Total No. of Questions : 7]

SEAT No. : ____

PC-3818

[Total No. of Pages : 2

[6339]-101
M.Sc.
ZOOLOGY
ZOUT-111: Biochemistry and Biochemical Techniques
(Revised 2019) (4 Credits) (Semester - I)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates :

1) ***Q.1 is compulsory.***
2) ***Solve any five questions from Q.2 to Q.7.***
3) ***Q.2 to Q.7 carry equal marks.***

Q1) **Solve Any Five of the following:** **[10]**

a) What is Radioisotope?

b) Define the term: Isomerization.

c) What is Isoelectric point?

d) What is radiation hazard?

e) Give them any two properties of water.

f) What is sanger's reagent? Explain it's uses.

Q2) a) What are allosteric enzyme? Explain their co-operative behaviour. **[7]**

b) Write a note on partition chromatography with suitable example. **[5]**

Q3) a) What is lipid? Add a note on classification of lipid. **[7]**

b) State Beer-Lambert law. Differentiate between calorimeter and spectrophotometer. **[5]**

Q4) a) Explain the methods of DNA sequencing. **[7]**

b) Proteins are most important biomolecules, justify. **[5]**

P.T.O.

Q5) a) Explain the effect of different parameters on enzymes catalysed reaction. **[7]**

b) Discuss in details chemicals and physicals properties of carbohydrates. **[5]**

Q6) a) What are the types of Electrophoresis? Explain any one details. **[7]**

b) Describe the structure of water molecules. **[5]**

Q7) **Write short notes on Any Two of the followings:** **[12]**

a) Ion exchange chromatography.

b) Factors affecting on enzyme activity.

c) GM Counter.

Total No. of Questions : 7]

SEAT No. :

PC3819

[Total No. of Pages : 2

[6339]-102
First Year M.Sc.
ZOOLOGY
ZOUT- 112 : Cell Biology and Developmental Biology
(Revised 2019 Pattern) (Semester - I) (4 Credits)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Q.2 to Q.7 carry equal marks.***
3) ***Solve any five questions from Q.2 to Q.7.***

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

a) Facilitated diffusion.

b) Tight junction.

c) Autophagy.

d) Superficial cleavage.

e) Neural competence.

f) Microlecithal egg.

Q2) a) Explain acrosomal reaction of sperm during fertilization in seaurchin. **[7]**

b) Explain cyclins & cyclin dependent kinases in short. **[5]**

Q3) a) Explain the role of RER & GC in glycosylation of proteins. **[7]**

b) Explain the role of Hensen's node in birds as a organizer. **[5]**

P.T.O.

Q4) a) Explain the importance of Drosophila as the best model for genetic analysis. Add a note on its demerits. **[7]**

b) Explain cell adhesion molecules with their significance **[5]**

Q5) a) Explain the role of lysosomes in intracellular & extracellular digestion. **[7]**

b) Explain how pattern formation takes place during early development. **[5]**

Q6) a) Explain fluid mosaic model of plasma membrane & discuss how lipids maintain fluidity of membrane. **[7]**

b) Explain the mechanism of protein trafficking. **[5]**

Q7) Attempt any two of the following.

a) Differentiate between spermatogenesis & oogenesis add a not on growth phase of oocyte. **[6]**

b) Explain nucleo. cytoplasmic interactions. **[6]**

c) Explain the structure & function of SER (smooth endoplamic reticulum). **[6]**

* * *

Total No. of Questions : 7]

SEAT No. :

PC3820

[Total No. of Pages : 2

[6339]-103

M.Sc. - I

ZOOLOGY

ZOUT-113 : Genetics and English for Scientific Communications

(Revised 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 question 2 to question 7.***
3) ***Questions 2 to 7 carry equal marks.***

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

a) Linkage group

b) Multiple Alleles

c) Conjugation

d) Antonyms

e) Plagiarism

f) Tautology

Q2) a) Discuss the concept of gene intractions. Add a note on recessive epistasis. **[7]**

b) Write a note on proof reading symbols in scientific writting. **[5]**

Q3) a) Discuss the significance of material and methods in paper. Add a note on publication ethics. **[7]**

b) Write a note on Mitochondrial inheritance with example. **[5]**

P.T.O.

