

Total No. of Questions : 7]

SEAT No. :

PE-5339

[Total No. of Pages : 2

[6513]-101

First Year M.Sc.

ZOOLOGY

**ZOUT-111 : Biochemistry and Biochemical Techniques
(2019 Pattern) (Semester - I)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question No.1 is compulsory.
- 2) Solve any five questions from Q.No. 2 to Q.No. 7.
- 3) Q.No.2 to Q.No.7 carry equal marks.

Q1) Solve any five of the following: **[10]**

- a) What is an ionic bond?
- b) Define non essential amino acids.
- c) Name any two sources of water soluble vitamins.
- d) What are radio isotopes?
- e) What is Warburg apparatus?
- f) What is moving boundary electrophoresis?

Q2) a) Elaborate on the industrial uses of enzymes. **[7]**

- b) What is centrifugation? Describe the preparative centrifugation method. **[5]**

Q3) a) Elaborate on structural details of monosaccharides add a note on glycosidic bond and its biological significance. **[7]**

- b) Explain the method used for DNA electrophoresis. **[5]**

Q4) a) Describe the quaternary structure of protein with suitable example. **[7]**

- b) Write a note on radiation hazards. **[5]**

P.T.O.

- Q5)** a) What are enzymes? Explain the properties of enzymes. [7]
b) Describe the principle of Ion-exchange chromatography. [5]
- Q6)** a) Write the principle and applications of Adsorption chromatography. [7]
b) Describe the classification of lipids. [5]
- Q7)** Write short notes on any two of the following: [12]
a) Maxam - Gilbert DNA sequencing method.
b) Visible spectrophotometry technique.
c) Water as a universal solvent.



Total No. of Questions : 7]

SEAT No. :

PE-5340

[Total No. of Pages : 2

[6513]-102

First Year M.Sc.

ZOOLOGY

**ZOUT-112 : Cell Biology and Developmental Biology
(2019 Pattern) (Semester - I)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question No. 1 is compulsory.
- 2) Solve any five questions from Q.No. 2 to Q.No.7.
- 3) Questions 2 to 7 carry equal marks.

Q1) Solve any five of the following: [10]

- a) Define Protein Trafficking.
- b) Describe alecithal egg.
- c) What are Intrinsic proteins?
- d) Define Vitellogenesis.
- e) What is tumour suppressor gene?
- f) Explain Induction.

Q2) a) Describe the ultrastructure of nuclear pore complex. [7]

b) Explain importance of fish as a model organism. [5]

Q3) a) Discuss the role of bicoid and nanos in antero-posterior axis formation of Drosophila. [7]

b) Comment on cyclins and Cyclin-Dependent Kinases(CDKs). [5]

Q4) a) Explain protein import in mitochondria. [7]

b) Describe molecular strategy to avoid polyspermy. [5]

Q5) a) Comment on the process of neurulation in frog and chick. [7]

b) Explain polymorphism in Lysosomes. [5]

P.T.O.

- Q6)** a) Explain regeneration in Hydra. [7]
b) Explain the mechanism of synaptic transmission. [5]
- Q7)** Write short notes on any two of the following: [12]
a) Macromolecules in living system
b) Actin and Myosin
c) Ageing



Total No. of Questions : 7]

SEAT No. :

PE-5341

[Total No. of Pages : 2

[6513]-103
First Year M.Sc.
ZOOLOGY
ZOUT-113 : Genetics and English in Scientific
Communication
(2019 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No. 1 is compulsory.*
- 2) *Solve any five questions from Q.No. 2 to Q.No.7.*
- 3) *Questions 2 to 7 carry equal marks.*

Q1) Solve any five of the following: **[10]**

- a) Sex-linked inheritance.
- b) Pseudoalleles
- c) Law of dominance
- d) Give the full form of IMRAD.
- e) State the importance of keywords.
- f) Qualities of good title.

Q2) a) Describe the format of research paper. Add a note on importance of introduction in it. **[7]**

b) Discuss the process of transformation in Bacteria. **[5]**

Q3) a) Explain the Hary-Weinbergs principle. Add a note on its applications. **[7]**

b) Justify the importance of review of literature in scientific publications. **[5]**

Q4) a) Discuss the format of Research project. Add a note on funding agencies in India. **[7]**

P.T.O.

- b) A sample of 1000 students showed the following distribution of blood groups. [5]

A = 4300

B = 1400

AB = 500

O = 3800

Calculate the frequencies of I^A , I^B and I^O .

