Total No. of Questions : 7]

SEAT No. :

P2494

[Total No. of Pages : 2

[6066]-211

M.Sc. - I

ZOOLOGY

ZOUT - 121 : Moleculars Biology &Bioinformatics

(2019 Pattern) (Semester-II)

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) ***Q.2 to Q.7 carry equal marks.***

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

a) Give structure of ribosome in eukaryates.

b) Write expansion

i) EMBL

ii) DDBJ

c) Explain chromatin remodeling.

d) Explain the telomere.

e) What is OMIM.

f) Define phosphodiester linkage.

Q2) a) Describe activation of amino acids during translation process. **[7]**

b) Write a note on origin recognition complex in replication of eurkaryotes. **[5]**

Q3) a) Explain the post translational modification of M-RNA. **[7]**

b) Describe SINES and LINES. **[5]**

Q4) a) Explain the working of BLAST based on sequence alignment. **[7]**

b) Explain SOS repair mechanism of DNA. **[5]**

P.T.O.

Q5) a) Write a note on DNA damage by UV radiation and alkylating agents. **[7]**

b) Explain the lac operon in prokary otes. **[5]**

Q6) a) What is secondary database? What are major secondary database. **[7]**

b) Explain C-Value paradox. **[5]**

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

a) Explain the mechanism of okazaki fragments? Give different enzymes involved in replication.

b) Write a note on retrotransposons.

c) Discuss the importance of biological databases in bioinformatics.

● ● ●

Total No. of Questions: 7]

SEAT No. :

P2490

[Total No. of Pages : 2

[6066]-111
M.Sc.-I
ZOOLOGY
ZOUT-111 : Biochemistry & Biochemical Techniques
(2019 Pattern) (Semester-I) (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) Define Radioactivity

b) Write principle of HPLC

c) What is Respiratory Quotient

d) What are cofactors

e) What is molarity

f) Define polysaccharides

Q2) a) What are Disaccharides? Briefly give an account of their classification **[7]**

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

Q3) a) Write in brief the classification of vitamins **[7]**

b) Atomic absorption spectrometry used for Quantification for metals Justify. **[5]**

Q4) a) Discuss briefly the classification of aminoacids **[7]**

b) Discuss the detail 'molecular exclusion' **[5]**

P.T.O.

Q5) a) Explain the secondary level structure of proteins **[7]**

b) Write methods of DNA sequencing **[5]**

Q6) a) Elaborate the principle and application of SDS-PAGE **[7]**

b) Explain the structure of water **[5]**

Q7) Write short notes on any 2 of the following **[12]**

a) Ion exchange chromatography

b) Non-competitive inhibition

c) Write the principle of Beer-Lambert's low & its application in Spectrophotometer

Total No. of Questions : 7]

SEAT No. :

P-2491

[Total No. of Pages : 2

[6066]-112

M.Sc. (Part - I)

ZOOLOGY

ZOUT - 112 : Cell Biology and Developmental Biology

(2019 Pattern) (Semester - I) (4 Credits)

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

Instructions to the candidates:

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

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

a) Competence.

b) Centrolecithal egg.

c) Holoblastic cleavage.

d) Lysosome.

e) Tight junction.

f) Ion channels.

Q2) a) Describe the slow and fast block to polyspermy. **[7]**

b) Explain the structure of golgi complex and mention its functions. **[5]**

Q3) a) Explain the functions of plasma membrane. Describe synaptic transmission. **[7]**

b) Describe the neurulation in chick. **[5]**

Q4) a) Describe various phases of mitosis with neat labelled digrams. **[7]**

b) Explain advantages of Drosophila melanogaster as model organism. **[5]**

P.T.O.

Q5) a) Describe ultrastructure of mitochondria. Mention its functions. **[7]**

b) Explain the species specific sperm attraction. **[5]**

Q6) a) Describe animal - vegetal axis determination in amphibians. **[7]**

b) Explain different types of cytoskeleton. **[5]**

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

a) Distinguish between Apoptosis and necrosis.

b) Explain oncogenes and tumour suppressor genes.

c) Describe the structure of sperm.

