

Total No. of Questions : 6]

SEAT No. :

P2834

[5029]-101

[Total No. of Pages : 2

M.Sc.-I

ZOOLOGY

ZY- 101(T): Biochemistry

(2013 Pattern) (Semester-I) (3 Credit)

Time :2½Hours]

[Max. Marks : 38

Instructions to the candidates:

- 1) *Attempt any three questions from Q.No.1 to Q.No.5.*
- 2) *Question No.6 is Compulsory.*
- 3) *Figures to the right indicate full marks.*
- 4) *Draw neat labeled diagrams wherever necessary*

- Q1)** a) Classify lipids in brief. [4]
b) Give the biological significance of monosaccharides. [4]
c) What is Rickets? [2]
- Q2)** a) Explain the structure of water molecule. Add a note on properties of water. [5]
b) Explain source and functions of vitamin E. [3]
c) What is holoenzyme? [2]
- Q3)** a) Define pH? Explain the role of buffers in biological system with an example. [3]
b) Give M-M equation and derive Lineweaver-Burk equation. [3]
c) What are structural polysaccharides? Explain their structure and function with examples. [4]
- Q4)** a) Explain competitive and Non Competitive enzyme inhibition. [4]
b) Explain coenzymes with suitable examples. [4]
c) Write Henderson-Hasselbalch equation and give its importance. [2]

P.T.O.

Q5) a) What are isozymes? Explain them with suitable example. **[5]**

b) Classify enzymes with suitable examples. **[5]**

Q6) Write short note on.(Any two): **[8]**

a) Draw the structure of following polypeptide.

Ser-Ala-Lys

b) Effect of temperature on enzyme activity.

c) Allosteric enzyme.

d) Biological significance of Lipids.



Total No. of Questions : 6]

SEAT No. :

P2835

[5029]-102

[Total No. of Pages : 2

M.Sc-I

ZOOLOGY

ZY 102(T): Cell Biology

(2013 Pattern)(Semester-I)(3 Credits)

Time :2½Hours]

[Max. Marks : 38

Instructions to the candidates:

- 1) *Attempt any three questions from Q.No.1 to Q.No.5.*
- 2) *Question No.6 is Compulsory.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

- Q1)** a) Describe functions of Rough Endoplasmic reticulum. [4]
b) Lysosomes are suicide bags in cell. Explain [4]
c) Explain glycocalyx [2]
- Q2)** a) Describe fluid mosaic model of plasma membrane [5]
b) Explain cell adhesion molecules with their significance [3]
c) What are plasmodesmata. [2]
- Q3)** a) Explain the mechanism of synaptic transmission. [4]
b) Give the organic compounds of cytoplasmic matrix [3]
c) Describe β oxidation of fatty acids. [3]
- Q4)** a) Explain the different phases of cell cycle. [5]
b) Explain Nucleo-cytoplasmic interactions. [5]
- Q5)** a) Explain glyoxylate cycle & give its significance. [5]
b) Describe composition & functions of microtubules [5]

P.T.O.

Q6) Write short note on.(Any two):

[8]

- a) Intermediate filaments.
- b) Sketch & label ultrastructure of nucleus
- c) Protein import in mitochondria.
- d) Genetic system of chloroplast.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P2836

[5029] - 103

M.Sc.-I

ZOOLOGY

ZY - 103T : Genetics

(2013 Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks :25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No.1, 2 &3.*
- 2) *Question No.4 is compulsory.*
- 3) *Figures to right indicate full marks.*
- 4) *Draw neat labeled diagrams wherever necessary.*

- Q1)** a) Define Epistasis. Explain Epistatic gene interaction with reference to Duplicate gene epistasis. [4]
- b) Explain- Structural organization of Lac operon [4]
- c) Define: [2]
- i) Linkage group
 - ii) cistron
- Q2)** a) Write the characteristic features of autosomal recessive inheritance [4]
- b) "Quantitative traits are influenced by both, genes and environmental factors"-Explain. [3]
- c) Explain-classical concept of a gene. [3]
- Q3)** a) Describe the technique of somatic cell hybridization. State its applications. [5]
- b) The PTC tasting ability was checked in a population of 1000 individuals.600 individuals were tasters and remaining were non-tasters. Calculate the percentage of heterozygous tasters [3]
- c) State the assumptions and results of Hardy-Weinberg's law. [2]

P.T.O.

Q4) A corn plant known to be heterozygous at three loci is test crossed. The progeny phenotypes and numbers are as follows: [5]

a	b	c	570
+	+	+	575
+	b	c	355
a	+	+	360
a	b	+	37
+	+	c	37
+	b	+	33
a	+	c	33

Determine the sequence of genes on the chromosomes and the distance between them. Construct a genetic map for the three loci

OR

Among 600 students of a college, the following ABO blood types were obtained: [5]

A:280, B: 19, AB: 13 and O: 288. Calculate the gene frequencies of genes I^A , I^B , and i



Total No. of Questions :4]

SEAT No. :

P2837

[5029]-104

[Total No. of Pages :2

M.Sc.

ZOOLOGY

**ZY-104 (T): Biostatistics
(2013 Pattern) (Semester - I)**

Time : 1½ Hours]

[Max. Marks :25

Instructions to the candidates:

- 1) *Attempt any two questions from Q 1, Q 2, and Q 3.*
- 2) *Questions 4 is compulsory.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of calculator and statistical tables is allowed.*

Q1) a) Define the terms: Population, frequency, cumulative frequency, mode.[4]

b) Describe in brief the method of drawing pie diagram. [3]

c) Define the term bivariate data. Give one suitable example. [3]

Q2) a) The table below gives frequency distribution. Compute 17th Percentile.[4]

Class	Frequency
00-20	12
20-40	19
40-60	26
60-80	32
80-100	17
100-120	11

b) State the formula for quartile deviation, variance and coefficient of variation. [3]

c) Explain the concept of regression. State the equations of two regression lines. [3]

P.T.O.

- Q3)** a) What are different types of events? Give one example of each. [4]
- b) State the probability distribution of Poisson distribution. Also state its properties. [3]
- c) Define: Hypothesis, P-value, Type II error. [3]
- Q4)** Write short note on any one: [5]
- a) F-test for equality of two population variance.
- b) Mathematical and Classical definition of Probability.