- Q5) a)** In a test cross of *Drosophila* gives following phenotypes. [7]

Phenotype	-	Number
+ e +	-	2150
Cu + s+	-	2320
+ + s+	-	1690
cu e +	-	1790
+ e s+	-	980
cu + +	-	1030
+ + +	-	30
cu e s+	-	10

Determine the correct sequence of genes on chromosome. Construct the genetic map based on distance between the three loci.

- b) Why is English important for a scientist? [5]

- Q6) a)** What is Scientific communication? Add a note on sentence structure. [7]

- b) Write a note on polygenic inheritance. [5]

- Q7)** Write short notes: [12]

- Precis writing
- Dominant epistasis
- Applications of genetics in medicine



Total No. of Questions : 5]

SEAT No. :

PE-5342

[Total No. of Pages : 3

[6513]-104

First Year M.Sc.

ZOOLOGY

ZODT-114 : Biostatistics

(2019 Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question No. 1 is compulsory.
- 2) Solve any three questions from Q. No. 2 to Q. No. 5.
- 3) Question No. 2 to 5 carry equal marks.
- 4) Figures to the right indicate full marks.
- 5) Use of statistical table and calculator is allowed.

Q1) Solve any five of the following:

[1 each]

Choose correct alternative from the following:

- i) Which limits are excluded in case of exclusive method of classification?
 - A) Lower limits
 - B) Upper limits
 - C) Either lower or upper limits
 - D) Neither lower or upper limits
- ii) The arithmetic mean of first n natural numbers is _____.
 - A) $\frac{n+1}{2}$
 - B) $\frac{n(n+1)}{2}$
 - C) $n(n+1)$
 - D) $\frac{n}{2}$
- iii) If the largest value in a set is 89 and its range is 82, then the smallest value of the set is _____.
 - A) 82
 - B) 6
 - C) 7
 - D) 9

P.T.O.

- b) If a random variable $X \rightarrow B(n, p)$ with
- i) $E(X) = 6$ and $\text{Var}(X) = 4.2$, find n and p . [2]
 - ii) $P = 0.6$, $E(X) = 6$, find n and $\text{var}(X)$. [2]

Q5) Solve any four of the following: [2½ each]

- a) For a random variable X follows poison distribution with parameter m and $P(X = 5) = \frac{3}{10} P(X = 4)$ then find the values of parameter m , mean and variance of X .
- b) If a random variable $X \rightarrow N(100, 9)$ then find $P(X \leq 100)$, $P(X \geq 100)$, mean and variance of X .
- c) Explain the terms: level of significance, P-value.
- d) Explain the chi-square test for goodness of fit.
- e) Explain paired t-test.
- f) Explain F-test for equality of two population variances.



Total No. of Questions : 7]

SEAT No.:

PE-5343

[Total No. of Pages : 2

[6513]-201

First Year M.Sc.

ZOOLOGY

ZOUT-121 : Molecular Biology and Bioinformatics

(2019 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.No.1 is compulsory.*
- 2) *Solve any five questions from Q.No.2 to Q.No.7.*
- 3) *Question No.2 to Q.No.7 carry equal marks.*

Q1) Solve any five of the following: **[10]**

- a) What are histones? Enlist the types of histones.
- b) Define Exons and Introns.
- c) Define the EXPASY and OMIA web resources.
- d) What are three chemical bonds that form DNA?
- e) What is ORC in prokaryotes?
- f) Define cot value.

Q2) a) What is transcription? Explain post-transcriptional modifications in eukaryotes. **[7]**

b) Explain the properties of genetic code. **[5]**

Q3) a) What is phylogenetic tree? Explain the method of parsimony. **[7]**

b) Explain base analogue cause mutation. **[5]**

Q4) a) Explain regulation of LAC Operon. **[7]**

b) Describe types and functions of RNA polymerase in eukaryotes. **[5]**

P.T.O.

- Q5)** a) Describe multiple sequence alignment methods. [7]
b) Explain physical properties of DNA. [5]
- Q6)** a) Describe different types of DNA damages. [7]
b) Explain Mu transposition controlling elements. [5]
- Q7)** Write short note on any two of the following: [12]
a) B type of DNA
b) Charging of tRNA
c) Metabolomics



Total No. of Questions : 7]

SEAT No. :

PE-5344

[Total No. of Pages : 2

[6513]-202
First Year M.Sc.
ZOOLOGY
ZOUT-122 : Endocrinology and Parasitology
(Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No. 1 is compulsory.*
- 2) *Solve any five questions from Q.No. 2 to Q.No.7.*
- 3) *Questions 2 to 7 carry equal marks.*

Q1) Solve any five of the following: **[10]**

- a) Define Chronobiology.
- b) Enlist adenohypophyseal hormones.
- c) What are glucocorticoids?
- d) Define altruism.
- e) What is polyspermy?
- f) Biological control of parasites.

