

Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

PC4173

[6339]-1001

M.Sc. (Part - I)

ZOOLOGY

ZOO-501-MJ : Advanced Biochemistry

(2023 Credit Pattern) (Semester - I)

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 7 carry equal marks.*

Q1) Solve any five of the following :

[5]

- a) Define Enzyme.
- b) Define Glycogenolysis.
- c) Write biological function of lecithins.
- d) Classify carbohydrates.
- e) Write the names of disorders caused by purine metabolism.
- f) Write biological function of Vitamin D.

Q2) a) Describe salvage Pathway.

[6]

b) Write about lecithins and their biological functions.

[4]

Q3) a) Explain the applications of enzymes in diagnostics.

[6]

b) Describe the phenomenon of Glycolysis in carbohydrates.

[4]

P.T.O.

- Q4)** a) Explain the separation of Amino acid by ion exchange chromatography. [6]
- b) Write about clinical significance of SGPT. [4]

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

- a) Lesch - Nyhan syndrome.
- b) Maple syrup urine disease.
- c) Bacterial polysaccharides.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

PC4174

[6339]-1002

M.Sc. - I

ZOOLOGY

ZOO-502-MJ: Advanced Cell Biology

(2023 Credit Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

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

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

- a) What is membrane potential?
- b) Exocytosis or cell Vomitting.
- c) What is MPF.
- d) Active transport in cell membrane.
- e) Define stem cells.
- f) Cytoskeleton of cell.

Q2) a) Describe Polymorphism in lysosomes & add a note on its functions.**[6]**

b) Distinguish between Active transport & Passive transport. **[4]**

Q3) a) Explain the role of MPF, Cyclin, CDKs in cell cycle. **[6]**

b) What is significance of cell signalling? **[4]**

Q4) a) Describe channels & pumps in the cell membrane? **[6]**

b) Explain fluid Mosaic model of Plasma membrane. **[4]**

P.T.O.

Q5) Write short notes on any Two of the following.

[10]

- a) Stem cells, their types & write their applications.
- b) Cytoskeleton associated proteins & their functions.
- c) Protein trafficking.



Total No. of Questions : 5]

SEAT No. :

PC4175

[Total No. of Pages : 2

[6339]-1003

M.Sc.-I

ZOOLOGY

**ZOO -503 -MJ : Comparative Embryology
(2023 Credit Pattern) (Semester - I)**

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 2 to 5 carry equal marks.*

Q1) Solve any five of the following.

[5]

- a) Define gastrulation.
- b) Define invagination.
- c) What is Nieuwkoop center?
- d) Define stem cell.
- e) Define microlecithal egg.
- f) Define morphallaxis regeneration.

Q2) a) Explain discoidal cleavage with suitable example.

[6]

b) Define fertilization and give its types with example.

[4]

P.T.O.

Q3) a) Describe different morphogenetic cell movements during gastrulation.[6]

b) Explain acrosome reaction in sea urchin. [4]

Q4) a) Give the role of organizer in frog development. [6]

b) Describe regulation of sperm motility in mammals. [4]

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

a) Hormonal regulation of insect metamorphosis.

b) Theory of preformation and theory of pangenesis.

c) Spermatogenesis in mammals.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages :2

PC4176

[6339]-1004

M.Sc.- I

ZOOLOGY

ZOO 504 MJ : Medical Entomology

(2023 Credit Pattern) (Semester- I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Answer any three questions from Q2 to Q5.*
- 3) *Q2 to Q5 carry equal marks.*

Q1) Solve any five of the following:

[5]

- a) Name the vector of filariasis.
- b) Define integrated vector incrimination.
- c) Define vector - parasite relationship.
- d) Define medical entomology.
- e) Enlist two insect vector from order Hemiptera.
- f) Name the vector of rickettsiosis.

Q2) a) Explain the morphology, life cycle & medical importance of *Anopheles* sp. **[6]**

b) Describe the mode of transmission & prophylaxis of Japanese encephalitis. **[4]**

Q3) a) Describe the pathogenicity, mode of transmission & control measure of endemic typhus. **[6]**

b) Describe the life cycle & veterinary importance of hard ticks. **[4]**

P.T.O.

Q4) a) Explain the life cycle, medical importance & control measure of Redavild bug. [6]

b) Forensic importance of house flies & rove beetles. [4]

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

a) Mechanical method of vector control.

b) Myiasis and its type.

c) Morphology & life cycle of head louse.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

PC4177

[6339]-1005

First Year M.Sc.