EEE

Total No. of Questions :4]

SEAT No. :

P2838

[5029]-105

[Total No. of Pages :1

M.Sc.

ZOOLOGY

**ZY-105: Skills in Scientific Communication and Writing
(2013 Pattern - Credit System) (Semester - I)**

Time : 1½ Hours]

[Max. Marks :25

Instructions to the candidates:

- 1) Attempt any two questions from Q 1, 2, and Q 3.*
- 2) Question no 4 is compulsory.*

Q1) a) Mention the common errors that occurs in written communication. [4]

b) Explain tautology, double negative and double positive. [4]

c) Importance of key words. [2]

Q2) a) What are the objectives of a project work. [4]

b) Write a note on power point slides. [3]

c) Mention any three synonyms. [3]

Q3) a) Write a letter to editor for publishing a research paper. [4]

b) What is IMRAD format. [3]

c) Mention any two acronyms. [3]

Q4) Explain how to write 'Introduction'. [5]

OR

Write a note on different types of citations.

EEE

Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :1

P2839

[5029]-106

M.Sc. -I

ZOOLOGY

**ZY-106 T: Freshwater Zoology
(2013 Pattern) (2 Credits) (Semester - I)**

Time : 1½ Hours]

[Max. Marks :25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No. 1 to Q.No. 3.*
- 2) *Questions no. 4 is compulsory.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

Q1) a) Describe protective adaptations in rotifers. **[4]**

b) Give diagnostic features of fairy shrimps. **[3]**

c) Give adaptations of crocodiles. **[3]**

Q2) a) Describe adaptations for respiration in freshwater insects. **[5]**

b) Describe importance of pH in aquatic life. **[3]**

c) Describe oligotrophic lake. **[2]**

Q3) a) Explain lotic Habitat. **[4]**

b) Describe biological changes in river due to sewage pollution. **[3]**

c) Give importance of tadpole in life cycle of frog. **[3]**

Q4) Write short notes on (any one): **[5]**

a) Thermal stratification.

b) protective adaptations in freshwater protozoa.

EEE

Total No. of Questions :6]

SEAT No. :

[Total No. of Pages :2

P2840

[5029]-201

M.Sc. -I

ZOOLOGY

ZY-201 T: Biochemistry - II (3C)

(2013 Pattern) (Semester - II)

Time : 2½ Hours]

[Max. Marks :38

Instructions to the candidates:

- 1) *Attempt any three questions from Q.No.1, to Q.No. 5.*
- 2) *Questions No.6 is compulsory.*
- 3) *Figures to the right indicate full marks.*
- 4) *Draw neat labeled diagrams wherever necessary.*

Q1) a) Explain in brief role of enzyme in the regulation of metabolic pathways.[5]

b) Write note on entropy. [3]

c) Define catabolism and anabolism. [2]

Q2) a) Draw the gluconeogenic pathway of glucose synthesis. [4]

b) Explain the role of glycogen phosphorylase in glycogen breakdown. [4]

c) Give the significance of glycolysis. [2]

Q3) a) Explain the formation of isocitrate from citrate. [3]

b) What is oxidative phosphorylation. [3]

c) Write a note on ATP Synthase. [4]

Q4) a) Explain in detail Complex IV (cytochrome oxidase) of the mitochondrial electron transfer chain. [4]

b) Explain the conversion of glutamate in to carbamoyl phosphate. [3]

c) What is deamination? [3]

P.T.O.

Q5) a) Explain the role of cAMP in metabolic pathway. **[5]**

b) Explain ketogenesis in brief. **[5]**

Q6) Attempt any two of the following:

a) Explain the conversion of nucleoside monophosphate to nucleoside triphosphate. **[4]**

b) Explain the oxidation of odd chain fatty acids. **[4]**

c) How is uric acid formed from GMP. **[4]**

EEE

Total No. of Questions :6]

SEAT No. :

[Total No. of Pages :2

P2841

[5029]-202

M.Sc. -I

ZOOLOGY

ZY-202 (T): Molecular Biology (3C)

(2013 Pattern) (Semester - II)

Time : 2½ Hours]

[Max. Marks :38

Instructions to the candidates:

- 1) *Attempt any three questions from Q.No.1, to Q.No. 5.*
- 2) *Questions No.6 is compulsory.*
- 3) *Figures to right indicate full marks.*
- 4) *Draw neat labeled diagrams wherever necessary.*

- Q1)** a) Write a note on Watson and Crick model of DNA. [5]
- b) Explain the nucleotide excision repair. [3]
- c) What is Satellite DNA? [2]
- Q2)** a) What are the nucleosomes? Explain their role in chromatin organization. [4]
- b) What is Genetic code? Explain the phenomenon of degeneracy of genetic code. [4]
- c) What is central dogma of molecular biology? [2]
- Q3)** a) What are non-replicative transposons? [3]
- b) Explain the structure of nucleotide. [3]
- c) Write a note on activation of amino acids during translation. [4]
- Q4)** a) Explain the termination of transcription in bacteria. [4]
- b) Explain any two types of DNA Damage. [4]
- c) Define linkage number. [2]

P.T.O.

- Q5)** a) Write a note on processing of m RNA at 3' end. [5]
b) Explain the promoters of eukaryotic polymerase. [5]
- Q6)** Write notes on any two of the following:
- a) Elongation process of translation. [4]
b) Temperature melting. [4]
c) Termination of transcription in bacteria. [4]
d) Photoreactivation. [4]

EEE

Total No. of Questions :4]

SEAT No. :

P2842

[5029]-203

[Total No. of Pages :1

M.Sc.

ZOOLOGY

**ZY-203 T: Developmental Biology
(2013 Pattern) (Credit System) (Semester - II)**

Time : 1½ Hours]

[Max. Marks :25

Instructions to the candidates:

- 1) Attempt any two questions from Q.No. 1 to Q.No. 3.*
- 2) Question no. 4 is compulsory.*
- 3) Neat labelled diagrams must be drawn wherever necessary.*
- 4) Figures to the right side indicate full marks.*

- Q1)** a) Explain molecular signaling during neural induction. [4]
- b) Explain cell ageing with example. [3]
- c) Give importance of maternal macromolecules and organelles during early development. [3]
- Q2)** a) Explain acrosome reaction of sperm. [5]
- b) Explain radial cleavage with example. [3]
- c) Give the significance of oogenesis. [2]
- Q3)** a) Explain importance of chick as model organism. [4]
- b) Enumerate role of Lampbrush chromosome. [3]
- c) Explain cortical granule reaction to avoid polyspermy. [3]
- Q4)** Attempt any one of the following: [5]
- a) Comment on role of Torso morphogen gradient in pattern formation of *Drosophila*.
- b) Explain role of Hensen's node as a organizer in birds.