Q2) a) Describe hormone receptors on the plasma membrane. **[7]**

b) Write a note on myiasis. **[5]**

Q3) a) Explain lifecycle and transmission of Trypanosoma sps. **[7]**

b) Describe hypothalamo-hypophysiotropins. **[5]**

Q4) a) Describe role of X and Y organs in regulation of crustacean metabolism. **[7]**

b) Write a note on pathogenicity, treatment and prophylaxis of Ancylostoma sps. **[5]**

Q5) a) Describe molecular characteristics of surface coat of Trypanosoma. **[7]**

b) Write a note on gastrointestinal hormones. **[5]**

P.T.O.

- Q6)** a) Describe hormonal regulation of carbohydrates metabolism. [7]
b) Explain preparation and demonstration of specific antigens of Entamoeba. [5]

- Q7)** Write short notes on any two of the following: [12]
a) Ultradian rhythm
b) ELISA
c) Renin-angiotensin system



Total No. of Questions : 7]

SEAT No. :

PE-5345

[Total No. of Pages : 2

[6513]-203

First Year M.Sc.

ZOOLOGY

**ZOUT-123 : Comparative Animal Physiology and
Environmental Biology**

(2019 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.No.1. is compulsory.*
- 2) *Solve any five questions from Q.No. 2 to Q. No.7*
- 3) *Q.No. 2 to Q. No.7 carry equal marks.*

Q1) Solve any Five of the following **[10]**

- a) Thermoneutral zone
- b) Bohr's effect
- c) Reflexes
- d) Community succession
- e) Endemic species
- f) Enlist any 2 microbes associated with animals

Q2) a) Describe the concept of ecosystem? Add a note on food chain. **[7]**

b) Write a note on carbohydrate digestion. **[5]**

Q3) a) Explain the mechanism of ventilation associated with gills. **[7]**

b) Justify the role of local communities in wildlife management. **[5]**

Q4) a) Discuss the wetland habitats in India. Add a note on its conservation. **[7]**

b) Write a note on proteins of sarcomeres **[5]**

Q5) a) Explain the mechanism of osmoregulation in hyperosmotic regulators. **[7]**

b) Write a note on forest vegetation in India. **[5]**

P.T.O.

- Q6)** a) Discuss the forest habitats in India. Add a note on project tiger. [7]
b) Justify the types of nitrogenous waste in animals in relation to their habitat. [5]

- Q7)** Write a short note on any Two of the following [12]
a) Thermoregulation in Homeotherms.
b) Structure of mammalian kidney.
c) Carbon cycle.



Total No. of Questions : 5]

SEAT No.

PE-5346

[Total No. of Pages : 1

[6513]-204
First Year M.Sc.
ZOOLOGY
ZODT-124: ICHTHYOLOGY
(2019 Pattern) (Semester - II)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Q. 1. is compulsory.*
- 2) *Solve any three questions from Q.2 to Q.5*
- 3) *Questions 2 to 5 carry equal marks.*

Q1) Solve any five of the following **[5]**

- a) Explain photoreceptors in fishes.
- b) Define Chromatophores.
- c) Enlist any two Exotic ornamental Fishes.
- d) Explain placoid scale.
- e) Give the name of any two accessory respiratory organs.
- f) Define stenotialine fishes.

Q2) a) Give diagnostic characteristics of class Teleostomi. **[6]**

b) Write a note on heart of fish. **[4]**

Q3) a) Explain structure and function of thyroid gland in fishes. **[6]**

b) Bottom dwelling fishes have flat body from Justify. **[4]**

Q4) a) Discuss the Gonads and gametic cycle in fishes. **[6]**

b) Give the symptoms and control measure for bacterial diseases in fishes. **[4]**

Q5) Write short notes on any two of the following **[10]**

- a) Evolutionary succession of fishes.
- b) Describe the structure and function of airbladder in fishes.
- c) Brain of fishes.



[6513]-204
First Year M.Sc.
ZOOLOGY
ZODT-124: Metabolic Pathways
(2019 Pattern) (Semester - II)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Q. 1. is compulsory.
- 2) Solve any three questions from Q.No. 2 to Q. No. 5 .

