  
(b) What is torsion? What are its adaptive advantages in gastropods?  
(10+10=20 Marks)

**SECTION-II**

- Q.No.5** (a) Discuss the structure and function of swim bladder in fishes.  
(b) Describe the process of excretion and osmoregulation in fishes.  
(10+10=20 Marks)
- Q.No.6** Give an account on reproduction in Amphibia and discuss importance of courtship behavior. (20 Marks)
- Q.No.7** (a) What are different types of feathers in birds?  
(b) What adaptations of birds promote endothermy and flight?  
(10+10=20 Marks)
- Q.No.8** Describe in detail the poisonous apparatus and biting mechanism of poisonous snakes. (20 Marks)



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**CASE NO. 2C2023**

**SUBJECT: ZOOLOGY (PAPER-II)**

**TIME ALLOWED: THREE HOURS**

**MAXIMUM MARKS: 100**

**NOTE:**

- i. All the parts (if any) of each Question must be attempted at one place instead of at different places.
- ii. Write Q. No. in the Answer Book in accordance with Q. No. in the Q. Paper.
- iii. No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.
- iv. Extra attempt of any question or any part of the question will not be considered.

**NOTE:** Attempt FIVE Questions in All Selecting ONE from each Section. Attempt in Urdu or English.

**SECTION-A**

- Q. No. 1.** a) Differentiate in detail among replication, transcription and translation.  
b) Write down the significance and mechanism of glycolysis, kreb's cycle and electron transport chain.  
(10+10=20 Marks)
- Q. No. 2.** a) Briefly describe structure and function of mitochondria.  
b) What are the mechanisms by which enzymes accelerate cellular reactions?  
(10+10=20 Marks)

**SECTION-B**

- Q. No. 3.** a) Which adaptive mechanisms of water regulation are used by the insects to limit their evaporative loss?  
b) Describe the osmoregulatory adaptations as characteristics of desert mammals.  
(10+10=20 Marks)
- Q. No. 4.** a) How nervous coordination systems works in animals? Describe the phenomenon in detail.  
b) Describe the physiological anatomy of digestive tract in animals. (10+10=20 Marks)

**SECTION-C**

- Q. No. 5.** a) Write down usefulness of DNA recombinant technology in human life with practical examples.  
b) How the mutation occurred in genes? What are the consequences of genetic mutation?  
(10+10=20 Marks)
- Q. No. 6.** a) Differentiate between crossing over and recombination. How are these mechanisms affected by gene linkage?  
b) Describe the factors that affect recombination frequencies. (10+10=20 Marks)

**SECTION-D**

- Q. No. 7.** a) What are the assumptions of Hardy Weinberg Principle? How these assumptions influence allele frequencies?  
b) Explain the statement that Charles Darwin knew about the survival of the fittest but he had no idea about the arrival of the fittest.  
(10+10=20 Marks)
- Q. No. 8.** a) 'Ontogeny recapitulate phylogeny'. Elaborate in detail.  
b) Describe the theory of organic evolution with the supportive examples.  
(10+10=20 Marks)

**SECTION-E**

- Q. No. 9.** a) What is 'Green House Effect'? What are its causes and impact on ecosystem?  
b) Describe the role of predators and decomposers in an ecosystem.  
(10+10=20 Marks)
- Q. No. 10.** a) Differentiate between anthropogenic eutrophication and natural eutrophication. Suggest measures to reduce both types of eutrophication.  
b) What is desertification? Explain factors causing desertification and identify the remedial measures.  
(10+10=20 Marks)