Q4) a) What is somatic cell fusion. Add a note on hybridoma technique and its applications. **[7]**

b) Describe the draft of research project. Enlist the funding agencies in India. **[5]**

Q5) a) Discuss the outline of scientific research paper. Add a note on plagiarism. **[7]**

b) In a given population the following allelic frequencies were recorded. Calculate the possible genotype frequencies. **[5]**

$I^A = 0.30$ $I^B = 0.30$ $I^O = 0.40$

Q6) a) The following numbers were obtained form test cross progencies in *Drosophila*. Constrct a genetic map. **[7]**

i) + m + – 218

ii) w + f – 236

iii) + + f – 168

iv) w m + – 178

v) + m f – 95

vi) w + + – 101

vii) + + + – 03

viii) w m f – $\frac{01}{1000}$

b) Write a note on language as communication tool. **[5]**

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

a) Law of dominance

b) Quantitative traits

c) Hypothesis

Total No. of Questions : 5]

SEAT No. : ____

PC3821

[Total No. of Pages : 3

[6339]-104

M.Sc. - I

ZOOLOGY

ZODT-114(1) : Biostatistics

(Revised 2019 Pattern) (Semester - I) (2 Credits)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

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

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

a) Define : Population and sample.

b) Define : Class-frequency, cumulative frequency.

c) Define : Bivariate data.

d) State absolute and relative measures of dispersion.

e) Define : Null hypothesis.

f) Define : Level of significance.

g) Define : Critical region.

Q2) a) The following is the frequency distribution of number of persons according to their diastolic blood-pressure (mmHg).

Blood-pressure	65-70	70-75	75-80	80-85	85-90	90-95
No. of persons	12	27	30	45	20	10

Draw 'less-than' ogive curve for the above data and hence obtain median graphically. **[6]**

b) Describe scatter diagram. How it is useful to show different types of correlation. **[4]**

P.T.O.

Q3) a) Theory predicts that the proportion of beans in 3 groups A, B and C should be in the ratio 1 : 2 : 3. In an experiment on 300 beans the frequencies in the 3 groups were found to be 45, 105 and 150 respectively. Does the experiment supports the theory. Use 5% level of significance. **[6]**

b) Explain with illustrations : **[4]**

Type-I error and Type - II error

Q4) a) State probability density function of normal distribution. State its any four properties. **[6]**

If $X \rightarrow N(100, 16)$ then obtain $P(X \leq 100)$, $P(X \geq 100)$

b) The average number of post-operation infected patients per month in a hospital is 3. Find the probability that in a randomly selected month there will be **[4]**

i) no infected patient

ii) at most 2 infected patient

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

a) Chi-square test of goodness of fit.

b) Large sample test for equality of two population means.

c) What is meant by regression. State the two equations of line of regression. How many regression coefficients are there. State properties of them.

Total No. of Questions : 5]

PC3821

[6339]-104

M.Sc. - I

ZOOLOGY

ZODT-114(2) : Fresh Water Zoology

(Revised 2019 Pattern) (Semester - I) (2 Credits)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Solve any 3 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) Lotic habitat.
b) Mastax in Rotifers.
c) Explain Buoyancy.
d) Oilgotrophic lake.
e) Protective adaptations in Mollusca.
f) Features of fairy shrimps.

Q2) a) Describe adaptations for respiration in insects. **[6]**

b) Biological changes in rivers due to sewage pollution. **[4]**

Q3) a) Describe respiratory adaptations in fresh water insects. **[6]**

b) Give importance of dissolved oxygen in aquatic life. **[4]**

Q4) a) Physiological adaptations of fresh water fishes. **[6]**

b) Describe importance of light in fresh water. **[4]**

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

a) Give protective adaptations of protozoa.
b) Describe protective adaptations in Rotifers.
c) Explain succession of Lakes.

Total No. of Questions :7]

SEAT No. : ____

PC3822

[Total No. of Pages :2

[6339]-201

First Year M.Sc.