Total No. of Questions : 7]

SEAT No. :

P2492

[Total No. of Pages : 2

[6066]-113
M.Sc. - I
ZOOLOGY
ZOUT - 113 : Genetics and English for Scientific Communication
(2019 Pattern) (Semester - I) (4 Credits)

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

Instructions to the candidates:

1) ***Q. 1 is compulsory.***
2) ***Solve any five questions 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) Pseudoalleles

b) Quantitative traits

c) Genetics

d) Past tense

e) Tautology

f) Hypothesis

Q2) a) Discuss the draft of research project. Add a note on funding agencies in India. **[7]**

b) Write a note on ABO blood group and its genetics. **[5]**

Q3) a) Describe the law of segregation with example. **[7]**

b) Write a note on effictive oral presentation. **[5]**

Q4) a) Discuss the outline of a scientific research paper. Add a note on Abstract. **[7]**

b) In a population the frequency of dominant allele is 0.60 and recessive allele is 0.40. Calculate the frequencies of possible genotypes in population. **[5]**

P.T.O.

Q5) a) Discuss the inheritance of any 3 genetic disorders in human. **[7]**

b) Write a note on editing and corrections of scientific paper. **[5]**

Q6) a) Discuss the types of tenses with example. **[7]**

b) Explain the concept of incomplete linkage with example. **[5]**

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

a) Quantitative traits.

b) Precis writing.

c) Pragmatic competence in communication.

Total No. of Questions : 5]

SEAT No. : ____

P2493

[Total No. of Pages : 3

[6066]-114
M.Sc.-I
ZOOLOGY
ZODT-114 : Biostatistics
(2019 Pattern) (Semester-I) (2Credits)

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) ***Figures to the right indicate full marks.***
4) ***Use of calculator and statistical table is allowed.***
5) ***Symbols have their usual meanings.***

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

a) Define class frequency.

b) If y = x-10 with $\bar{x}$ =10 then $\bar{y}$=____.

c) Define qurtile deviation.

d) Define bivariate data

e) Define discrete random variable.

f) If x$\rightarrow$N(0,1) then mode of r.v.x = _____

Q2) a) What do you mean by central tendency? Describe the various measures of centrel tendency. State the requisites of a good measure of central tendency. **[6]**

b) The range, arithmatic mean and standard deviation of a group of 10 items is 20,62 and 10 respectively. If each items is increased by 5, what will be the new range, arithmatic mean and standard deviation of items. **[4]**

Q3) a) Define Karl-Pearson's coefficient of correlation 'r'. State the properties of 'r'.How will you interpret the values **[6]**

i) r = +1

ii) r = –1,

iii) r = 0

b) the two regression lines are 3x–y–5=0 and 4x–3y=0. Find the values arithmatic mean of x and of y $(\bar{x}, \bar{y})$, and correlation coefficient between x and y. **[4]**

P.T.O.

Q4) a) Describe chi-square test for goodness of fit. **[6]**

b) If $X \rightarrow N(30,9)$ then obtain the values of mean, median, mode and variance of random variable X. Also obtain. $P(X \leq 30)$, $P(X \geq 30)$ **[4]**

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

a) Define : null hypothesis, Alternative hypothesis, critical region, Acceptance region.

b) Explain with illustrations, type I error, type II error.

c) Explain F-test for equality of two population variances.

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Total No. of Questions : 5]

P2493

[6066]-114

M.Sc.-I

ZOOLOGY

ZODT-114 : Fresh Water Zoology

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

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) ***Qustons No. 2 to 5 carry equal marks.***

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

a) Define dissolved oxygen.

b) gastrotricha

c) Hardness of water

d) Water pollution

e) ostracoda

f) Rotifera

Q2) a) What are the morphological characters of the copepoda? **[6]**

b) Write a note on economic importance of fresh water crustacea. **[4]**

Q3) a) Explain general characters of cladocera. Add a note on its reproduction. **[6]**

b) Explain respiratory adaptation in freshwater hemiptera. **[4]**

Q4) a) Describe the impact of invasive species on freshwater biota. **[6]**

b) Explain locomotory and sensory adophtions in freshwater fauna. **[4]**

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

a) Bryozoa

b) Edtrophication

c) Diversity of vertebrates in freshwater bodies.