ZOOLOGY

ZOO-505 MJ : Biosystematics and Biodiversity

(2023 Credit Pattern) (Semester-I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Attempt any three questions from question 2 to Q. 5.*
- 3) *Question 2 to question 5 carry equal marks.*

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

- a) What is exotic species? Give two examples of it.
- b) What is voucher specimen?
- c) What is Trinomen? Write one example of it.
- d) Mention any two roles of National Biodiversity Authority (NBA).
- e) Define Biodiversity Hotspot and enlist 2 examples of it.
- f) What do you mean by 'species richness'?

Q2) a) Explain the procedure and applications of DNA Barcoding. **[6]**

b) Write a note on importance of biodiversity. **[4]**

Q3) a) Define and explain 'Mark-recapture' method. Add a note on its importance. **[6]**

b) Enlist and explain briefly any four types of Taxonomic Publications. **[4]**

P.T.O.

Q4) a) Give an account of Shannon Biodiversity Index. [6]

b) Explain briefly roles of state Biodiversity Board (SBB). [4]

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

a) ICZN

b) Biological Diversity Act, 2002

c) Cladistics.



Total No. of Questions : 5]

SEAT No. :

PC4178

[6339]-1006

[Total No. of Pages :2

M.Sc. - I

ZOOLOGY

ZOO 508 MJ : Biostatistical Applications

(2023 Credit Pattern) (Semester- I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

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

Q1) Solve any five of the following:

[5]

- a) Explain types of data.
- b) Explain quartiles of raw data.
- c) Explain standard deviation (s.d.) of raw data.
- d) Interpret the different values of coefficient of correlation.
- e) Explain the prediction of response variable.
- f) Explain the concept of sample and population.

Q2) a) If the range, arithmetic mean and standard deviation of 10 observations are 12, 50 and 6 respectively and each observation is increased by 10, then what will be the new range, arithmetic mean, s.d. and coefficient of variation? **[6]**

b) Define median of raw data. Which quartile is known as median of the data. **[4]**

Q3) a) Calculate the Karl - Pearson's coefficient of correlation between the weight of dogs of type A (x) and of type B (y) from the following data :

$n = 10, \sum x = \sum y = 25, \sum x^2 = \sum y^2 = 150, \sum xy = 140$. Comment on the result. **[6]**

b) Explain the concept of Bivariate data, state how to identify dependent and independent variables. Explain the scatter diagram. **[4]**

P.T.O.

Q4) a) Describe the Chi-square test for goodness of fit. State the assumptions we make while applying the test. [6]

b) Define : Null hypothesis, Alternative hypothesis, critical region, Acceptance region. [4]

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

a) Type - I and Type - II errors.

b) ANOVA - One way and Two - way tables.

c) Describe paired t - test.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

PC4179

[6339]-1007

M.Sc. - I

ZOOLOGY

**ZOO-MJ510: Freshwater Zoology
(2023 Credit Pattern) (Semester - I)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

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

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

- a) Wetlands
- b) Dissolved oxygen
- c) National water policy
- d) Lotic habitat
- e) Pollution of freshwater
- f) Hardness of water

Q2) a) What is eutrophication? Explain its causes and consequences. [6]

b) Write a note on gaint water bug. [4]

Q3) a) Describe in detail ecological and economical importance of catfishes.[6]

b) Explain the implications of physical conditions of water on fresh water fauna. [4]

Q4) a) Write the distinguishing features of Rotifera. [6]

b) Describe the need and importance of conservation. [4]

P.T.O.

Q5) Solve any two of the following.

[10]

- a) Lentic Freshwater habitat
- b) Fairy shrimp
- c) Impact of climate change on Freshwater habitat



Total No. of Questions : 5]

SEAT No. :

PC4180

[Total No. of Pages : 2

[6339]-1008

M.Sc.-I

ZOOLOGY

**ZOO - 514 - MJ : Research Methodology
(2023 Credit Pattern) (Semester - I) (2 Credit)**

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 2 to 5 carry equal marks.*

Q1) Answer the following. (Any five)

[5]

- a) What is database?
- b) What is Impact factor?
- c) Explain patent
- d) Explain H-index
- e) What is science citation index
- f) Define Bioinformatics

Q2) a) What is Research? Enlist types of Research with suitable examples. **[6]**

b) Explain how to quote references in thesis. **[4]**

Q3) a) Define Research design. Explain the characteristics of good research. **[6]**

b) Write the applications of Bioinformatics. **[4]**

P.T.O.