ZOOLOGY

ZOUT-121: Molecular Biology & Bioinformatics

(Revised 2019 Pattern) (Semester- II) (4 Credits)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

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

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

a) Explain Temperature melting of DNA.

b) Explain ribosome structure.

c) What are NCBI and EBI web resources?

d) What are ribonucleoproteins?

e) What is the role of helicase in DNA replication?

f) Define SOS repair.

Q2) a) Define replication and explain process of termination of replication in prokaryotes. **[7]**

b) What is pharmacogenomics? Explain the process of drug development. **[5]**

Q3) a) Explain mechanism of prokaryotic gene transcription . **[7]**

b) Describe A type DNA and B type DNA. **[5]**

P.T.O.

Q4) a) Classify and explain major type of databases and mention example of each database. **[7]**

b) Explain post-translational modifications. **[5]**

Q5) a) Describe the types of transposable elements and explain significance of transposable element in biology. **[7]**

b) Describe the blast algorithm. **[5]**

Q6) a) Explain regulation of Trp operon. **[7]**

b) Explain cot ½ and give its importance. **[5]**

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

a) Double strand break repair.

b) Maturation of Okazaki fragments.

c) Applications of Bioinformatics.

Total No. of Questions : 7]

SEAT No. : [ ]

PC3823

[Total No. of Pages : 2

[6339]-202
First Year M.Sc.
ZOOLOGY
ZOUT-122: Endocrinology and Parasitology
(Revised 2019 Pattern) (Semester - II) (4 Credits)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Question No.1 is compulsory.***
2) ***Solve any five questions from Q.2 to Q.7.***
3) ***Figures to the right indicate full marks.***

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

a) Define moulting.

b) Enlist gastrointestinal hormones.

c) Give the concept of biological timing system.

d) Define the term parasitoidal.

e) What is parthenogenesis.

f) Genetic control of parasites.

Q2) a) Describe hormonal receptors in cytoplasm. **[7]**

b) Write a note on types of transmission. **[5]**

Q3) a) Explain life cycle and Transmission of Schistosoma sps. **[7]**

b) Describe mechanism & hormone action related to steroid hormones. **[5]**

Q4) a) Describe adenohypophysial hormones. **[7]**

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

P.T.O.

Q5) a) Describe circumsporozoite protein and merozoites s-antigen of Plasmodium. **[7]**

b) Write a note on role of hormones in control of calcium metabolism. **[5]**

Q6) a) Describe hormonal regulation of protein metabolism. **[7]**

b) Explain preparation and demonstration of specific antigens of Leishmania. **[5]**

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

a) Circadian rhythm.

b) Immunodiffusion.

c) Control of chromatophores.

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Total No. of Questions : 7]

SEAT No. :

PC3824

[Total No. of Pages : 2

[6339]-203

M.Sc. - I

ZOOLOGY

ZOUT-123 : Comparative Animal Physiology and Environmental Biology

(Revised 2019 Pattern) (Semester-II) (4 Credits)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

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

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

a) Tonicity

b) Neural integration

c) Sarcoplasmic reticulum

d) Population

e) Endanged species

f) Enlist any two microbes associated with Human.

Q2) a) Describe the role of calcium in muscle contraction. **[7]**

b) Write a note on energy flow in ecosystem. **[5]**

Q3) a) Explain the methods of wildlife conservation in detail. **[7]**

b) Justify the compensatory patterns in Poikilotherms. **[5]**

P.T.O.

Q4) a) Discuss the mechanism of photoreception in vertebrate photoreceptors. **[7]**

b) Write a note on biodiversity hotspots of India. **[5]**

Q5) a) Define 'Biodiversity'? Add a note on Forest Fauna of India. **[7]**

b) Explain osmoregulatory mechanism of Hyperosmotic regulators. **[5]**

Q6) a) Discuss the process of urine formation in mammalian kidney. **[7]**

b) Justify the impact of climate on biodiversity. **[5]**

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

a) Community Ecology

b) Red Data Book

c) Protein digestion

Total No. of Questions : 5]

SEAT No. : ____

PC3825

[Total No. of Pages : 4

[6339]-204

First Year M.Sc.

ZOOLOGY

ZODT 124 : Ichthyology

(2019 Revised Pattern) (Semester - II) (Credits - 2)

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) ***Question 2 & 5 carry equal marks.***

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

a) Taste buds in fishes. Explain.

b) Enlist any 2 accessory respiratory organs.

c) Explain fish body form.

d) Define Stenohaline fishes.

e) Give the name of any two varieties of Exotic Ornamental Fishes.

f) Explain Ctenoid Scale.