Total No. of Questions : 7]

SEAT No. :

P2494

[Total No. of Pages : 2

[6066]-211

M.Sc. - I

ZOOLOGY

ZOUT - 121 : Moleculars Biology &Bioinformatics

(2019 Pattern) (Semester-II)

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) ***Q.2 to Q.7 carry equal marks.***

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

a) Give structure of ribosome in eukaryates.

b) Write expansion

i) EMBL

ii) DDBJ

c) Explain chromatin remodeling.

d) Explain the telomere.

e) What is OMIM.

f) Define phosphodiester linkage.

Q2) a) Describe activation of amino acids during translation process. **[7]**

b) Write a note on origin recognition complex in replication of eurkaryotes. **[5]**

Q3) a) Explain the post translational modification of M-RNA. **[7]**

b) Describe SINES and LINES. **[5]**

Q4) a) Explain the working of BLAST based on sequence alignment. **[7]**

b) Explain SOS repair mechanism of DNA. **[5]**

P.T.O.

Q5) a) Write a note on DNA damage by UV radiation and alkylating agents. **[7]**

b) Explain the lac operon in prokary otes. **[5]**

Q6) a) What is secondary database? What are major secondary database. **[7]**

b) Explain C-Value paradox. **[5]**

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

a) Explain the mechanism of okazaki fragments? Give different enzymes involved in replication.

b) Write a note on retrotransposons.

c) Discuss the importance of biological databases in bioinformatics.

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Total No. of Questions : 7]

SEAT No. :

P2495

[Total No. of Pages : 2

[6066] - 212

M.Sc. (Part - I)

ZOOLOGY

ZOUT - 122 : Endocrinology and Parasitology

(2019 Pattern) (Semester - II)

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 are hypothalamo hypophysiotropins?

b) What are mineralocorticoids?

c) What is signal transduction cascade?

d) Define the term paratenic.

e) What is transovarian transmission?

f) Define parasitism.

Q2) a) Describe grographical distribution and life cycle of schistosoma. **[7]**

b) Explain adenohypophysial hormones. **[5]**

Q3) a) Explain hormone receptors in nucleus. **[7]**

b) Describe heterospecific type of transmission. **[5]**

Q4) a) Discuss circumsporozoite protein and merozoite s - antigen of plasmodium **[7]**

b) Describe renin aldosterone system in osmoregulation. **[5]**

P.T.O.

Q5) a) Describe the role of hormones in calcium metabolism. **[7]**

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

Q6) a) Describe preparation and demonstration of specific antigen of Trypanosoma. **[7]**

b) Explain hormonal regulation of protein metabolism. **[5]**

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

a) Circannual rhythms.

b) Complement fixation Test.

c) Types of hormones.

Total No. of Questions : 7]

SEAT No. :

P-2496

[Total No. Of Pages : 2

[6066]-213
M.Sc. (Part-I)
ZOOLOGY
ZOUT-123 : Comparative Animal Physiology and Environmental Biology
(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 questions from Q.No.2 to Q.No 7.***
3) ***Question No.2 to 7. carry equal marks.***

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

a) Principles of neuronal integration.

b) What are enzymes?

c) Explain Resistance and tolerance

d) Define Ecosystem.

e) Describe Biochemical cycle.

f) Describe types of wetland.

Q2) a) Describe the enzymatic types of glandular secretions for the digestion of food. **[7]**

b) Explain the development and evolution of ecosystems. **[5]**

Q3) a) Describe the ecological status of forest and arid land and their conservation. **[7]**

b) Describe comparative biochemistry of nitrogen excretion in mammal. **[5]**

P.T.O

Q4) a) What is ventilation? Explain the role of gills in ventilation. **[7]**

b) Write a note on factor affecting wildlife management. **[5]**

Q5) a) Define Biomes and add a note on classification of Biomes. **[7]**

b) Explain the structure and function of myogenic heart. **[5]**

Q6) a) Explain the basic process of urine formation in mammalian kidney **[7]**

b) Enlist the wildlife conservation projects in India. **[5]**

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

a) Explain hyper and hypo osmotic regulars.

b) Endangered species of animals in India.

c) Describe community Ecology.