EEE

Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :1

P2843

[5029]-204

M.Sc.

ZOOLOGY

ZY-204 T: Endocrinology

(2013 Pattern) (Credit System) (Semester - II)

Time : 1½ Hours]

[Max. Marks :25

Instructions to the candidates:

- 1) Attempt any two questions from question no.1, 2 & 3.*
- 2) Question no. 4 is compulsory.*
- 3) Figures to the right indicate full marks.*
- 4) Draw neat and labelled diagrams wherever necessary.*

Q1) a) Explain hormonal regulation of insect metamorphosis. **[5]**

b) Explain the role of pituitary in regulating control of chromatophores. **[3]**

c) Enlist hormones involved in calcium and phosphate metabolism. **[2]**

Q2) a) What are hormone receptors? Explain plasma membrane receptors. **[4]**

b) Write a note on gastrointestinal hormones. **[3]**

c) Explain vitellogenesis in amphibians. **[3]**

Q3) a) Explain hormonal regulation of carbohydrate metabolism. **[4]**

b) Write a note on role of PRL and STH. **[3]**

c) Explain chemical messengers. **[3]**

Q4) Write short notes on any one of the following: **[5]**

a) Role of JG complex in osmoregulation.

b) Role of X & Y organs in moulting and colour change in crustaceans.

EEE

Total No. of Questions :4]

SEAT No. :

P2844

[5029]-205

[Total No. of Pages :1

M.Sc. -I

ZOOLOGY

**ZY-205 (T): Comparative Animal Physiology
(2013 Pattern) (Semester - II)**

Time : 1½ Hours]

[Max. Marks :25

Instructions to the candidates:

- 1) *Attempt any two questions from question no.1, 2 & 3.*
- 2) *Question No. 4 is compulsory.*
- 3) *Figures to the right indicate full marks.*
- 4) *Draw neat labelled diagrams wherever necessary.*

- Q1)** a) Describe the process of digestion. [4]
b) Explain the ultrastructure of motor end plate. [4]
c) Define: osmotic regulators. [2]
- Q2)** a) Explain the mechanism of thermoregulation in homeotherms. [4]
b) What is excretion? Explain comparative biochemistry of nitrogen excretion. [4]
c) Enlist the essential amino acids. [2]
- Q3)** a) Write a note on physiological and ecological significance of O₂ dissociation curve. [3]
b) Explain the principles of neural integration. [3]
c) Describe the role of calcium in muscle contraction. [4]
- Q4)** a) Discuss the role of haemoglobin in gas transport. Add a note on its chemistry. [5]

OR

- b) Write a comparative account on the distribution and specificity of digestive enzymes in animals. [5]

EEE

Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P2845

[5029]-206

M.Sc. -I

ZOOLOGY

**ZY-206 (T): Biochemical Techniques
(2013 Pattern) (2 Credits) (Semester - II)**

Time : 1½ Hours]

[Max. Marks :25

Instructions to the candidates:

- 1) *Attempt any two questions from Q. No.1, 2 & 3.*
- 2) *Question No. 4 is compulsory.*
- 3) *Figures to right indicate full marks.*
- 4) *Draw neat labeled diagrams wherever necessary.*

- Q1)** a) What is HPLC? Explain its principle and application. [4]
b) Explain Edman's degradation reaction and give its application. [3]
c) Explain the principle of atomic absorption spectrometry. [3]
- Q2)** a) Explain native PAGE. [5]
b) Explain the principle of Warburg's apparatus. [3]
c) Define isoelectric point. [2]
- Q3)** a) Explain the application of UV-Spectrophotometry. [4]
b) Explain the application of centrifugation. [3]
c) Give the application of gel filtration chromatography. [3]
- Q4)** Attempt any one: [5]
a) Explain the radiation hazards.
b) Explain any one method of DNA sequencing.

EEE

P.T.O.

Total No. of Questions :4]

P2845

[5029]-206

M.Sc. -I

ZOOLOGY

ZY-206 (T): Ichthyology

(2013 Pattern) (2Credits) (Semester - II)

Time : 1½ Hours]

[Max. Marks :25

Instructions to the candidates:

- 1) *Attempt any two questions from Q. No.1, to 3.*
- 2) *Question No. 4 is compulsory.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

- Q1)** a) Describe any one order from class osteichthyes with two examples. [4]
b) Explain role of swim bladder in fishes. [3]
c) Describe anadromous migration. [3]
- Q2)** a) Give an account of osmoregulation in fishes. [5]
b) Explain in brief seasonal changes in male gonads in fishes. [3]
c) Define chromatophores. [2]
- Q3)** a) Describe food & feeding habits of fishes. [4]
b) Discuss functions of pituitary gland in fishes. [3]
c) Differentiate the orders petromyzontia & myxinoidea. [3]
- Q4)** Write short notes on (any one): [5]
a) Lateral line system.
b) Thyroid gland.

EEE

Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :6

P2846

[5029]-301

M.Sc. -II

ZOOLOGY

**ZY-301 (T): Animal Physiology - I
(2013 Pattern) (Special Paper - 4 Credits) (Semester - III)**

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Attempt any five questions.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat labeled diagrams wherever necessary.*

Q1) a) Explain the mechanism of water & electrolyte balance in marine air breathing vertebrates. **[4]**

b) Describe in detail the role of malpighian tubules in insects. **[4]**

c) Define: Buoyancy. **[2]**

Q2) a) Describe various strategies employed for reduction in density so as to achieve neutral buoyancy. **[5]**

b) Explain the structure and composition of plasma membrane. Add a note on facilitated diffusion. **[5]**

Q3) a) What is bioluminescence? Add a note on phyletic distribution of bioluminescence. **[4]**

b) Explain various regulatory mechanisms to achieve homeostasis. **[4]**

c) Enlist any two miscellaneous and products of nitrogen metabolism. **[2]**

Q4) a) Discuss the problems of deep sea diving. **[5]**

b) What is ureotelism? Add a note on: Urea cycle. **[5]**

P.T.O.