Q1) Solve any five of the following **[5]**

- a) Define glycogenesis.
- b) Define catabolic pathways.
- c) State the first law of thermodynamics.
- d) Describe oxidative phosphorylation
- e) Explain the concept of free energy.
- f) What is galactosemia?

Q2) a) Describe the role and clinical significance of PFK in regulation of glycolysis. **[6]**

b) Describe the transport of fatty acids through blood. **[4]**

Q3) a) Explain the conversion of citric acid to α -ketoglutaric acid. **[6]**

b) What is Von-Gerkes disease? **[4]**

Q4) a) Describe the steps of NADH production in TCA cycle. **[6]**

b) Explain in detail complex I of electron transport chain. **[4]**

Q5) Write short notes on any two of the following **[10]**

- a) Describe oxidative deamination of amino acids.
- b) Describe the structure of ATP and comment on its function.
- c) Describe synthesis of purine.



Total No. of Questions : 7]

SEAT No. :

PE-5347

[Total No. of Pages : 2

[6513]-301

S.Y. M.Sc.

ZOOLOGY

**ZOUT-231 : Animal Physiology - I
(2019 Pattern) (Semester - III)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Solve any five of the questions from Q.No. 2 to Q.No. 7.*
- 3) *Q.No.2 to Q.No.7 carry equal marks.*

Q1) Solve any five of the following: **[10]**

- a) Differentiate between conductance and capacitance.
- b) Write the function of bile juice.
- c) What is action potential?
- d) Define photoperiodism.
- e) What is isometric and isotonic muscle contraction?
- f) Define Bioluminescence.

Q2) Answer the following questions:

- a) Describe the regulation of Circadian and lunar and tidal, rhythms. **[7]**
- b) Describe lung volume and capacities. **[5]**

Q3) Answer the following questions:

- a) Describe in detail the internal structure of skeletal muscle. **[7]**
- b) Explain the structure and functions of luminescent organs. **[5]**

Q4) Answer the following questions:

- a) Explain the phenomenon of gaseous exchange across the pulmonary and systemic capillaries. **[7]**
- b) Discuss the structure and functions of electro-receptors. **[5]**

P.T.O.

Q5) Answer the following questions:

- a) Explain Buoyancy due to gas floats with examples. [7]
- b) Describe the role of central and peripheral receptors in nonrenal control of respiration. [5]

Q6) Answer the following questions:

- a) Describe the phenomenon of digestion of food in stomach and intestine. [7]
- b) Write about the properties of action potential. [5]

Q7) Write short notes on any two of the following: [12]

- a) Goldman - Hodgkin - Katz potential.
- b) Regulation of acclimatization and acclimation.
- c) Calorimetry and BMR.



Total No. of Questions : 7]

SEAT No. :

PE-5348

[Total No. of Pages : 2

[6513]-302

S.Y. M.Sc.

ZOOLOGY

ZOUT-231 : Entomology - I
(2019 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question No.1 is compulsory.
- 2) Solve any five questions from Q.No. 2 to Q.No. 7.
- 3) Q.No.2 to Q.No.7 carry equal marks.

Q1) Solve any five of the following: **[10]**

- a) Describe aristate antenna with example.
- b) Define polyneoptera with example.
- c) Describe hemelytra of insect.
- d) Explain fossorial leg with example.
- e) Explain the function of pronotum.
- f) Define bipolar neuron.

Q2) a) Describe the morphology of abdominal appendages of a typical insect. **[7]**

b) Explain the characters of order collembola with examples. **[5]**

Q3) a) Explain the inter-relationship between insect and other arthropods. **[7]**

b) Describe the process of moulting in insect cuticle. **[5]**

Q4) a) Describe the digestive system of an generalized insect. **[7]**

b) Explain the characters of order Diptera with examples. **[5]**

P.T.O.

- Q5)** a) Give morphological characters of order plecoptera with examples. [7]
b) Describe accessory respiratory organs in insect. [5]
- Q6)** a) Mention the distinguishing characters of order strepsiptera with examples. [7]
b) Describe different sense organs and their functions. [5]
- Q7)** Write short notes on any two of the following: [12]
a) Insect hormones, their types and functions.
b) Tympanation type of sound production.
c) Sponging type of mouthparts.



Total No. of Questions : 7]

SEAT No. :

PE-5349

[Total No. of Pages : 2

[6513]-303

S.Y. M.Sc.