Q2) a) What is Digestion? Describe anatomical modification in digestive system of fishes. **[6]**

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

Q3) a) Give diagnostic characteristics of class Elasmobrancii. **[6]**

b) "Majority of Eusturine fishes are euryhaline" Justify. **[4]**

P.T.O.

Q4) a) Discuss the gonads and spawning in fishes. **[6]**

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

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

a) Setting-up and maintenance of freshwater aquarium.

b) Explain structure and function of pituitary gland in fishes.

c) Gills in fishes.

Total No. of Questions : 5]

PC3825

[6339]-204

First Year M.Sc.

ZOOLOGY

ZODT 124 : Metabolic Pathways

(2019 Revised Pattern) (Semester - II) (Credits - 2)

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.***

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

a) Explain the concept of entropy.

b) Describe the function of PDH complex.

c) What is lipid metabolism?

d) Define gluconeogenesis.

e) State the second law of thermodynamics.

f) Define transamination.

Q2) a) Describe the process of glycolysis. **[6]**

b) Describe oxidative deamination. **[4]**

Q3) a) Describe ketogenesis and mention its impact on human health. **[6]**

b) Inborn error of metabolism - Maple syrup urine. **[4]**

Q4) a) Discuss oxidative phosphorylation. **[6]**

b) Regulation and significance of citric acid cycle. **[4]**

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

a) Describe denovo synthesis of pyrimidine.

b) Regulation of metabolic pathways.

c) Give the structure of ATP and state its function in metabolism.

Total No. of Questions : 7]

SEAT No. :

PC-3826

[Total No. of Pages : 6

[6339]-301
M.Sc. - II
ZOOLOGY
ZOUT - 231 : Animal Physiology - I
(2019 Pattern) (4 Credits) (Semester - III)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates :

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

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

a) What is Bohr effect?

b) What is Goldman Hodkin Katz Potential.

c) Write the functions of liver.

d) Differentiate between Inspiration and Expiration.

e) What is twitch summation and tetanus.

f) Define Circadian Rhythm.

Q2) **Answer the following questions.**

a) Explain the biochemical and molecular mechanism of Bioluminescence. **[7]**

b) Draw neat and well labelled diagram of Internal structure of skeletal muscle. **[5]**

Q3) **Answer the following questions.**

a) Describe in detail the gaseous exchange across the pulmonary and systemic capillaries. **[7]**

b) Describe the structure and functions of electroorgans. **[5]**

P.T.O.

Q4) **Answer the following questions.**

a) With the help of examples explain buoyancy with swim bladder. **[7]**

b) Describe the structure and functions of liver. **[5]**

Q5) **Answer the following questions.**

a) Describe the digestion of nutrients in intestine. **[7]**

b) Explain extracellular and intracellular environment. **.[5]**

Q6) **Answer the following questions.**

a) Describe the regulation of any two biological clocks. **[7]**

b) Discuss the phenomenon of resting membrane potential. **[5]**

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

a) Lung volume and capacities.

b) Chemical Basis of muscle contraction.

c) Role of various ion channels.

▽▽▽▽

Total No. of Questions : 7]

PC-3826

[6339]-301
M.Sc. - II
ZOOLOGY
ZOUT 231 : Entomology - I
(2019 Pattern) (4 Credits) (Semester - III) (Special)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates :

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

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

a) Describe geniculate antenna with example.

b) Define Exopterygota.

c) Describe elytra of insect.

d) Explain saltatorial leg with example.

e) Explain the functions of tympanum.

f) Define multipolar neuron.

Q2) a) Describe the sensory appendages of a typical insect head. **[7]**

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

Q3) a) Explain in brief the evolution of insect. **[7]**

b) Describe the functions of insect integument with examples. **[5]**

Q4) a) Explain the tracheal system of insect with diagram. **[7]**

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

P.T.O.