Total No. of Questions : 5]

SEAT No. : ____

P2497

[Total No. of Pages : 4

[6066]-214
M.Sc. - I
ZOOLOGY
ZODT : 124 : Metabolic Pathways
(2019 Pattern) (Semester - II) (2 Credits)

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.***
3) ***Q.No.2 Q.No.5 carry equal marks.***

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

a) State first law of thermodynamics.

b) Define transmission.

c) What is regulatory enzymes?

d) What is carnitine shuttle?

e) Define catabolism and anabolism.

f) What is redox potentials.

Q2) a) Draw the glycolytic Pathway of Glucose breakdown. **[6]**

b) Describe the process of Glycogensis. **[4]**

Q3) a) Describe complex I and complexII of ETC. **[6]**

b) Explain the energetics of Glycolysis to TCA in Aerobic condition. **[4]**

P.T.O.

Q4) a) Explain omega (ω) oxidation of fatty acid's Explain with example. **[6]**

b) What is role of α-ketogltarate in amino acid metabolism. **[4]**

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

a) Explain the salvage pathway of purine and pyrimidine synthesis.

b) Explain the structure and function of ATP.

c) Explain the conversion of fumarate to malate to oxaloacetate.

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Total No. of Questions : 5]

P2497

[6066]-214
M.Sc. - I
ZOOLOGY
ZODT -124 :Ichthyology
(2019 Pattern) (Semester - II) (2 Credits)

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

Instructions to the candidates:

1) ***Q.I is compulsory.***
2) ***Solve three two questions from Qno.2 to Qno.5.***
3) ***Q.No. 2 to QNo.5 carry equal marks.***

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

a) Define parental care.

b) Aglomerular Kidney.

c) Name any two indigenous ornamental Fishes.

d) What is eurohayline fish.

e) Name any two common diseases in fishes.

f) Fish feed.

Q2) a) Describe breeding and rearing of ornamental fishes. **[6]**

b) Explain the structure of Gonads in fishes. **[4]**

Q3) a) Give a note on thyroid gland in Fishes. **[6]**

b) Heart and accessory pumps. **[4]**

Q4) a) Write a note on evolutionary succession and Fossil history of Fishes. **[6]**

b) Biological and chemical, water Filtration system. **[4]**

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

a) Role of Gills and Skin.

b) Water quality management in aquarium.

c) Taste buds in fishes.

Total No. of Questions : 7]

SEAT No. :

P2498

[Total No. of Pages : 6

[6066]-311
M.Sc. - II
ZOOLOGY
ZOUT-231 : Animal Physiology - I (Special)
(2019 Pattern) (Semester - III) (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) Define B.M.R.

b) What is R.Q.?

c) Define Acclimatisation?

d) What is chloride shift?

e) Define Buoyancy?

f) Define Muscle twitch.

Q2) a) Define external environment. Explain aquatic and terrestrial environment. **[7]**

b) Explain side filament theory of muscles. **[5]**

Q3) a) Explain the structure and function of plasma membrane. Add a note on facilitated diffusion. **[7]**

b) Distinguish between tolerance and resistance. **[5]**

Q4) a) Explain gastrointestinal hormone and give its Functions. **[7]**

b) Describe the phyletic distribution of luminescent organs. **[5]**

P.T.O.

Q5) a) Explain the structure and Function of electric organs. **[7]**

b) What is biological clock? Explain its regulation. **[5]**

Q6) a) Explain the transportation of carbodioxide. **[7]**

b) Describe gas floats with examples. **[5]**

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

a) Digestion of proteins.

b) Neuronal control of respiration

c) Structure and function of swim bladder.

Total No. of Questions : 7]

P2498

[6066]-311
M.Sc. - II
ZOOLOGY
ZOUT-231 : Entomology -I (Special)
(2019 Pattern) (Semester - III) (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) Define Apterygota.

b) Explain tegmina.

c) Explain raptorial legs.

d) Define compound eyes.

e) Define tympanam with examples.

f) Define laciferase.