- Q5)** a) What is animal electricity? Explain the structure of electric organ. [4]
- b) What is action potential? Add a note on role of various ion channels in generation of action potential. [4]
- c) Define: Acclimatisation. [2]
- Q6)** a) What is an aerobic metabolism? Add a note on significance of lactic acid synthesis. [4]
- b) Define internal environment. Add a note on extracellular and intracellular environment. [4]
- c) Define: Conductance. [2]
- Q7)** a) Explain organs used by various organisms for excretion. Add a note on mechanism of urine formation by vertebrate kidney. [5]
- b) Explain the energy cost of running and swimming. [5]
- Q8)** a) Write a note on acclimation to low O₂ level. [4]
- b) Explain the atmosphere and aquatic environment with reference to their physiological implications. [4]
- c) Define: Euryhaline. [2]

EEE

Total No. of Questions :8]

P2846

[5029]-301

M.Sc.-II

ZOOLOGY

ZY-301 (T): Entomology - I

(2013 Pattern) (4 Credits) (Semester - III)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Attempt any five questions.*
- 2) Figures to the right indicate full marks.*

- Q1)** a) Discuss inter-relationship of insects with other arthropods. [5]
b) Write the structure and example of geniculate antenna. [3]
c) Explain abdomen of wasp. [2]
- Q2)** a) Give the distinguishing characters of order diptera with two examples. [4]
b) Explain the characters of Hemiptera with two examples. [3]
c) Give functions of regenerative cells. [3]
- Q3)** a) Mention the distinguishing characters of Hymenoptera with two examples. [4]
b) Explain important calcicular derivatives in insects. [4]
c) Give the meaning of oligopneustic tracheal system. [2]
- Q4)** a) Explain modifications of head capsule in insects. [4]
b) Explain tegmina. [3]
c) Explain ostia in insects. [3]

- Q5)** a) Describe exocrine glands in insects. [5]
b) Sketch and label fossorial leg. [3]
c) Define endopterygota. [2]
- Q6)** a) Explain piercing and sucking tupe of month parts. [4]
b) Explain course of blood circulation in insects. [4]
c) Give the functions of cryptonephridium. [2]
- Q7)** a) Explain male reproductive system in insects. [5]
b) Explain panoistic ovariole. [5]
- Q8)** a) Explain light producing organs in insects. [5]
b) What is excretion? Explain structure and functions of malpighian tubules. [5]

EEE

Total No. of Questions :8]

P2846

[5029]-301

M.Sc.-II

ZOOLOGY

ZY-301 (T):Genetics - I

(2013 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Attempt any five questions.*
- 2) *Figures to right indicate full marks.*
- 3) *Draw neat labeled diagrams wherever necessary.*

- Q1)** a) Derive an equation for change in allelic frequency caused by migration. **[5]**
- b) Explain the terms: **[3]**
- i) Pseudogenes,
 - ii) Cladogenesis
 - iii) Synonymous substitution.
- c) Explain the advantages of Heterozygote superiority over the homozygotes with a suitable example. **[2]**
- Q2)** a) How do 'r' strategies differ from 'k' strategies. **[4]**
- b) The narrow sense heritability of wool length in a breed of sheep is 0.92, and the narrow sense heritability of body size is 0.87. The genetic correlation between wool length and body size is - 0.84. If a breeder selects for sheep with longer wool, what will be the most likely effects on wool length and body size? **[4]**
- c) Inbreeding leads to homozygosity- Explain. **[2]**
- Q3)** a) Describe In vivo gene therapy with suitable example. **[4]**
- b) Write a note on flow cytometry. **[3]**
- c) The narrow sense heritability for abdominal bristle number is 12. A male with 10 bristles is mated to a female with 20 bristle number. What is the expected number of the bristles among these progeny? **[3]**

- Q4)** a) Explain directional and stabilizing selection modes and their effects with suitable example. [4]
- b) The mean value of a trait is 100 units and the narrow sense heritability is 0.4. A male and a female measuring 124 and 126 units, respectively, mate and produce a large number of offspring, which are reared in an average environment. What is the expected value of the trait among these offspring? [4]
- c) Enlist any four fluorescent dyes along with their excitation range used in genetic analysis. [2]
- Q5)** a) Why might Mitochondrial DNA sequences accumulate substitutions at a faster rate than nuclear gene in the same organism? [4]
- b) Calculate the effective population size (N_e) for a breeding population of 02 adult males and 98 adult females. [2]
- c) What is speciation? How do sympatric speciation differ from allopatric mode of speciation. [4]
- Q6)** a) Explain in brief: Molecular Markers. [5]
- b) Explain how a phylogenetic relationship can be determined using nucleic acid sequencing. [5]
- Q7)** a) What are model organisms? Explain the life cycle of *E.coli*. State various reasons why is it used as a model organism in genetics studies. [5]
- b) How do geneticists use parsimony method of determining phylogenetic distances? [5]
- Q8)** a) Explain the role of Mu temperate bacteriophage in genetics studies. [5]
- b) 'Genetic polymorphism allows many populations to confront new environmental challenges'- Justify. [5]

EEE

Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P2847

[5029] - 302

M.Sc. (Part-II)

ZOOLOGY

**ZY - 302(T) : Immunology
(2013 Pattern) (Semester - III)**

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No.1,2 & 3.*
- 2) *Question No.4 is Compulsory.*
- 3) *Figures to the right indicate full marks.*
- 4) *Draw neat and labelled diagrams wherever necessary.*

- Q1)** a) Enlist primary and secondary lymphoid organs of human. [2]
b) Write a short note on immunological tolerance. [3]
c) Explain the principle and application of hybridoma technique. [5]

- Q2)** a) Explain the principle and procedure of immuno-diffusion and give its applications. [4]
b) Explain the clonal selection theory. [4]
c) What are the different applications of immuno-fluorescence. [2]

- Q3)** a) Explain in short the alternative cascade of complement fixation. [3]
b) Write a short note on inflammation. [3]
c) Explain the structure-function relationship of immunoglobulin. [4]

- Q4)** What is immune-deficiency? Add a note on disorders associated with immune-deficiency. [5]

OR

Explain the cellular basis of immunity. Add a note on different cells of the human immune system. [5]