ZOOLOGY

ZOUT-231 : Genetics - I

(2019 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Solve any five questions from Q.No. 2 to Q.No. 7.*
- 3) *Q.No.2 to Q.No.7 carry equal marks.*

Q1) Solve any five of the following:

[10]

- a) Enlist the model organisms used in genetic research.
- b) Define Hardy Weinberg Law.
- c) What is quantitative genetics?
- d) Define polymorphism.
- e) Enlist the strategies used for human genome project.
- f) Define genetic toxicology.

Q2) a) Describe the methods for estimating gene frequencies in population, including the effect of mutation and migration. **[7]**

b) Describe the life cycle and genetic nomenclature of T phages. **[5]**

Q3) a) Discuss the concepts of selection mutation equilibrium and derive the genetic equations for these equilibrium. **[7]**

b) Explain assortative mating. **[5]**

Q4) a) What are selection strategies and how the effect evolutionary processes in a population. **[7]**

b) Explain guidelines of FDA and EPA for genetic toxicology study. **[5]**

P.T.O.

- Q5)** a) Compare ex-vivo and in-vivo gene therapy providing two examples of gene delivery system used in gene therapy. [7]
b) Explain quantitative inheritance in human. [5]
- Q6)** a) What is Heritability? Explain its role in quantitative genetics. [7]
b) What are classical concepts of speciation. [5]
- Q7)** Write short notes on any two of the following: [12]
a) Molecular information in phylogenetic relationship
b) Chromosomal paints and probes
c) Genetic drift



Total No. of Questions : 7]

SEAT No. :

PE-5350

[Total No. of Pages : 2

[6513]-304

S.Y. M.Sc.

ZOOLOGY

**ZOUT-232 : Fundamentals of Systematics and Economic
Zoology**

(2019 Pattern)(Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) **Question No. 1 is compulsory.**
- 2) **Solve any five questions from Q.No. 2 to Q.No.7.**
- 3) **Questions 2 to 7 carry equal marks.**

Q1) Solve any five of the following: [10]

- a) Define Sympatric species.
- b) Define Numerical Taxonomy.
- c) Give two examples of Prawn species used in Prawn culture.
- d) What is "Piggery"?
- e) Give two examples of Rotifers.
- f) Give two examples of Agricultural pest.

Q2) a) Describe DNA fingerprinting techniques & its applications. [7]

- b) Discuss economic importance of Protozoa. Add note on malarial parasite. [5]

Q3) a) Discuss role of Dairy industry of India. Add note on milk products. [7]

- b) State and explain principles of ICZN. [5]

Q4) a) What is Nomenclature? Explain rules of Zoological Nomenclature as per ICZN. [7]

- b) Write principles of Homonymy and Synonymy. [5]

Q5) a) Explain in detail taxonomic key and their types. [7]

- b) Write short note on Vermitechnology. [5]

P.T.O.

- Q6)** a) Describe role of soil protozoan in Agriculture. [7]
b) Write short note on Hierarchies of classification.. [5]
- Q7)** Write short notes on any two of the following: [12]
a) Economic importance of Amphibia
b) Dairy Industry
c) Importance of Coral reefs



Total No. of Questions : 7]

SEAT No. :

PE-5351

[Total No. of Pages : 2

[6513]-305

S.Y. M.Sc.

ZOOLOGY

**ZOUT-233 : Research Methodology and Insect Physiology
and Biochemistry**

(2019 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No. 1 is compulsory.*
- 2) *Solve any five questions from Q.No. 2 to Q.No.7.*
- 3) *Questions 2 to 7 carry equal marks.*

Q1) Solve any five of the following: **[10]**

- a) What is Trophocyte?
- b) Define hemocyte. Write names of any two types of hemocytes in insects.
- c) Write full form of PTTH hormone. Where it is synthesized?
- d) What is ISSN number?
- e) What do you mean by the term “Hypothesis”?
- f) Define Plagiarism.

Q2) a) Define Electrophoresis. Write its procedure and applications. **[7]**

- b) Explain briefly the process of sclerotization, its types and importance. **[5]**

Q3) a) Give an account of “Types of hemocytes in Insects”. **[7]**

- b) Write an essay on: Procedure of patenting. **[5]**

Q4) a) Discuss different steps involved in Scientific Research. **[7]**

- b) Explain briefly: Respiration in aquatic insects. **[5]**

P.T.O.

- Q5)** a) Explain structure and function of Malpighian tubules. [7]
b) Write a short note on: Review of Literature and its importance. [5]
- Q6)** a) Give an account of: Endocrine system of Insects. [7]
b) Explain in briefly about “Tools of Data Collection” in Research. [5]
- Q7)** Write short notes on any two of the following: [12]
a) Bioinformatics
b) Microsomal oxidation of insecticides
c) Impact factor and its importance



Total No. of Questions : 5]

SEAT No. :

PE-5352

[Total No. of Pages : 2

[6513]-306

S.Y. M.Sc.