Q2) a) Describe morphology of thorax of a typical insect. **[7]**

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

Q3) a) Explain the relationship between insects and other arthropods. **[7]**

b) Describe the insect cuticle and its components. **[5]**

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

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

Q5) a) Give the morphological characters of coleoptera with two examples. **[7]**

b) Explain the path of blood circulation in insects. **[5]**

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

b) Describe any four sense organs of an insect and their functions. **[5]**

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

a) Mouthparts of Hemipteran insects.

b) Explain endocrine glands of insects.

c) Expand on the histology of hindgut of orthopteroid insect.

Total No. of Questions : 7]

P2498

[6066]-311
M.Sc. - II
ZOOLOGY
ZOUT-231 : Genetics - I (Special)
(2019 Pattern) (Semester - III) (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) Applications of Quantitative genetics

b) Inbreeding co-efficient

c) Allopatric speciation

d) Chromosomal probes

e) Assortive mating

f) Missense and non-sense mutation

Q2) a) Describe the life-cycle of Saccharomyces cervisial. Highlight its advantages as model organism. **[7]**

b) explain one model organism used in genetic toxicology studies. **[5]**

Q3) a) Enlist the similarity and defferences between genetic toxicology and mutation research. **[7]**

b) What is gene theraphy? Write a note on its current research status. **[5]**

Q4) a) If the necessive allele for an x-linked recessive disease in human, has a Frequency of 0.02 in the population what proportion of individuals in the population will have the disease? Assume that the population is 50:50 (male : female) **[7]**

b) Define Hardy-weinberg equilibrium? Explan the effect inbreeding on population Equilibrium. **[5]**

Q5) a) Define genetic drift? How it affects the Genotype and allele frequencies in a small population? **[7]**

b) Write explanatory notes on, quantitative inheritance in human. **[5]**

Q6) a) Explain Neutral theory of mutation. **[7]**

b) Explain how will you bring out relatioship between alleles A1 and A2 of a gene A using phenotypic scale. **[5]**

Q7) Differentiate between any two of the following: **[12]**

a) Disruptive and directional selection.

b) RFLPs and VNTRs.

c) Inbreeding and Genetic drift.

Total No. of Questions : 7]

SEAT No. :

P-2499

[Total No. of Pages : 2

[6066]-312

M.Sc. (Part - II)

ZOOLOGY

ZOUT-232: Fundamentals of Systematics and Economic Zoology (2019 Pattern) (Semester - III) (4 Credits)

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) ***Question No. 2 to 7 carry equal marks.***

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

a) What is ICZN?

b) What is Parapatric Speciation?

c) Enlist names of any three minor phyla.

d) What is Vermiculture?

e) Name any two prawn species and commercially in prawn culture.

f) Give two examples of model animals used in pharmaceutical industry.

Q2) a) Explain in detail Taxonomic keys and their types. **[7]**

b) Write a note on : Economic importance of Lac culture. **[5]**

Q3) a) Explain coral reefs and their significance. **[7]**

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

P.T.O.

Q4) a) Describe RAPD technique and its applications in systematics. **[7]**

b) Discuss economic importance of dairy industry in India. **[5]**

Q5) a) Write an essay on : "Five Kingdom Sysem". **[7]**

b) State and explain economic importance of Protozoa. **[5]**

Q6) a) What is curetting? Explain the process of curetting. **[7]**

b) Write a short note on "Apiculture". **[5]**

Q7) Write a Short Note on any <u>two</u> of the following : **[12]**

a) Preservation of animal specimens.

b) Wool industry.

c) Piggery.

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Total No. of Questions : 7]

SEAT No. :

P2500

[Total No. of Pages : 2

[6066]-313
M.Sc. (Part - II)
ZOOLOGY
ZOUT - 233 : Research Methodology & Insect Physiology and Biochemistry
(2019 Pattern) (Semester - III) (4 Credits)

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

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any 5 questions 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) What is corpora allata.

b) What is circular Dichroism.

c) Define Moulting.

d) What is science citation Index.

e) Define ventilation.

f) What is Inflibnet.