Q4) a) Explain in details components of desertation. **[6]**

b) What is data in research? Explain Primary and Secondary data, with suitable example. **[4]**

Q5) Write short notes on. (Any two) **[10]**

a) Multidimensional scaling

b) Biomedical waste disposal, Biodiversity act 2008

c) Plagiarism

* * *

Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

PC4181

[6339]-2001

M.Sc. - I

ZOOLOGY

ZOO 551MJ : Molecular Biology

(2023 Credit Pattern) (Semester-II) (Credits 2)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

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

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

- a) Define chromatin remodelling.
- b) Define central Dogma.
- c) What is satellite DNA?
- d) Define hyperchromicity.
- e) Name the bonds present in 13 form of DNA.
- f) Differentiate between codon and anti codon.

Q2) a) Explain the process of elongation and termination of transcription in Eukaryotes. **[6]**

b) Give an account of different types of ribosomes. **[4]**

Q3) a) Explain organization of chromosome w.r.t unique and repetitive DNA sequences. **[6]**

b) Describe physical properties of DNA. **[4]**

P.T.O.

Q4) a) Explain the mechanism of replication in Eukaryotes. [6]

b) Explain nuclear export of mRNA. [4]

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

a) Genetic code

b) DNA polymerases in Eukaryotes

c) Ribonucleoproteins.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

PC4182

[6339]-2002

M.Sc. (Part - I)

ZOOLOGY

**ZOO-552-MJ : Comparative Endocrinology
(Credit 2023 Pattern) (Semester - II)**

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 2 to 5 carry equal marks.*

Q1) Solve any five of the following :

[5]

- a) What is GABA?
- b) Which hormone is responsible for glucose storage as glycogen?
- c) Define Hormone?
- d) Which gland secretes Epinephrin & Nor epinephrin hormone?
- e) What is hormone receptor?
- f) Name Disorder of thyroid gland?

Q2) a) Describe Rerun-angiotensin system in non-mammalian tetrapods?

[6]

b) Describe effects of Insulin on carbohydrate Metabolism?

[4]

P.T.O.

Q3) a) Give an account of classification of Hormones based on their origin & chemical nature with examples? [6]

b) Why calcium homeostasis is important? [4]

Q4) a) Describe vertebrate neuroendocrine system? [6]

b) Write role of Parathyroid Hormone? [4]

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

a) Hormonal regulation of Mineral Metabolism.

b) Comparative aspects of pancreatic hormones of non-mammals vertebrate.

c) Role of thyroid hormone in Thermogenesis.

x x x

Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

PC4183

[6339]-2003

M.Sc. - I

ZOOLOGY

ZOO 553 MJ : Comparative Animal Physiology

(2023 Credit Pattern) (Semester-II)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

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

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

- a) Enlist proteins of myo filaments.
- b) Function of Hemerythrin.
- c) Define Juxtaglomerular complex.
- d) What is sarcomere?
- e) Name the pigments present in Rod & cone cells.
- f) What is chloride shift?

Q2) a) With the help of diagram explain the structure of skeletal muscle. **[6]**

b) Write about different types of sense organs and their functions. **[4]**

Q3) a) Describe the physiology of digestion in mammals. **[6]**

b) Draw the diagram of internal structure of mammalian heart. **[4]**

Q4) a) Explain the process of urine formation in mammalian kidney. **[6]**

b) Explain the process of O₂ and Co₂ transport in mammals. **[4]**

P.T.O.

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

[10]

- a) Biokinetic zones
- b) Organs of photoreception
- c) Structure of mammalian kidney



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

PC4184

[6339]-2004

First Year M.Sc.

ZOOLOGY

ZOO-554-MJ : Biochemical Techniques

(2023 Credit Pattern) (Semester - II) (2 Credits)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

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

Q1) Solve any five of the following :

[5]

- a) Give the examples of solvents used in TLC.
- b) Write any two supporting media used in electrophoresis.
- c) Define centrifugation.
- d) What is monochromator.
- e) What is TEM.
- f) Write the types of ddNTP's.

Q2) a) Describe Affinity chromatography.

[6]

b) Write the principle of surface plasmon resonance.

[4]

P.T.O.