ZOOLOGY

ZODT-234 : Genetic Toxicology

(2019 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question No. 1 is compulsory.
- 2) Solve any three questions from Q.No. 2 to Q.No.5.
- 3) Questions 2 to 5 carry equal marks.

Q1) Solve any five of the following: [5]

- a) Genetic Toxicology
- b) Peri-centric mutation
- c) Mutagen
- d) Write the name of autosomal trisomy disease.
- e) Risk Assessment
- f) What are benign cancers?

Q2) a) Discuss strain and genotype of *Drosophila melanogaster* used in sex-linked recessive lethal test. [6]

b) Describe various chromosomal aberrations. [4]

Q3) a) Discuss how tautomeric shifts in DNA bases leads to mutations. [6]

b) Explain hazard assessment and risk analysis. [4]

Q4) a) Discuss how various end point of various mutations result into carcinogenicity? [6]

b) Discuss molecular mutation detection systems. [4]

P.T.O.

Q5) Solve any two of the following:

[10]

- a) Discuss use of plant system as screening tests for mutation.
- b) Explain micro-nucleus test in mice.
- c) Discuss scope and importance of genetic toxicology.



Total No. of Questions : 5]

SEAT No. :

PE-5353

[Total No. of Pages : 2

[6513]-307

S.Y. M.Sc.

ZOOLOGY

ZODT-234 : Immunology

(2019 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question No. 1 is compulsory.
- 2) Solve any three questions from Q.No. 2 to Q.No.5.
- 3) Questions 2 to 5 carry equal marks.

Q1) Solve any five of the following: [5]

- a) Define the term Immunology.
- b) Which are five basic classes of Antibodies?
- c) What is MHC?
- d) What is full form of 'V', 'D' and 'J' segments of heavy and light chains.
- e) What do you mean by 'Somatic Hypermutation'?
- f) State any two applications of ELISA.

Q2) a) Give an account of secondary lymphoid organs. [6]

b) Explain the concept of 'Hypersensitivity' with suitable examples. [4]

Q3) a) What is vaccine? Elaborate on different types of vaccines. [6]

b) Write a note on: Antibody class switching. [4]

Q4) a) Give an elaborative account of: Principle and applications of Hybridoma technology. [6]

b) Explain the concepts of Active and Passive Immunization. [4]

P.T.O.

Q5) Write short note on any two of the following:

[10]

- a) Cell mediated Immunity
- b) Antigen-antibody reaction
- c) Immunological Tolerance



Total No. of Questions : 7]

SEAT No.:

PE-5354

[Total No. of Pages : 2

[6513]-401

S.Y. M.Sc.

ZOOLOGY

ZOUT-241 : Animal Physiology - II

(2019 Pattern) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.No.1 is compulsory.*
- 2) *Solve any five questions from Q.No.2 to Q.No.7.*
- 3) *Question No.2 to Q.No.7 carry equal marks.*

Q1) Solve any five of the following:

[10]

- a) Define Osmoconformer.
- b) What is Electrocardiography?
- c) Explain HPA axis.
- d) Explain chronic stress.
- e) What is pacemaker.
- f) Define Hypertension.

Q2) a) What is excretion? Explain osmoregulation in fresh water fishes.

[7]

b) Explain the problems of deep sea diving.

[5]

Q3) a) What is saltatory conduction? Explain effect of drugs on synaptic transmission.

[7]

b) Explain structure and function of taste bud.

[5]

Q4) a) What is synapse? Explain structure of synapse and neuronal integration.

[7]

b) "Glycogen is energy storage molecule". Explain.

[5]

P.T.O.

- Q5)** a) What is cardiac cycle? Explain the events of cardiac cycle. [7]
b) Describe structure and functions of nerve cell. [5]
- Q6)** a) What is excretion? Explain different types of animal on the basis of their excretory products and give one example of each. [7]
b) “Chronic stress cause deleterious effect” Explain. [5]
- Q7)** Write short notes (Any Two): [12]
a) Role of Neurotransmitters
b) Impact of drugs and diseases on synaptic transmission
c) Physiology of hearing



Total No. of Questions : 7]

SEAT No. :

PE-5355

[Total No. of Pages : 2

[6513]-402

S.Y. M.Sc.