Q2) a) What is digestion? Describe physiology of digestion and absorption of Lipids in insects. **[7]**

b) Define confocal microscopy and give its significance. **[5]**

Q3) a) Describe the structure and function of Integument. **[7]**

b) Write importance of analysis and interpretation of scientific data. **[5]**

Q4) a) Define Biostatistics. Explain the quantitative methods of Biostatistics used for analysis of biological data. **[7]**

b) Describe physico - chemical characteristics of plasma in insects. **[5]**

P.T.O.

Q5) a) Describe ventillatory mechanism in Insects. **[7]**

b) What is bioinformatics. Write their applications. **[5]**

Q6) a) Give an account of protein micro array in research. **[7]**

b) What is excretion? Describe regulation of nitrogen excretion and water balance in Insects. **[5]**

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

a) Describe moulting and Juvenile hormones in Insects.

b) Give the importance of literature survey in reseach.

c) Describe in microsomal and extra microsomal enzymes involved in detoxification.

Total No. of Questions : 5]

SEAT No. : ____

P2501

[Total No. of Pages : 2

[6066]-314
M.Sc.-II
ZOOLOGY
ZODT-234 : IMMUNOLOGY
(Rev. 2019 Pattern) (Semester-III) (2 Credits)

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) ***Q.2 to Q.5 carry equal marks.***

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

a) Define major histocompatibility complex (MHC)

b) What do you mean by vaccination?

c) Name any two allergic diseases.

d) Give 2 examples of lymphoid organs.

e) What is monoclonal antibody?

f) Give 2 examples of "live-attenuated-vaccines".

Q2) a) Describe active and passive immunization. **[6]**

b) Write a note on "clonal-selection-theory". **[4]**

Q3) a) Give an account of steps involved in immediate response to infection. **[6]**

b) Describe different antibody classes. **[4]**

Q4) a) State principle and applications of hybridoma technology. **[6]**

b) Explain the process of "Antigen-processing". **[4]**

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

a) Write a note on "Complement Fixation Test"

b) Discuss the process of "Antigen-Antibody Reaction"

c) Explain cell-mediated immunity with suitable examples.

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Total No. of Questions : 5]

P2501

[6066]-314
M.Sc.-II
ZOOLOGY
ZODT-234 : GENETIC TOXICOLOGY
(Rev. 2019 Pattern) (Semester-III)

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 Q.5 carry equal marks.***

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

a) What is frameshift mutation?

b) Define toxicology

c) What is clastogen?

d) What is intercalating agents?

e) What is transition mutation?

f) Name any 2 chemicals having genotyxic potential.

Q2) a) Explain the scope and significance of genetic toxicology. **[6]**

b) How will you test genotoxic potential of compound in bacteria. **[4]**

Q3) a) Role of genetic toxicology in congenital malfermations. **[6]**

b) Explain role of RFLP in detecting molecular mutations. **[4]**

Q4) a) Describe in detail any 2 Mammalian cytogenetic tests. **[6]**

b) Write a note on risk assessment. **[4]**

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

a) Explain mechanism by which 5-bromouracil causes mutation.

b) Use of yeast test system in genotoxic screening.

c) Micronucleus test & its applications.

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Total No. of Questions : 7]

SEAT No. :

P2502

[Total No. of Pages : 6

[6066]-411
M.Sc. - II
ZOOLOGY
ZOUT-241 : Animal Physiology - II
(2019 Pattern) (Semester - IV) (Special) (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) Define : Blood pressure.

b) Enlist the component of blood.

c) 'Chronic stress cause deleterious effects' - Justify.

d) What is high altitude sickness?

e) Give the examples of neurotransmitters.

f) Define : Osmoconforners.

Q2) a) Define cardiac output. Explain the internal structure of heart. **[7]**

b) Describe in detail the role of malphigian tubules in insects. **[5]**

Q3) a) Describe the structure of internal ear. Add a note on physiology of hearing. **[7]**

b) Role of veins as blood reservoir and process of venous return. **[5]**

Q4) a) Describe ornithine cycle and it's importance in excretory nitrogen metabolism. **[7]**

b) Differentiate between energy storage forms i.e. fats & glycogen. **[5]**

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Q5) a) What is excretion? Explain osmoregulation in fresh water fishes. **[7]**

b) Explain the role of rhodopsin in sense of vision. **[5]**

Q6) a) What is synapse? Add a note on neuronal integration. **[7]**

b) Explain the problems of deep sea diving. **[5]**

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

a) Acclimation to low O_2 level.

b) Neuronal and hormonal control of heart.

c) Explain the structure of nerve cell.