Q3) a) Explain principle and working of Fluorescence microscope. [6]

b) Write a note on capillary electrophoresis. [4]

Q4) a) Describe the methods of protein sequencing. [6]

b) Explain analytical centrifugation. [4]

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

a) Electromagnetic spectrum.

b) Write principle of agarosegel electrophoresis.

c) Next generation sequencing.

x x x

Total No. of Questions : 5]

SEAT No. :

PC4185

[Total No. of Pages : 1

[6339]-2005

M.Sc. - I

ZOOLOGY

**ZOO 555 MJ : Integrated Pest Management
(2023 Credit Pattern) (Semester - II)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Solve any three questions from Q2 to Q5.*
- 3) *Question 2 to 5 carry equal marks.*

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

- a) Define fungicides.
- b) What is DDIS?
- c) How ICT is used in IPM?
- d) What is the role of remote sensing in IPM?
- e) What is IPM?
- f) What is the role of acoustic sensors in pest management?

Q2) a) Describe IoT based pest detection methods with its benefits. [6]

b) Explain significance of pest management. [4]

Q3) a) Describe chemical control of pest management. [6]

b) Explain genetic manipulation of crop. [4]

Q4) a) Describe biological control of pest management. [6]

b) Explain genetic manipulation of pest population. [4]

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

- a) Bioherbicide approach to weed control.
- b) Entomopathogenic viruses in insect pest control.
- c) Dynamics of economic injury level.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

PC4186

[6339]-2006

M.Sc. - I

ZOOLOGY

ZOO-560-MJ: Medical Parasitology

(2023 Credit Pattern) (Semester - II)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

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

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

- a) Define parasitoids with examples.
- b) Describe the symptoms of Rabies.
- c) Name any two parasites of phylum protozoa.
- d) Chloroquine is a drug used against which parasite?
- e) Name any two Dipteran parasite vectors?
- f) Define Xenodiagnosis with example.

Q2) a) Give geographical distribution, morphology and life cycle of Entamoeba histolytica. [6]

b) Explain immune response to parasitic adaptations. [4]

Q3) a) Mention disease management and prophylaxis of Trypanosoma. [6]

b) Mention the symptoms of Anthrax. [4]

Q4) a) Describe the chemical control for parasites. [6]

b) Give significance of black flies as vectors. [4]

P.T.O.

Q5) Write short notes on any Two of the following.

[10]

- a) Describe the diagnostic methods of blood in the determination of parasites.
- b) Explain with examples, the types of parasite and host.
- c) Describe the mode of infection and treatment of Leshmania sp.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages :1

PC4187

[6339]-2007

M.Sc. - I

ZOOLOGY

ZOO 562 MJ : Economic Zoology

(2023 Credit Pattern) (Semester- II)

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 2 to 5 carry equal marks.*

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

- a) What is sponge culture?
- b) What is Autotrophic biofloc system?
- c) Define fisheries.
- d) What is ornamental fish farming?
- e) What is pearl culture?
- f) Explain Biofloc fish farming.

Q2) a) Explain in detail preservation, processing & export of prawns. **[6]**

b) Explain harmful parasitic protozoans to human & its livestock. **[4]**

Q3) a) Give microbial role in biofloc system. **[6]**

b) Explain harmful Nematodes to human & its livestock. **[4]**

Q4) a) Describe preparation of farm for prawn culture. **[6]**

b) Management of Nutrition & feeding in biofloc fish farming. **[4]**

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

- a) Value added products from fisheries.
- b) Scope & challenges in molluscs culture.
- c) Artificial pearl formation in molluscs.



Total No. of Questions : 7]

SEAT No. :

[Total No. of Pages : 2

PC4188

[6339]-3001

M.Sc. (Part - II)

ZOOLOGY

ZOO-601-MJ : Animal Physiology - I

(Credit 2023 Pattern) (Semester - III)

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 Tolerance.
- b) What is Sarcomere.
- c) Write about Pacemaker.
- d) What is EEG.
- e) Write about symptoms of anorexia nervosa.
- f) What is Bioluminescence and what causes it to glow?

Q2) a) Describe cortico-spinal and multi-neuronal pathways.

[7]

b) Draw neat and labelled diagram of internal structure of Eye.

[5]

Q3) a) Explain in detail the physiology of hearing.

[7]

b) Describe the impact of drugs and diseases on synaptic transmission.**[5]**

Q4) a) Explain the gross neuroanatomy of brain.