✓ ✓ ✓

P.T.O

Total No. of Questions : 4]

P2847

[5029] - 302

M.Sc.- II

ZOOLOGY

**ZY-302T : Environmental Biology
(2013 Pattern- 2Credits) (Semester - III)**

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No.1 to Q.No.3.*
- 2) *Question No.4 is Compulsory.*
- 3) *Neat and labelled diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

Q1) a) Describe Impact of climate on Biodiversity. **[5]**

b) What are endemic species? **[3]**

c) Define edge effect. **[2]**

Q2) a) Describe importance of wild life conservation. **[4]**

b) Describe the role of microbes in environmental science. **[3]**

c) Discuss vital role of local communities in wild life management. **[3]**

Q3) a) Describe interrelationship between microbes and human. **[4]**

b) Comment upon India's Biogeographical history. **[4]**

c) Describe goals of wild life management. **[2]**

Q4) Write an essay on faunal biodiversity. **[5]**

OR

Explain the energy flow in ecosystem. **[5]**

✓ ✓ ✓

Total No. of Questions : 4]

SEAT No. :

P2848

[5029] - 303

[Total No. of Pages : 2

M.Sc.-II

ZOOLOGY

**ZY-303(T) : Genetic toxicology
(2013 Pattern) (Semester - III) (2 Credits)**

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No.1,2 & 3.*
- 2) *Question No.4 is Compulsory.*
- 3) *Figures to the right indicate full marks.*
- 4) *Draw neat labelled diagrams wherever necessary.*

Q1) a) What is Toxicology? Explain the significance of genetic toxicology. [4]

b) Explain the biological significance of mutagens. [3]

c) Explain the process of inversion in chromosome. [3]

Q2) a) Explain the Ames test and give its significance in genetic toxicology.[5]

b) Why is *Drosophila* used in mutation studies [3]

c) What is congenital malformation [2]

Q3) a) Explain in brief the numerical changes in chromosome [3]

b) Write a note on micronucleus test. [3]

c) What are base analogs? Explain the mechanism by which they cause mutation. [4]

Q4) Write note on any one of the following

a) Molecular methodologies used to detect mutation [5]

b) Carcinogenicity [5]

✓ ✓ ✓

P.T.O

Total No. of Questions : 4]

P2848

[5029] - 303

M.Sc.-II

ZOOLOGY

ZY-303(T) : Aquaculture

(2013 Pattern) (2 Credits) (Semester - III)

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No.1,2 & 3.*
- 2) *Question No.4 is Compulsory.*
- 3) *Figures to the right indicate full marks.*
- 4) *Draw neat labelled diagrams wherever necessary.*

- Q1)** a) Write a note on cary fish culture [4]
b) Describe fish culture in paddy fields [4]
c) What are Nursery Ponds? [2]

- Q2)** a) Describe briefly the methods of preservation and processing of fishes. [5]
b) Give the methods of packaging and transportation of fishes [3]
c) Name the non parasitic diseases found in fishes. [2]

- Q3)** a) What are the requirements for breeding fresh water prawns? [4]
b) Write a note on pearl formation [3]
c) Explain the use of Information Communication technology in fisheries.[3]

- Q4)** Describe the techniques used in mixed fish farming in India. [5]

OR

Explain the role of hard water in culture of Macrobrachium species [5]

✓ ✓ ✓

Total No. of Questions : 4]

SEAT No. :

P2849

[5029] - 304

[Total No. of Pages :1

M.Sc.-II

ZOOLOGY

**ZY - 304(T) : Insect Physiology and Biochemistry (2Credits)
(2013 Pattern) (Semester - III)**

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No. 1 to Q.No 3.*
- 2) *Question No.4 is Compulsory.*
- 3) *Neat and labelled diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

Q1) a) Describe histological structure of insect integument. **[5]**

b) Describe structure and physiology of flight muscles. **[3]**

c) What is ventilation? **[2]**

Q2) a) Describe structure and functions of fat bodies. **[4]**

b) Describe types of haemocytes. **[3]**

c) How insecticide degradation takes place in insects. **[3]**

Q3) a) What is hormone? Describe chemistry and physiology of juvenile hormone. **[4]**

b) Describe structure of malpighian tubule. **[3]**

c) Describe process of protein digestion and absorption. **[3]**

Q4) Attempt any One of the following **[5]**

a) Describe the physiology of digestion and absorption of carbohydrates and lipids in insects.

b) What is haemolymph? Describe physico-chemical characteristics of plasma.

✓ ✓ ✓

Total No. of Questions : 4]

SEAT No. :

P2850

[5029] - 305

[Total No. of Pages :1

M.Sc.-II

ZOOLOGY

**ZY - 305(T) : Research Methodology
(2013 Pattern) (Semester - III) (2Credits)**

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No.1, to Q.No.3.*
- 2) *Question No.4 is Compulsory.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

Q1) a) Mention the points of differences between qualitative and quantitative research. [4]

b) Define Biostatistics and explain the importance of students 't' test [3]

c) Give the importance of literature survey in research [3]

Q2) a) Explain the importance of Histochemistry in research. [5]

b) List out the points for the preparation of the manuscript. [3]

c) Write the applications of different databases in Bioinformatics. [2]

Q3) a) Give an account of protein microarray in research. [4]

b) Write short notes on chromatography [3]

c) What is real time PCR? [3]

Q4) a) Explain the role of Biostatistics in research with the help of examples [5]

OR

b) Discuss in detail the different types of microscopic techniques applied in research. [5]

✓ ✓ ✓

Total No. of Questions : 4]

SEAT No. :

P2851

[5029] - 306

[Total No. of Pages :1

M.Sc.-II

ZOOLOGY

**ZY - 306(T) : Parasitology (2Credits)
(2013 Pattern) (Semester - III)**

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No.1 to 3.*
- 2) *Question No.4 is Compulsory.*
- 3) *Neat and labelled diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

- Q1)** a) Describe morphology and mode of transmission of Schistosoma sps. [5]
b) Explain how parasitic effects benefits the host. [3]
c) What do you mean by conspecific transmission? [2]
- Q2)** a) Describe molecular characteristics of VSG of Trypanosoma. [4]
b) Describe chromatin diminution in Ascaris. [3]
c) What is ELISA. [3]
- Q3)** a) Describe heterospecific transmission of parasites. [4]
b) Describe parthenogenesis and polyspermy in Platyhelminthes. [3]
c) Explain surface antigen diversity of Plasmodium. [3]
- Q4)** Attempt any One of the following: [5]
a) Describe morphology and life cycle of Leishmania sps.
b) Describe various serological methods so as to demonstrate specific antigens of Entamoeba and Leishmania.