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Total No. of Questions : 7]

P2502

[6066]-411
M.Sc. - II
ZOOLOGY
ZOUT-241 : Entomology -II
(2019 Pattern) (Semester - IV) (Special) (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 scarabaeiform larva with suitable example.

b) Define gastrulation.

c) Explain emergence from the pupa.

d) Explain oviposition habits in insects laying eggs in aquatic habitat.

e) Explain oviparity with example.

f) Define regeneration.

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

b) Describe the structure of ovariole. **[5]**

Q3) a) Describe cleavage and blastoderm formation in insects. **[7]**

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

Q4) a) Describe the blastokinesis in insects. **[7]**

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

Q5) a) What is diapause? Explain various factors controlling diapause in insects. **[7]**

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

Q6) a) Describe formation of dorsal closure and dorsal organ in insects. **[7]**

b) Explain role of juvenile hormone in insect metamorphosis. **[5]**

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

a) Coarctate pupa with suitable examples.

b) Viviparity.

c) Aging in insects.

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Total No. of Questions : 7]

P2502

[6066]-411
M.Sc. - II
ZOOLOGY
ZOUT-241 : Genetics - II
(2019 Pattern) (Semester - IV) (Special) (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) Elaborate the term "Induced Mutation".

b) Distinguish between Autosomal recessive traits and Autosomal dominant traits.

c) If a couple has 7 childrens, what will be the probability of having 3 girls and then having 4 boys?

d) Define chimerism with examples.

e) Enlist the factors causing complications in basic pedigree pattern.

f) Mention the examples of carbohydrate metabolism disorders.

Q2) a) Describe how neurogenetics play role in control of circadian rhythm. **[7]**

b) What are the indications of chromosomal testing in prenatal and pre-implantation diagnosis? **[5]**

Q3) a) Describe Rothenbuhler's experiment on genetics of Bee behaviour. **[7]**

b) Explain regulation of segmentation genes and homeotic genes in *Drosophila*. **[5]**

Q4) a) Elucidate the detects in purine metabolism with respect to Lesch-Nyhan Syndrome. **[7]**

b) Write a note on LOD score analysis. **[5]**

Q5) a) Describe morphology and structure of nucleic acids of Bacteriophage T2. **[7]**

b) Write a note on physical mapping methods. **[5]**

Q6) a) Mutations in CFTR gene leads to cystic fibrosis- Justify. **[7]**

b) Explain in brief how HLA are associated with diseases. **[5]**

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

a) Cell cycle genetics.

b) Epigenetics.

c) Use of pedigree studies in human genetics.

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Total No. of Questions : 7]

SEAT No. :

P2503

[Total No. of Pages : 2

[6066]-412

M.Sc. (Part - II)

ZOOLOGY

ZOUT - 242 : Mammalian Reproductive Physiology and Aquaculture

(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 'Suckling Reflex'?

b) Define Climacteric.

c) What is the role of prolactin hormone?

d) Define Aquaculture.

e) What is intensive fish culture?

f) Give the composition of pearl.

Q2) a) Describe the anatomy of Male Reproductive System. **[7]**

b) Explain how pH affects water quality and fish culture. **[5]**

Q3) a) Discuss the management practices carried out during fish culture in ponds. **[7]**

b) Discuss the hormonal regulation in females with respect to reproduction. **[5]**

Q4) a) Describe the successive stages in Oestrous Cycle. **[7]**

b) Discuss the role played by environmental factors on breeding of fish. **[5]**

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Q5) a) Discuss the various fish preservation methods and justify its need. **[7]**

b) Describe the process of conception and blastocyst formation during pregnancy. **[5]**

Q6) a) Give the causes of infertility in males and females. **[7]**

b) Describe the steps in culture of freshwater prawn. **[5]**

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

a) Puberty.

b) Induced breeding.

c) Fish products and by-products.