Q5) a) Give the morphological characters of order Orthoptera with examples. **[7]**

b) Describe the malpighian tubules, their function and types in insects. **[5]**

Q6) a) Mention the distinguishing characters of Lepidoptera with examples. **[7]**

b) Describe insect haemocytes their types and functions. **[5]**

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

a) Endocrine glands, their types and functions.

b) Explain stridulation type of sound production in insects.

c) Manipulate type of mouthparts in insects.

▽▽▽▽

Total No. of Questions : 7]

PC-3826

[6339]-301
M.Sc. - II
ZOOLOGY
ZOUT - 231 : Genetics - I
(2019 Pattern) (4 Credits) (Semester - III) (Special)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates :

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

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

a) Enlist applications of Hardy Weinberg law.

b) Mention Life cycle stages of Caenorhabditis elegans.

c) What is Co-variance?

d) Mention the role of FDA in genetic toxicology study.

e) What is Sympatric speciation?

f) Enlist the examples of Gene delivery systems.

Q2) a) What is the need to study quantitative genetics in a population? **[7]**

b) Explain the life cycle and genetic nomenclature of Saccharomyces Cerevisiae. **[5]**

Q3) a) Explain the role of inbreeding in a population. **[7]**

b) Describe screening test for bacterial and yeast system. **[5]**

Q4) a) Elaborate the ethical issues related to gene therapy and write a note on its current research status. **[7]**

b) Explain heritability and its type along with its applications. **[5]**

P.T.O.

Q5) a) Explain Neutral theory of Mutation. **[7]**

b) Describe VNTRs and RFLPs. **[5]**

Q6) a) Explain genetic drift. How it affects the Genotype and allele frequencies in a small population? **[7]**

b) Describe the modern concepts of speciation. **[5]**

Q7) Write short notes on any <u>two</u> of the following : **[12]**

a) Assortative mating.

b) Mutation.

c) Paralogous gene and orthologous gene.

▽▽▽▽

Total No. of Questions : 7]

SEAT No. :

PC3827

[Total No. of Pages : 2

[6339]-302
S.Y.M.Sc.
ZOOLOGY
ZOUT - 232 : Fundamentals of Systematics and Economic Zoology
(2019 Revised 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) Define 'Taxa'.

b) Give two examples of Household insect pest.

c) What is vermiculture?

d) Define parapatric species.

e) Give two examples of model animal used in pharmaceutical industry.

f) State 'Principle of priority" with respect to Zoological nomenclature.

Q2) a) Describe RAPD techniques and add note on its applications. **[7]**

b) Discuss economic importance of vermitechnology. **[5]**

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

b) Write merits and demerits of 'taxomic key'. **[5]**

Q4) a) Define species. Enlist types of species. **[7]**

b) Describe methods of preservation in taxonomy. **[5]**

P.T.O.

Q5) a) Write economic importance of prawn culture. **[7]**

b) Discuss important rules of zoological nomenclature. **[5]**

Q6) a) Describe economic importance of household insect pest and storegrain pest. **[7]**

b) Write short note on 'Biological Classification'. **[5]**

Q7) Write short note on any two of the following. **[12]**

a) Numerical Taxonomy.

b) Wool industry.

c) Economic importance of Reptiles.

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Total No. of Questions : 7]

SEAT No. :

PC3828

[Total No. of Pages : 2

[6339]-303

M.Sc. - II

ZOOLOGY

ZOUT-233 : Research Methodology and Insect Physiology and Biochemistry

(2019 Revised 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 question 2 to question 7.***
3) ***Questions 2 to 7 carry equal marks.***

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

a) State any two functions of fat body in Insects.

b) What are microsomal oxidases?

c) What is Sclerotization?

d) What is ISSN number?

e) Define 'Plagiarism'.

f) What do you mean by 'Intellectual property Rights'?

Q2) a) Describe the procedure of NMR. Add a note on its applications. **[7]**

b) Discuss the functions of Integument. **[5]**

Q3) a) Give an account of types of Hemocytes in Insects. **[7]**

b) Write an essay on: 'Procedure of Patenting'. **[5]**

P.T.O.