✓ ✓ ✓

Total No. of Questions : 4]

SEAT No. :

P2852

[5029] - 307

[Total No. of Pages :1

M.Sc. II

ZOOLOGY

**ZY - 307 (T) : fundamentals of Systematics
(2013 Pattern) (Semester - III)**

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No.1,2 & 3.*
- 2) *Question No.4 is Compulsory.*
- 3) *Figures to right indicate full marks.*
- 4) *Draw neat labelled diagrams wherever necessary.*

- Q1)** a) Give major differences between Chordates and nonchordates. [4]
b) What are dichotomous keys? Explain with examples [3]
c) How are various molecular markers helpful in detecting genetic polymorphism? [3]
- Q2)** a) Describe the five kingdom classification? [5]
b) Explain in detail phylogeography. [3]
c) Explain the term Cyto-taxonomy. [2]
- Q3)** a) What is hierarchical classification? Give its advantages [3]
b) Define
i) Species [3]
ii) Biological species concept
iii) Subspecies
c) Describe RAPD and RFLP and their role in systematics [4]
- Q4)** Write note on any one of the following.
a) Preservation and care of insect specimens [5]
b) Give the operative principles in International code for Zoological nomenclature [5]

✓ ✓ ✓

Total No. of Questions : 4]

SEAT No. :

P2853

[5029] - 308

[Total No. of Pages :1

M.Sc. II

ZOOLOGY

ZY - 308 T : Insect Ecology

(2013 Pattern) (Semester - III) (2Credits)

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No.1, to Q.No.3.*
- 2) *Question No.4 is Compulsory.*
- 3) *Neat and labelled diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

- Q1)** a) Describe how climatic factors regulate insect population. [5]
b) Discuss plant defence mechanism. [3]
c) What is niche? [2]
- Q2)** a) Describe how natural enemies affects on insect population. [4]
b) Discuss insect importance in cycling of nutrients. [3]
c) Discuss insect conservation measures. [3]
- Q3)** a) Discuss how insects compete with each others. [4]
b) 'Insects are beneficial to human being'. Justify the sentence. [3]
c) Describe insect defoliators. [3]
- Q4)** Write short note on any One of the following: [5]
a) Insect-human relationship.
b) Structure of plant community.

✓ ✓ ✓

Total No. of Questions : 4]

SEAT No. :

P2854

[5029] - 309

[Total No. of Pages :1

M.Sc.

ZOOLOGY

ZY - 309 : Toxicology-I (2-Credits)

(2013 Pattern) (Semester - III)

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No.1,2 & 3.*
- 2) *Question No.4 is Compulsory.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

Q1) a) Explain the mode of action of any one toxicant. **[5]**

b) What is difference between toxin & poison. **[3]**

c) Define xenobiotics. **[2]**

Q2) a) What are insecticides, describe any one insecticide and its mode of toxicity. **[4]**

b) Illustrate the mechanism of action of teratogens. **[4]**

c) Define heavy metals. **[2]**

Q3) a) Define receptors, give their chemical nature and its role in toxicity. **[4]**

b) Write a note on cytochrome P-450 species. **[4]**

c) Define bioactivation. **[2]**

Q4) Define biotransformation and describe its mechanism. **[5]**

OR

What is toxicity? Explain the acute and chronic toxicity.

✓ ✓ ✓

Total No. of Questions : 8]

SEAT No. :

P2855

[5029] - 401

[Total No. of Pages : 6

M.Sc.-II

ZOOLOGY

**ZY-401T : Animal Physiology-II (Special)
(2013 Pattern) (Semester - IV) (4Credits)**

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *Attempt any five questions.*
- 2) *Figures to the right indicates full marks.*
- 3) *Draw neat labelled diagrams wherever necessary.*

- Q1)** a) Describe cardiovascular response of exercise [5]
b) Explain the transport of CO₂. [3]
c) Define-saltatory conduction. [2]
- Q2)** a) Explain lung volume and capacities. [4]
b) Explain the structure and function of organ of corti. [4]
c) What is partial pressure. [2]
- Q3)** a) Describe the extrinsic mechanism of blood clotting. [4]
b) Explain receptor adaptation. [4]
c) Define BMR [2]
- Q4)** a) Explain the general mechanism of digestion [5]
b) Explain electrocardiography. [5]
- Q5)** a) Explain the molecular mechanism of muscle contraction [5]
b) Explain the effect of drugs on synaptic transmission. [3]
c) Define-heart sounds [2]

P.T.O.

- Q6)** a) Explain small molecule, rapid acting and large molecule, slow acting neurotransmitters. [5]
b) Explain the excitation-contraction coupling mechanism of muscle contraction. [5]
- Q7)** a) Explain the structure and function of eye. [3]
b) Explain the various factors involved in hypo. & hypertension [3]
c) Explain the role of intrinsic and extrinsic nerve plexus in regulating digestion. [4]
- Q8)** a) Describe neuronal control of respiration [5]
b) Describe the role of arteriole in distribution in cardiac output and maintenance of arterial blood pressure. [5]

✓ ✓ ✓

Total No. of Questions :8]

P2855

[5029] - 401

M.Sc.-II

ZOOLOGY

**ZY-401T : Entomology-II (Special)
(2013 Pattern) (Semester - IV)(4Credits)**

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Attempt any five questions.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat labelled diagrams wherever necessary.*

- Q1)** a) Describe the process of vitellogenesis in insects. [5]
b) Explain oviposition habits in phytophagous insects. [3]
c) Explain seminal transfer in insects. [2]
- Q2)** a) Describe oligopod larva with suitable examples. [4]
b) Sketch and label panoistic ovariole. [4]
c) Explain role of juvenile hormone. [2]
- Q3)** a) Describe any two theories of gastrulation [4]
b) Describe holometabolous development [3]
c) Explain naid. [3]
- Q4)** a) Describe development of alimentary canal in insects. [5]
b) Explain protopod phase of insect embryo [3]
c) Explain anatrepsis. [2]
- Q5)** a) Describe the process of spermatogenesis in insects. [4]
b) Explain regeneration in insects. [4]
c) What is metamorphosis? [2]