ZOOLOGY

ZOUT-241 : Entomology - II
(2019 Pattern) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Solve any five question from Q.No.2 to Q.No.7.*
- 3) *Question 2 to 7 carry equal marks.*

Q1) Solve any five of the following: **[10]**

- a) Define Oogenesis.
- b) Define gastrulation.
- c) Explain Katatrepsis.
- d) Explain the role of anti-diuretic hormone.
- e) Explain ovoviviparity.
- f) Define regeneration.

Q2) a) Describe the structure of egg and mention different types of eggs. **[7]**

b) Sketch and label panoistic orariele. **[5]**

Q3) a) Describe segmentation in insect development. Add a note on bicoid and nanos genes. **[7]**

b) Describe polypod larva with suitable examples. **[5]**

Q4) a) Describe embryonic membranes with diagram. **[7]**

b) Describe embryonic development of nervous system in insects. **[5]**

P.T.O.

- Q5)** a) What is diapause? Explain various factors controlling diapause in insects. [7]
b) Explain holometabolous development. [5]
- Q6)** a) Describe paedogenesis and parthenogenesis in insects. [7]
b) Explain the role of juvenile hormone in insect metamorphosis. [5]
- Q7)** Write short notes on any two of the following: [12]
a) Polyembryony
b) Viviparity
c) Ageing in insects



Total No. of Questions : 7]

SEAT No. :

PE-5356

[Total No. of Pages : 2

[6513]-403

S.Y. M.Sc.

ZOOLOGY

ZOUT-241 : Genetics - II

(2019 Pattern) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Solve any five question from Q.No.2 to Q.No.7.*
- 3) *Question 2 to 7 carry equal marks.*

Q1) Solve any five of the following:

[10]

- a) Define Chimerism.
- b) Synteny orthology.
- c) Temperate phage.
- d) Write any two strains of inbred lines of mice.
- e) What are triplet repeat disorders?
- f) What are cancer critical genes?

Q2) a) Explain pre-implantation and prenatal diagnostic methods.

[7]

b) Elucidate Rothenbuhler's bee experiment.

[5]

Q3) a) Explain genetic basis of sex determination and dosage compensation in *Drosophila*.

[7]

b) Write a note on HLA polymorphism and disease association.

[5]

Q4) a) Explain biochemistry and psychopathology of Alzheimer's disease.

[7]

b) Write a note on tumor suppressor genes.

[5]

P.T.O.

- Q5)** a) Describe molecular switch determining lytic or lysogenic switch in bacteriophage lambda. [7]
b) Explain in details restriction maps. [5]
- Q6)** a) Describe genetics of circadian rhythm. [7]
b) Discuss cytogenetic studies done in cancer. [5]
- Q7)** Solve any two of the following: [12]
a) What is epigenetics? Add a note on its application.
b) Explain twin and adoption study designs.
c) Write a note on nucleic acid features of T7 phage.



Total No. of Questions : 7]

SEAT No. :

PE-5357

[Total No. of Pages : 2

[6513]-404

S.Y. M.Sc.

ZOOLOGY

**ZOUT-242 : Mammalian Reproductive Physiology &
Aquaculture**

(2019 Pattern) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) **Question No. 1 is compulsory.**
- 2) **Solve any five questions from Q.No. 2 to Q.No.7.**
- 3) **Questions 2 to 7 carry equal marks.**

Q1) Solve any five of the following: [10]

- a) Define Aquaculture.
- b) What is meant by tubectomy?
- c) Name major fungal diseases in fishes.
- d) What is meant by 'Suckling Reflex'?
- e) Define Menopause.
- f) What is monoculture?

Q2) a) What is fish preservation? Explain various methods of fish preservation in fishery technology. [7]

b) Describe various methods of contraceptions in female. [5]

Q3) a) Describe male reproductive system. [7]

b) Describe role of environmental factors on breeding. [5]

Q4) a) Describe phases of menstrual cycle. [7]

b) Describe the steps in the culture of fresh water prawn. [5]

Q5) a) Describe various types of diseases of fish encountered during fish culture. [7]

b) Discuss gamete transportation in the process of fertilization. [5]

P.T.O.

- Q6)** a) Describe artificial control of reproduction with reference to in-vitro fertilization and embryo transfer. [7]
b) Write advantages of induced breeding. [5]
- Q7)** Write short notes on any two of the following: [12]
a) Nutritional value of fish
b) Puberty
c) Integrated fish farming



Total No. of Questions : 5]

SEAT No. :

PE-5358

[Total No. of Pages : 2

[6513]-405

S.Y. M.Sc.