Q4) a) Elaborate on steps in scientific research. **[7]**

b) Explain ventilatory mechanisms in aquatic insects. **[5]**

Q5) a) Explain the mechanism of muscle contraction with regard to flight muscles of insects. **[7]**

b) Explain how to write 'Results and discussion' in research paper manuscript? **[5]**

Q6) a) Describe in detail Endocrine system of insects. **[7]**

b) Explain briefly 'Methods of data collection' in research. **[5]**

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

a) Structure and function of Malpighian Tubules.

b) Database and its applications.

c) Detoxification of Insecticides within microsomes.

Total No. of Questions : 5]

SEAT No. : ____

PC3829

[Total No. of Pages : 2

[6339]-304

S.Y. M.Sc.

ZOOLOGY

ZODT-234 : Immunology

(2019 Revised 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) What is Polyclonal Antibody?
b) What do you mean by "Complement Fixation Test"?
c) Define the term Hypersensitivity.
d) What are "Human Leukocyte Antigens (HLA)"? What is their Role?
e) Enlist any three examples of : Immunodeficiency disorders.
f) What is Live attenuated vaccine? Give 2 examples of it.

Q2) a) Give an account of the procedure and Applications of Hybridoma technology. **[6]**

b) Explain the concept of Autoimmunity. Add a note on its medical importance. **[4]**

Q3) a) Write an essay on Antibody structure and antibody classes. **[6]**

b) Elaborate on the concept of Hypersensitivity and its types. **[4]**

Q4) a) What is ELISA? Elaborate on the principle and Applications of ELISA Technique. **[6]**

b) Write a short note on : Immunological Memory. **[4]**

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

a) Secondary Lymphoid organs.
b) Clonal selection Theory of Antibody Production.
c) Major Histocompatibility complex (MHC).

P.T.O.

Total No. of Questions : 5]

PC3829

[6339]-304
S.Y. M.Sc.
ZOOLOGY
ZODT-234 : Genetic Toxicology
(2019 Revised 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) Non-sense mutation
c) Carcinogen
d) Anuploidy
e) Mutation frequency
f) Neoplasm

Q2) a) Describe ANY TWO mammalian cytogenetic tests. **[6]**

b) Describe genotype of Salmonella typhimurium TA98 used in Ames test. **[4]**

Q3) a) Discuss role of genetic toxicology in congenital malformation detection. **[6]**

b) Describe yeast test system. **[4]**

Q4) a) Justify the following statement: "Cancer is a multimutational disease". **[6]**

b) Discuss Base analogs as Mutagenic agent. **[4]**

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

a) Discuss various molecular methods to detect mutations.
b) Discuss use of Dominant lethal test in *Drosophila* for genotoxin screening.
c) Describe application of genetic toxicology in human and environmental monitoring.

Total No. of Questions : 7]

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M.Sc. - II

ZOOLOGY

ZOUT-241 : Animal Physiology - II (Special)

(Revised 2019 Pattern) (Semester- IV) (4 Credits)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any Five questions from Q.2 to Q.7.***
3) ***Questions 2 to 7 carries equal marks.***

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

a) Define Saltatory conduction.

b) What is BMR?

c) Explain the role of Angiotensin - II.

d) What is HPA axis?

e) Define - Heart Sound.

f) Explain hematocrit.

Q2) a) Define acclimation. Discuss the problems of deep sea diving. **[7]**

b) 'Glycogen is a energy storage molecule'- Explain. **[5]**

Q3) a) Explain the structure of eye. Add a note on physiology of vision. **[7]**

b) 'Arterioles are known as resistance vessels' - Justify. **[5]**

Q4) a) What is high altitude sickness? Discuss various physiological strategies used to cope up with effects of high altitude? **[7]**

b) Explain the impact of drugs & diseases on synaptic transmission. **[5]**

P.T.O.

Q5) a) Define cardiac cycle. Explain the events of cardiac cycle. **[7]**

b) Explain energy cost of running & swimming. **[5]**

Q6) a) Define osmoregulation. Explain the structure of vertebrate kedney. **[7]**

b) Explain electrocardiography & give it's applications. **[5]**

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

a) Intrinsic pathway of blood clotting.

b) Hypertension

c) Explain the structure of taste bud & give its function.