[7]

b) What is Parkinson's disease and cerebral hypoxia. Also write about symptoms causes, diagnosis and treatment. **[5]**

P.T.O.

Q5) a) Describe with the help of diagram the mechanism of cardiac cycle. [7]

b) Explain the regulation of different biological clocks. [5]

Q6) a) Explain in detail the chemical basis of skeletal muscle contraction. [7]

b) Write about osteoporosis, Paget's disease, rickets and osteomalacia diseases of bones. [5]

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

a) Neuromuscular junction.

b) Blood clotting and its molecular mechanism.

c) Molecular mechanism of thermal acclimation in Poikilotherms.



Total No. of Questions : 7]

SEAT No. :

[Total No. of Pages : 2

PC4189

[6339]-3002

M.Sc. (Part - II)

ZOOLOGY

ZOO-601-MJ : Entomology - I

(Credit 2023 Pattern) (Semester - III)

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 Apterygota.
- b) Write the structure and example of aristate antenna.
- c) Explain Hemelytra.
- d) Explain raptorial leg.
- e) Explain apneustic tracheal system.
- f) Explain stridulatory pegs.

Q2) a) Explain types of head orientations in insects.

[7]

b) Explain the characters of Dictyoptera with two examples.

[5]

Q3) a) Explain in brief interrelationship of insects with other arthropods.

[7]

b) Describe the structure of cuticle in insects.

[5]

Q4) a) Explain respiratory system in insects.

[7]

b) Explain the characters of Odonata with two examples.

[5]

P.T.O.

Q5) a) Give the distinguishing characters of order Thysanura with two examples. [7]

b) Explain Panoistic ovariole. [5]

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

b) Explain male reproductive system of generalized insect. [5]

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

a) Sponging type of mouthparts.

b) Endocrine glands in insects.

c) Structure and functions of malpighian tubules.



Total No. of Questions : 7]

SEAT No. :

[Total No. of Pages : 2

PC4190

[6339]-3003

M.Sc. (Part - II)

ZOOLOGY

ZOO-601-MJ : GENETICS - I

(Credit 2023 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) Enlist the applications of chi square test in genetic data analysis.
- b) What is the nature of donor strains & compatibility in conjugation?
- c) Define Allele and genotypic frequency in Hardy Weinberg population.
- d) What is Polymorphism? Enlist its types?
- e) Define the concepts of epigenetics.
- f) Which are the molecular tools used in Recombination DNA technology?

Q2) a) What is extranuclear inheritance? Explain mitochondrial petite in saccharomyces. **[7]**

b) Explain bacterial transformation in brief. **[5]**

Q3) a) Explain assortative mating & disruptive mating. **[7]**

b) Describe neutral theory of molecular evolution. **[5]**

Q4) a) Explain post transcriptional regulation with respect to alternative splicing, transport & targeting of RNA. **[7]**

b) Describe basic layout of R-DNA laboratory. **[5]**

P.T.O.

- Q5)** a) Explain in brief steps involved in construction of pedigree. [7]
- b) Give mathematical derivation for mutation changing gene frequency in a population. [5]
- Q6)** a) Describe bacterial genome organization. Explain transformation in bacteria. [7]
- b) Explain genetic basis of male infertility. [5]
- Q7)** Write short notes on any two of the following : [12]
- a) Complementation test
- b) Molecular data used in phylogenetic analysis
- c) Mechanism of X inactivation.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

PC4191

[6339]-3004

M.Sc. - II

ZOOLOGY

ZOO-602-MJ: Physiology of Reproduction

(2023 Credit 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.2 to Q.5.*
- 3) *Questions 2 to 5 carry equal marks.*

Q1) Solve any five of the following.

[5]

- a) ZIFT
- b) Acrosome
- c) Parturition
- d) List names of Hormones involved in spermatogenesis
- e) Fertilization
- f) Oogenesis

Q2) a) Explain spermatogenesis process and add a note on spermeogenesis?[6]

b) Describe ovarian cycle and its Hormonal regulation? [4]

Q3) a) Describe anatomy and growth of mammary gland? [6]

b) What are specific actions of FSH, LH, estrogen and progesteron during secretory phase of menstrual cycle? [4]

Q4) a) Describe all methods of contraception in male and female? [6]

b) Explain detail process of fertilization? [4]

P.T.O.