Total No. of Questions : 5]

SEAT No. :

P2504

[Total No. of Pages : 2

[6066]-413
M.Sc. (Part- II)
ZOOLOGY
ZODT - 243 : HISTOLOGY AND HISTOCHEMISTRY
(2019 Pattern) (2 Credit) (Semester - IV)

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) ***Q.2 to Q.5. carry equal marks.***

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

a) What is full from of 'PAS' method used for Glycogen.

b) What are macopolysaccharides?

c) What is cryostat?

d) What is role of Hydrochloric acid (HCl) in Feulgen method?

e) What is mordent?

f) Name two methods for locating DNA in tissues.

Q2) a) Give an account of principle and functioning of ultramicrotome. **[6]**

b) What is Histology? Discuss its scope and importance. **[4]**

Q3) a) What is dehydration? Give a stepwise account of procedure of dehydration of fixed tissues. **[6]**

b) Discuss the scope and importance of Enzyme Histochemistry. **[4]**

Q4) a) Give an account of principle and working of microtome. **[6]**

b) Write a short note on: Histochemical classification of lipids. **[4]**

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

a) What is Stain? Add a note on different types of stains used in Histology.

b) Give an outline of Histochemical classification of proteins.

c) Describe Sudan-black-B method for Lipids.

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P.T.O.

Total No. of Questions : 5]

P2504

[6066]-413
M.Sc. (Part- II)
ZOOLOGY
ZODT - 243 : Pest Control
(2019 Pattern) (2 Credit) (Semester - IV)

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) ***Q.2 to Q.5. carry equal marks.***

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

a) What a re pheromones?

b) Define Pest.

c) What are chemosterilants?

d) What is stomach poision?

e) What is emulsifiable concentrate?

f) What is larvicide?

Q2) a) Describe pesticide appliances. **[6]**

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

Q3) a) Explain principle and method of chemical Control of Pests. **[6]**

b) Write a note on biological agents in control of Pests. **[4]**

Q4) a) Describe non insect pests and their control. **[6]**

b) Write a note on principles of IPM. **[4]**

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

a) Antidote.

b) Stored grain pests.

c) Physical control of Pests.

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Total No. of Questions : 5]

SEAT No. :

P2505

[Total No. of Pages :2

[6066]-414
M.Sc. - II
ZOOLOGY
ZODT - 244 : Apiculture
(2019 Pattern) (Semester - IV) (2 Credits) (Theory)

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

Instructions to the candidates:

1) ***Q. No. 1 is compuslory.***
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) Apiary

b) Worker bee

c) Queen excluder

d) Bee venom

e) A.F.B.D.

f) Wax.

Q2) a) Describe honeybee diseases and preventive measures. **[6]**

b) Honey extractor. **[4]**

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

b) Classification of Honey bee **[4]**

Q4) a) Describe life cycle of honey bee. **[6]**

b) Bee flora. **[4]**

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

a) Entraprenurship in Apiculture.

b) Wag tail dance

c) Winter management.

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Total No. of Questions : 5]

P2505

[6066]-414
M.Sc. - II
ZOOLOGY
ZODT - 244 : Pollution Biology
(2019 Pattern) (Semester - IV) (2 Credits)

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

Instructions to the candidates:

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

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

a) Enlist types of Radioactive Pollution.
b) What is Limnology?
c) What is Eutrophication?
d) What is Bioaccumulation?
e) Define bioassay?
f) Define Hydrosphere?

Q2) a) Explain History, Aim & Objective of CPA. **[6]**

b) What is Radioactive pollution? Describe it's type. **[4]**

Q3) a) What is Biomagnification? Explain it's cases & consequence? **[6]**

b) Write short Note on
   i) Bioaccumulation
   ii) Eutrophication **[4]**

Q4) a) What is bioassay? Explain purpose of bioassay? **[6]**

b) Write a note on any two
   i) Hydrosphere
   ii) Atmosphere
   iii) Lithosphere **[4]**

Q5) Solve any <u>two</u> of the following. **[10]**

a) What is pollution? Explain type of pollutions.
b) What is pollution Monitoring? Which are different strategies of pollution monitoring for water.
c) Explain the process of Eutrophication?