- Q6)** a) Describe cleavage and blastoderm formation in insects. [4]
b) Describe obtect pupa with examples. [4]
c) Explain amnion in insects. [2]
- Q7)** a) Describe segmentation and appendages formation in insects. [5]
b) Describe development of reproductive system in insects. [5]
- Q8)** a) What is diapause? Describe its occurrence and initiation. [5]
b) Explain Hadron's experiments with imaginal discs. [5]

✓ ✓ ✓

Total No. of Questions : 8]

P2855

[5029] - 401

M.Sc.-II

ZOOLOGY

**ZY-401T : Genetics-II (Special)
(2013 Pattern) (Semester - IV) (4 Credits)**

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *Attempt any five questions.*
- 2) *Marks are shown on right hand margin.*
- 3) *Draw neat diagrams wherever necessary.*

- Q1)** a) Explain different types of mutations in LDL receptor gene that lead to familial hypercholesterolemia. [4]
b) Explain the following terms. [4]
i) Genome imprinting
ii) Uniparental Disomy
c) Define "Induced mutation". [2]
- Q2)** a) What are disorders of carbohydrate metabolism? Explain with one suitable example. [4]
b) Explain briefly physical mapping [3]
c) Explain Regeneration of TCR diversity. [3]
- Q3)** a) Explain briefly about invasive and non-invasive method of prenatal diagnosis. [4]
b) Differentiate between oncogenes and tumour suppressor genes. [4]
c) Define sex limited traits and sex linked inheritance [2]
- Q4)** a) Explain how dosage compensation occurs in humans. [5]
b) Write a note on DNA sequence mapping. [3]
c) Define cell hybrids [2]

- Q5)** a) Explain briefly how genetics and environment influences learning and memory formation. [5]
b) Explain following briefly [3]
i) chimerism
ii) Spontaneous mutations
c) Explain any one genetic experiment for investigating animal behavior. [2]
- Q6)** a) Write a note on twin and adoption studies [5]
b) Explain regulation of gap genes and pair rule genes. [5]
- Q7)** a) Explain the genetics of human behavioural defect in schizophrenia [5]
b) Explain the following [5]
i) Tay-Sachs syndrome
ii) Fragile X syndrome
- Q8)** a) Describe the characteristics of autosomal recessive inheritance. [5]
b) Explain molecular basis of Sickle cell anemia [5]

✓ ✓ ✓

Total No. of Questions : 4]

SEAT No. :

P2856

[5029] - 402

[Total No. of Pages : 2

M.Sc.-II

ZOOLOGY

**ZY - 402(T) : Economic Zoology
(2013 Pattern) (Semester - IV) (2Credits)**

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No.1 to Q.No.3.*
- 2) *Question No.4 is Compulsory.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

- Q1)** a) What are Parasitic Protozoa? Describe the role of any two Protozoans in human welfare. [4]
b) Write short notes on Reptiles and give their uses in industry. [4]
c) Name any four model animals used in Pharmaceutical industry. [2]
- Q2)** a) Explain in brief the Sponge Culture. [4]
b) Comment on Dairy Industry giving examples. [4]
c) Enlist any two birds and give their economic importance. [2]
- Q3)** a) What are Helminths? Describe the role of any two Helminths as human parasites. [4]
b) Write a note on insects of commercial value. [3]
c) Give a brief account of Wool industry. [3]
- Q4)** Attempt any one of the following: [5]
a) Describe in detail the household insects.
b) What are nematodes? Explain the role of any two parasitic animal nematodes.

✓ ✓ ✓

P.T.O

Total No. of Questions : 4]

P2856

[5029] - 402

M.Sc. -II

ZOOLOGY

**ZY- 402T : Bacteria and Phage Genetics
(2013 Pattern) (Semester - IV) (2Credits)**

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No.1 to Q.No. 3.*
- 2) *Question No.4 is Compulsory.*
- 3) *Neat labeled diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

Q1) a) Write a note on nucleic acid structure of T2 and T4 Phage. **[4]**

b) Explain bacterial chromosome. **[4]**

c) Define conditional suppressors. **[2]**

Q2) a) Describe morphology and nucleic acid structure of Bacteriophage T7. **[4]**

b) Describe interrupted mating experiment. **[4]**

c) Define Cistron. **[2]**

Q3) a) Write a note on Bacteriophage Mu. **[4]**

b) Describe retrovirus and reverse transcriptase. **[4]**

c) Define Auxotrophs. **[2]**

Q4) Explain IS elements and mechanism of transposition. **[5]**

OR

Write the distinguishing features of T even and odd phages w.r.t. morphology, life cycle and nucleic acid structure. **[5]**

✓ ✓ ✓

Total No. of Questions :4]

SEAT No. :

P2857

[5029]-403

[Total No. of Pages : 2

M.Sc. - II

ZOOLOGY

**ZY - 403 (T) : Mammalian Reproductive Physiology
(2013 Pattern) (Semester - IV) (2 Credits)**

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from Q1 to Q3.*
- 2) *Question No.4 is compulsory.*
- 3) *Draw neat and labelled diagrams wherever necessary.*
- 4) *Figures to the right indicate full marks.*

- Q1)** a) Explain the methods of embryo transfer. [5]
b) Explain the follicular phase and cycling of non-pregnant uterus. [3]
c) What is puerperium. [2]

- Q2)** a) Explain the environmental factors affecting reproductive patterns in seasonal breeders. [4]
b) Explain surgical methods of contraception in female. [3]
c) Explain the role of ovarian hormones. [3]

- Q3)** a) Explain the process of parturition and its neuroendocrine control. [4]
b) Explain the hormonal aspect of artificial control of reproduction. [4]
c) What is suckling reflex. [2]

- Q4)** Explain in vitro fertilization in detail. [5]

OR

- Explain the types and functions of placenta. [5]



P.T.O.