Q5) Write a short notes on any Two of the following.

[10]

- a) Estrous cycle and its hormonal regulations.
- b) Write a short note on Ferguson reflex.
- c) Write a short note on Pituitary gonadal axis.



Total No. of Questions : 5]

SEAT No. :

PC4192

[Total No. of Pages : 2

[6339]-3005

S.Y.M.Sc.

ZOOLOGY

**ZOO - 603 -MJ : Developmental Biology
(2023 Credit Pattern) (Semester - III)**

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 2 to 5 carry equal marks.*

Q1) Solve any five of the following.

[5]

- a) Define developmental biology.
- b) Define teratogen.
- c) What is reaction norm?
- d) Enlist any one environmental cue affecting normal development.
- e) What is modularity?
- f) What is programmed theory of aging?

Q2) a) Describe the process of primary neurulation.

[6]

b) Explain telomeue theory of aging.

[4]

P.T.O.

Q3) a) Describe the intrinsic pathway of apoptosis. [6]

b) Explain heterometry. [4]

Q4) a) Describe the formation of eye feild. [6]

b) Explain the role of symbionts in polyphenism. [4]

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

a) Deosophila melanogaster as a model organism.

b) Predator induced polyphenism.

c) Diabetes and teratogenesis.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages :1

PC4193

[6339]-3006

M.Sc. - II

ZOOLOGY

ZOO 604 MJ : Insect Physiology and Biochemistry

(2023 Credit Pattern) (Semester- III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Q.1 is compulsory.*
- 2) *Answer any three questions from Q2 to Q5.*
- 3) *Q2 to Q5 carry equal marks.*

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

- a) Write names of any Two cells of fat body.
- b) Define the term “Microsome”.
- c) What is the pH of Insect Hemolymph?
- d) Name any three inorganic components of insect hemolymph.
- e) Define ‘Sarcomere’.
- f) Write names of any Two subunits of Troponin Protein.

Q2) a) Explain the structure of Insect Integument with suitable diagram. **[6]**

b) Describe the structure of Malpighian Tubules. **[4]**

Q3) a) Describe various respiratory organs in aquatic Insects. **[6]**

b) Write an essay on : “Endocrine system of Insects”. **[4]**

Q4) a) Explain the process of protein digestion in Insects. **[6]**

b) Explain how insecticides are degraded in Microsomes. **[4]**

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

- a) Histological organization of Fat body.
- b) Physico-chemical properties of Hemolymph/plasma.
- c) Cellulose digestion in Insects.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

PC4194

[6339]-3007

M.Sc. - II

ZOOLOGY

**ZOO-610 MJ : Applied Genetics
(2023 Credit Pattern) (Semester-III)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Attempt any three questions from question 2 to 5.*
- 3) *Question 2 to question 5 carry equal marks.*

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

- a) Restriction enzymes
- b) Genetic counseling
- c) Embryonic stem cell
- d) VNTR
- e) Autosomal recessive inheritance pattern
- f) Monoclonal antibodies

Q2) a) Describe use of molecular markers in disease diagnostics with suitable example. **[6]**

b) Discuss Drosophila genome project. **[4]**

Q3) a) Discuss bacterial conjugation. Add a note on its application in chromosome mapping. **[6]**

b) Discuss amniocentesis. **[4]**

P.T.O.

Q4) a) Explain gene cloning. [6]

b) Discuss use of somatic cell hybrids in mapping. [4]

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

a) Describe gene therapy.

b) Describe in detail the process of genetic counseling.

c) Discuss various gene expression vectors used in genetic engineering.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages :1

PC4195

[6339]-3008

M.Sc. - II

ZOOLOGY

ZOO-612 MJ : Animal Behaviour

(2023 Credit Pattern) (Semester- III)

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 2 to 5 carry equal marks.*

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

- a) Explain conflict.
- b) What is Dispersal?
- c) What is Kin selection?
- d) What is cooperative breeding?
- e) What is flocking in birds?
- f) What is camouflage?

Q2) a) Describe anti-predator defence mechanism. **[6]**

b) Write a note on homing in birds. **[4]**

Q3) a) Describe in detail herding in mammals. **[6]**

b) Write a note on alloparental behaviour. **[4]**

Q4) a) Describe Reproductive strategies. **[6]**

b) Explain social organization in primates. **[4]**

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

- a) Types of mimicry
- b) Courtship
- c) Olfactory communication