Total No. of Questions : 7]

PC3830

[6339]-401

M.Sc. - II

ZOOLOGY

ZOUT-241 : Entomology - II (Special)

(Revised 2019 Pattern) (Semester- IV) (4 Credits)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any Five questions from Q.2 to Q.7.***
3) ***Questions 2 to 7 carry equal marks.***

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

a) Explain campodeiform larva with suitable example.

b) Define blastokinesis.

c) Explain eclosion in insects.

d) Explain oviposition habits in phytophagous insects.

e) Explain ovoviviparity with example.

f) Define aging.

Q2) a) What is spermatogenesis? Describe the process of spermatogenesis in insects. **[7]**

b) Explain attraction of gametes during fertilization. **[5]**

Q3) a) Describe development of insects up to germ band formation. **[7]**

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

Q4) a) Describe segmentation and appendages formation in insects. **[7]**

b) Describe embryonic development of alimentary canal in insects. **[5]**

Q5) a) What is diapause? Describe its occurrence and initiation. **[7]**

b) Explain paurometabolous development. **[5]**

Q6) a) What is gastrulation? Explain the general process of gastrulation in insects. **[7]**

b) Describe hormonal control of metamorphosis in insect. **[5]**

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

a) Exarate pupa with suitable examples.

b) Polyembryony.

c) Hadorn's experiments with imaginal discs.

Total No. of Questions : 7]

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M.Sc. - II

ZOOLOGY

ZOUT-241 : Genetics - II (Special)

(Revised 2019 Pattern) (Semester- IV) (4 Credits)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any Five questions from Q.2 to Q.7.***
3) ***Questions 2 to 7 carry equal marks.***

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

a) What is mean by MIM number? Enlist its applications.

b) What is co-dominance? How does it affect the phenotypes of the heterozygotes?

c) Outline important factors used in pedigree analysis.

d) Distinguish between monozygotic twins and dizygotic twins.

e) What is the role of spontaneous mutations in basic pedigree pattern?

f) Mention examples of lipid metabolism disorders.

Q2) a) What is genetic basis of sex determination in Drosophila? Explain the mechanism of dosage compensation in human being. **[7]**

b) How does genetics plays role in causing Huntington's disease? **[5]**

Q3) a) Elucidate all the mutational events that lead to development of oncogenes from protooncogenes. **[7]**

b) Write a note on Autosomal inheritance and sex-linked inheritance. **[5]**

Q4) a) Importance of Twin and adoptation studies in determining the "Nature and Nurture" factor. **[7]**

b) Explain the non-invasive methods of Prenatal and Pre-implantation diagnosis. **[5]**

Q5) a) What is meant by Hematopoietic systems? Describe the disorders of hematopoietic systems. **[7]**

b) Elucidate the relation between Epigenetics and cancer. **[5]**

Q6) a) Describe the morphology and life cycle of lambda phage. **[7]**

b) Distinguish between Parametric and Non-Parametric analysis. **[5]**

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

a) Role of genes in Biological cycles.

b) STS mapping.

c) HLA and disease association.

Total No. of Questions : 7]

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M.Sc. (Part-II)

ZOOLOGY

ZOUT-242: Mammalian Reproductive Physiology and Aquaculture (Revised 2019 Pattern) (Semester - IV) (4 Credits)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

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

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

a) What is Ferguson reflex?

b) What is Puerperium?

c) What is meant by Vasectomy?

d) Give the scientific name of Giant freshwater Prawn and its culturable characters.

e) What is the role of anesthetic drugs in live fish transport?

f) Which are the major nutritional contents in fish?

Q2) a) Describe the various events and stages of parturition. **[7]**

b) Give the application of Information Communication Technology (ICT) in Production and marketing in fisheries. **[5]**

Q3) a) Discuss the role of various physico-chemical parameters of water for fish culture. **[7]**

b) State the causes of mortality in transport of fish seed and brood fish. **[5]**

Q4) a) Describe the successive phases in Menstrual cycle. **[7]**

b) Explain the process of natural breeding of fish in pond water. **[5]**

P.T.O.

Q5) a) Give an account of various diseases of fish encountered during fish culture. **[7]**

b) Discuss the anatomical structure of mammary gland. **[5]**

Q6) a) Describe the various Assisted Reproductive Technologies as techniques to increase reproductive potential. **[7]**

b) Mention the various aquatic weeds and suggest measures for their control. **[5]**

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

a) Ageing and Reproduction.

b) Artificial feeding in fish culture.

c) Cage Culture.