Total No. of Questions : 4]

P2857

[5029]-403

M.Sc. - II

ZOOLOGY

**ZY - 403 (T) : Biodiversity Assessment
(2013 Pattern) (Semester - IV) (2 Credits)**

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) Attempt any two questions from Q1, Q2 to Q3.*
- 2) Question No.4 is compulsory.*
- 3) Neat labelled diagrams must be drawn wherever necessary.*
- 4) Figures to the right indicate full marks.*

Q1) a) Describe the characteristics features of phylum mollusca and Echinodermata, with suitable examples. **[4]**

b) Write a note on Biosphere reserve and wildlife sanctuaries with suitable examples. **[3]**

c) Discuss - Biodiversity as a natural and biological capital of Earth. **[3]**

Q2) a) Write a short note on wildlife values related to human culture. **[4]**

b) Define mass extinction. What are the factors for mass extinction. **[3]**

c) Explain three major threats to biodiversity. **[3]**

Q3) a) Explain the concept of ecodevelopment for biodiversity conservation. **[4]**

b) Write a note on project Rhino. **[3]**

c) Define threatened species, endangered species and Rare species with suitable examples. **[3]**

Q4) Describe India as a megadiversity Nation. **[5]**

OR

Describe various causes of depletion of biodiversity. Explain any two conservation methods. **[5]**



Total No. of Questions :4]

SEAT No. :

P2858

[5029]-404

[Total No. of Pages : 1

M.Sc. - II

ZOOLOGY

**ZY - 404 (T) : Histology and Histochemistry
(2013 Pattern) (Semester - IV) (2 Credits)**

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No. 1 to Q.No. 3.*
- 2) *Question No.4 is compulsory.*
- 3) *Figures to the right indicate full marks.*
- 4) *Draw neat labelled diagrams wherever necessary.*

- Q1)** a) Explain the structure and function of any two types of connective tissue. [5]
b) What is bipolar neuron? Give its structure. [3]
c) What are the constituent's of Bouin's fluid? [2]

- Q2)** a) Explain the problems encountered while sectioning using a microtome. [4]
b) Why is tissue fixation important in histology? [4]
c) What is glandular epithelium? [2]

- Q3)** a) Write a note on immunohistochemical staining. [3]
b) Why and when is xylene used in histological preparations. [3]
c) Explain the procedure of block making. [4]

- Q4)** Explain the principle and procedure of histochemical detection of basic protein. [5]

OR

How will you process tissues for histochemical detection of enzymes. [5]



Total No. of Questions :4]

SEAT No. :

P2859

[5029]-405

[Total No. of Pages : 1

M.Sc. - II

ZOOLOGY

**ZY - 405 (T) : Pollution Biology
(2013 Pattern) (Semester - IV) (2 Credits)**

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No.1 to Q.No.3.*
- 2) *Question No.4 is compulsory.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

Q1) a) Define Pesticide Pollution. Give the possible sources of Pesticide pollution. [4]

b) Comment on the sources and effects of Agricultural pollution. [4]

c) Describe the sources of Radioactive pollution. [2]

Q2) a) Describe the methods for Water pollution monitoring. [4]

b) Give the causes and consequences of Bioaccumulation. [3]

c) Describe the effects of Noise pollution. [3]

Q3) a) Define Bioassay. Give its purpose and selection criteria of test organisms. [4]

b) Write a note on Atmosphere. [3]

c) Explain the effects of Air Pollution on animals and humans. [3]

Q4) a) Give any two Biological methods for assessment of Environmental quality. [5]

OR

b) What is hazardous waste? Explain handling and management of hazardous waste. [5]



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages : 1

P2860

[5029]-406

M.Sc. - II

ZOOLOGY

ZY - 406 (T) : Apiculture

(2013 Pattern) (Semester - IV) (2 Credits)

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from Q.No.1 to 3.*
- 2) *Question No.4 is compulsory.*
- 3) *Draw neat labelled diagrams wherever necessary.*

Q1) a) Describe honey bee morphology. [5]

b) Discuss advantages of beekeeping. [3]

c) What is bee veil? [2]

Q2) a) Describe seasonal management in apiary. [5]

b) Discuss the types of honey bee species practiced in apiculture. [3]

c) Sketch and label bee box. [2]

Q3) a) Discuss bee keeping as an occupation. [4]

b) Describe protozoan diseases of honey bees. [4]

c) What is foraging? [2]

Q4) Write short notes on any one of the following:

a) Bee enemies. [5]

b) National Bee Board. [5]



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages : 1

P2861

[5029]-407

M.Sc.

ZOOLOGY

ZY - 407 (T) : Pest Control

(2013 Pattern) (Semester - IV) (2 Credits)

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) Attempt any two questions from question No. one to three.*
- 2) Question No.4 is compulsory.*
- 3) Figures to the right indicate full marks.*

- Q1)** a) Describe different types of insecticides based on mode of action. [5]
b) Describe control measures for rats and bandicoots. [3]
c) What are aerosols? [2]

- Q2)** a) Describe various cultural control measures employed in pest control. [4]
b) Explain use of pheromones in pest control. [4]
c) Define veterinary entomology. [2]

- Q3)** a) Describe structure and working mechanism of shoulder type rotary duster. [4]
b) Describe dry insecticide formulations. [3]
c) Discuss insects of medical importance. [3]

Q4) Write short notes on any one of the following:

- a) Stored grain pests. [5]
- b) Integrated pest Management. [5]



Total No. of Questions :4]

SEAT No. :

P2862

[5029]-408

[Total No. of Pages : 1

M.Sc. - II

ZOOLOGY

**ZY - 408 (T) : Toxicology - II
(2013 Pattern) (Semester - IV) (2 Credits)**

Time : 1½ Hours]

[Max. Marks : 25

Instructions to the candidates:

- 1) *Attempt any two questions from question No. one to three.*
- 2) *Question No.4 is compulsory.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

- Q1)** a) Give the various methods of excretion of toxic agents. [5]
b) Explain the term metabolomics. [3]
c) Define toxicology. [2]

- Q2)** a) Describe the metabolism of xenobiotics. [4]
b) Write a note on GI absorption of toxic compounds. [3]
c) What is IAEC? Give its objectives. [3]

- Q3)** a) Mention the role of regulatory agencies in toxicity testing. [4]
b) What are the alternatives for animal models in toxicology. [4]
c) What is GLP? [2]

- Q4)** Explain in brief detoxification mechanism of any one toxicant. [5]

OR

“Biomedical waste management is the utmost important aspect of toxicology”.
Justify. [5]