ZOOLOGY

**ZODT-243 : Histology and Histochemistry
(2019 Pattern) (Semester - IV)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Solve any three questions from Q.No.2 to Q.No.5.*
- 3) *Q.No.2 to Q.No.5 carry equal marks.*

Q1) Solve any five of the following: **[5]**

- a) Define Histology.
- b) Define connective tissue.
- c) Write the function of ultramicrotome.
- d) Define embedding.
- e) Write different types of fixatives.
- f) What is mordant.

Q2) Answer the following questions:

- a) Write about the principle, design and functioning of automated microtome. **[6]**
- b) Describe the histochemical localization of DNA. **[4]**

Q3) Answer the following questions:

- a) Write different applications and histochemical methods for detection of various types of carcinoma. **[6]**
- b) Describe the problems and trouble shooting of different tools used in histology. **[4]**

P.T.O.

Q4) Answer the following questions:

- a) Write the principle and mechanism for identification of total problems.[6]
- b) Write about the histochemical localization of mucopolysaccharides by DB method. [4]

Q5) Write short notes on any two of the following: [10]

- a) Principle for demonstration of lipids in various animal tissues by copper thyalocyaxin method.
- b) Mordants and Mordanting.
- c) Principle and method for identification of proteins by Bromophenol Blue method.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

PE-5359

[6513]-406

S.Y. M.Sc.

ZOOLOGY

ZODT-243 : Pest Control

(2019 Pattern) (Semester - IV)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Solve any three questions from Q.No.2 to Q.No.5.*
- 3) *Q.No.2 to Q.No.5 carry equal marks.*

Q1) Solve any five of the following:

[5]

- a) Pesticide
- b) Larvicide
- c) Residual pesticide
- d) Pheromones
- e) SIT
- f) Parasitoids

Q2) a) Describe cultural method of pest control.

[6]

b) Explain the damage caused by pests.

[4]

Q3) a) Describe principles and scope of biological control.

[6]

b) Explain strategies applied to control non insect pests.

[4]

Q4) a) Describe principles and application of IPM.

[6]

b) Explain drawbacks of chemical control of pest.

[4]

P.T.O.

Q5) Solve any two of the following:

[10]

- a) Insecticide formulation and dilution
- b) Antidote
- c) Household pests and their control



Total No. of Questions : 5]

SEAT No. :

PE-5360

[Total No. of Pages : 1

[6513]-407

S.Y. M.Sc.

ZOOLOGY

ZODT-244 : Apiculture

(2019 Pattern) (Semester - IV)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Q.No.1. is compulsory.
- 2) Solve any three questions from Q.NO.2 to Q.NO.5
- 3) Questions No. 2 to 5 carry equal marks.

Q1) Solve any five of the following [5]

- a) Gloves
- b) Italian Bee
- c) Langstroth Bee Box
- d) Rock Bee
- e) Royal jelly
- f) Bee Venom

Q2) a) Explain polymorphism with examples [6]

b) Honey Extractor [4]

Q3) a) Describe products of Apiculture Industry [6]

b) Caste system in Honey bees [4]

Q4) a) Explain Bee keeping equipments with their significance [6]

b) Bee flora [4]

Q5) Solve any two of the following [10]

- a) Round dance
- b) Commercial importance of Wax
- c) Bee Enemies with examples



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

PE-5361

[6513]-408

S.Y. M.Sc.

ZOOLOGY

**ZODT-244 : Pollution Biology
(2019 Pattern) (Semester - IV)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Solve any three questions from Q.No.2 to Q.No.5.*
- 3) *Q.No.2 to Q.No.5 carry equal marks.*

Q1) Solve any five of the following:

[5]

- a) Biosphere
- b) Limnology
- c) Bioconcentration
- d) IPM
- e) Bioassay
- f) Isotope

Q2) a) Define noise pollution. Add a note on characteristics and sources of noise pollution. **[6]**

b) Explain the histological methods to study impact of pollutants on living organisms. **[4]**

Q3) a) What is pollution monitoring? Explain the strategies for water pollution monitoring. **[6]**

b) Explain the impact of pesticides on living organism. **[4]**

P.T.O.

- Q4)** a) Describe biochemical and physiological methods to study impact of pollutants on animals. **[6]**
- b) Explain assessment of environmental quality by using Zooplankton. **[4]**

Q5) Solve any two of the following: **[10]**

- a) Eutrophication : process and issues.
- b) Radioactivity and its control.
- c) Selection of test organism for bioassay.