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Total No. of Questions : 5]

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M.Sc. (Part - II)

ZOOLOGY

ZODT - 243 : Histology and Histochemistry

(Revised 2019 Pattern) (Semester - IV) (2 Credits)

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.***

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

a) What is dehydration?

b) Define Histochemistry.

c) Name any two lipid groups stained by Sudan Black - B.

d) What is whole mount?

e) What purpose microtome is used for?

f) What is PAS?

Q2) a) Describe feulgen reaction and its significance. **[6]**

b) Add a note on : Histochemical localization of mucopolysaccharides. **[4]**

Q3) a) Give an account of principle and design of microtome. **[6]**

b) Give an outline of histochemical classification of lipids. **[4]**

Q4) a) Describe Bromophenol blue method for proteins. **[6]**

b) Add a note on : 'Dye - binding group' and 'mordants'. **[4]**

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

a) Discuss the importance of Enzyme Histochemistry.

b) Explain the aim, objectives and principle of fixatives.

c) Describe 'Pyronine method' for nucleic acids.

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P.T.O.

Total No. of Questions : 5]

PC3832

[6339]-403
M.Sc. (Part - II)
ZOOLOGY
ZODT - 243 : Pest Control
(Revised 2019 Pattern) (Semester - IV) (2 Credits)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Attempt any three questions from Q2 to Q5.***
3) ***Q2 & Q5 carry equal marks.***

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

a) What are repellants?

b) What are parasitoids?

c) What are sprayers?

d) Define fumingant

e) What is active ingradient in pesticide?

f) Define pesticide

Q2) a) Describe non insect pest and their control. **[6]**

b) Write a note on stored grain pests and their control. **[4]**

Q3) a) Explain principle and methods of mechanical control of pests. **[6]**

b) Write a note on principle of scope of biological control. **[4]**

Q4) a) Discuss drawbacks of chemical control of pest. **[6]**

b) Write a note on male sterile theory. **[4]**

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

a) Hazards of pesticides.

b) Household pests.

c) IPM

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Total No. of Questions : 5]

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M.Sc. - II

ZOOLOGY

ZODT 244 : Pollution Biology

(Revised 2019 Pattern) (Semester - IV) (2 Credits)

Time :2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

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

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

a) What is lithosphere?

b) Enlist types of radioactive pollution.

c) Define Bioassay.

d) Define hydrosphere.

e) What is limnology?

f) What is Bioaccumulation.

Q2) a) Explain History. Aim & Objective of EPA (Environment Pollution Act) **[6]**

b) Describe the sources & effects of radioactive pollution. **[4]**

Q3) a) What is biomagnification? Explain its causes & consequences. **[6]**

b) Write a short note on : **[4]**

i) Hydrosphere

ii) Lithsphere

P.T.O.

Q4) a) What is Biochemical waste? Explain handling & Management of Biomedical waste. **[6]**

b) What is bioassay? Expalin purpose of bioassay. **[4]**

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

a) Explain the process of eutrophication.

b) What is pollution? Explain types of pollution.

c) What is sound pollution? Describe effects of sound pollution on environment.

Total No. of Questions : 5]

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[6339]-404

M.Sc. - II

ZOOLOGY

ZODT - 244 : Apiculture

(Revised 2019 Pattern) (Semester - IV) (2 Credits)

Time :2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

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

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

a) Rockbee

b) Comb

c) Absconding

d) D.V.A.V.

e) Smoker

f) Any two insect pests of bee colony.

Q2) a) Give classification of honeybee, Add a note on social organization of bee colony. **[6]**

b) Round dance. **[4]**

Q3) a) Explain any four bee keeping equipments. **[6]**

b) Chemical composition and uses of honey. **[4]**

Q4) a) Selection of bee species of honey bees for apiculture. **[6]**

b) Bacterial diseases of honey bees. **[4]**

Q5) Solve any two of the following.

a) Describe seasonal management in honeybees. **[5]**

b) Limitations of bee keeping. **[5]**

c) Winter management. **[5]**