

Exam Code: 225002

Paper Code: 2239

Programme: Master of Science (Zoology) Semester- II

Course Title: Biostatistics

Course Code: MZOL-2334

Time Allowed: 3 Hours

Max Marks: 70

Note: Attempt five questions in all, selecting atleast one question from each section. Fifth question may be attempted from any section. Each question carries 14 marks. The students can use only Non-Programmable & Non-Storage Type Calculator and Statistical Tables.

Section A

1 a) Write short notes on

(i) Frequency distribution

(ii) Histogram

(iii) Dispersion

(iv) Kurtosis

(8)

b) The probability that a student passes a Zoology test is $\frac{2}{3}$ and probability that he passes both Zoology and Botany test is $\frac{14}{15}$. The probability that he passes at least one test is $\frac{4}{5}$. What is the probability that he passes Botany test? (6)

2 a) What are (i) Independent events (ii) Mutually exclusive events
(iii) Conditional probability (iv) Equally likely events (8)

b) Sam and Tina play a game in which their chances of winning are in the ratio 3:2. Find Sam's chance of winning at least three games out of five games played. (6)

Section B

3) a) The diameter of an electric cable, say X , is assumed to be a continuous variable with p.d.f.

$$f(x) = 6x(1 - x), \quad 0 \leq x \leq 1$$

(i) Check that $f(x)$ is p.d.f. (4)(ii) Determine a number 'b' such that $P(X < b) = P(X > b)$ (4)

b) Let X be a random variable with following probability distribution

X	-3	6	9
f(x)	$\frac{1}{6}$	$\frac{1}{2}$	$\frac{1}{3}$

Find: (i) $E(X)$ (ii) $E(X^2)$ (iii) $E(2X + 1)^2$ (6)

4) Discuss Binomial and Poisson distributions in detail. (14)

Section C

5) a) Calculate the correlation coefficient for the following data (6)

X	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	69	71

b) Define: (i) Line of Regression (4)

(ii) Regression coefficient (4)

6) Obtain the equations of two lines of regression for the following data. Also obtain the estimate of X for Y = 70 (14)

X	65	66	67	67	68	69	70	72
Y	67	68	68	65	72	72	69	71

Section D

7) a) Explain t-test for difference of means. (7)

b) To check the efficiency of a drug against typhoid, an experiment is conducted on 700 people of a locality. The drug was injected to 450 people and following cases of typhoid infection were found: (7)

	Infected	Not-Infected	Total
Administered the drug	140	310	450
Without drug	180	70	250
Total	320	380	700

Use χ^2 test to determine the effectiveness of the drug against typhoid

8) a) Explain: (i) Statistics (ii) Parameters (8)

(iii) Null Hypothesis (iv) Level of Significance

b) Two random samples gave following results. Test whether the samples come from the same normal population at 5% level of significance. Given $F_{0.05}(9,11) = 2.90$; $F_{0.05}(11,9) = 3.10$; $t_{0.05}(20) = 2.086$; $t_{0.05}(22) = 2.07$ (6)

Sample	Size	Sample mean	Sum of squares of deviation from mean
1	10	15	90
2	12	14	108

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Paper Code: 2236

Programme: Master of Science (Zoology)
Semester-II

Course Title: Functional Organization of Animals-II

Course Code: MZOL-2481 ✓

Time Allowed: 3 Hours

Max Marks: 70

Attempt five questions in all. Selecting at least one question from each section (A to D) respectively. Fifth question may be attempted from any section (A-D). Write legibly and Draw well labeled diagrams wherever necessary. Each question carries 14 marks.

Section-A

1. Discuss in brief about the various specializations of integument among Vertebrates. (14)
2. Explain briefly:
 - (a) Embryonic origin of Integumentary system
 - (b) Structure of Human skin (7+7)

Section-B

3. (a) Compare and Contrast between various kinds of Muscles.

(b) Explain the most favorable concept of muscle mechanics. (7+7)

4. Discuss the various exoskeletal and endoskeleton structures among invertebrates. (14)

Section-C

5. Discuss in detail the histology of Thyroid gland along with the physiological functions of its hormones. (14)

6. (a) What is hypothalamo-hypophyseal axis? Give its neurophysiological feed back advantage.

(b) Explain briefly: Diabetes insipidus, Cushing Syndrome and Grave's Disease. (7+7)

Section-D

7. Write short notes on:

(a) Encapsulated sensory receptors

(b) Associated sensory receptors (7+7)

8. Explain the structure of human ear along with mechanism of hearing and equilibrium. (14)

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Paper Code: 2237

Programme: Master of Science (Zoology) Semester- II

Course Title: Applied Zoology- I (Invertebrates)

Course Code: MZOL-2482

Time Allowed: 3 Hours

Max Marks: 70

Note: Attempt five questions in all, selecting atleast one question from each section (A to D). Fifth question may be attempted from any section. Each question carries 14 marks. Draw diagrams wherever necessary.

Section A

1. Explain in detail the social organization of colony and nest of the Honey Bees. 14
2. a) Which species of honey Bees are known to be used for Apiculture? 11
b) Write a note on the history of Apiculture 3

Section B

3. a) Write a note on cultivation and harvesting of Lac 9
b) Explain life cycle of Lac Insect. 5
4. a) What is Sericulture? Discuss different species of silk moth reared for sericulture. 7
b) Explain life cycle of Silk moth. 7

Section C

5. Write the systematic classification of Prawn. Which species are used for prawn culture? 14
6. Write a detailed note on spoilage and prevention of Prawns. 14

Section D

7. How Pearls are formed? Write a detailed note on composition, quality, and commercial value of Pearls. 14
8. What is vermiculture? Discuss different species of earthworms used in vermiculture. 14

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Programme: Master of Science (Zoology) Semester- II

Course Title - Evolution

Course Code - MZOL-2483 ✓

Time Allowed: 3 Hours

Max Marks: 35

Note: Attempt five questions in all, selecting atleast one question from each section (A to D). Fifth question may be attempted from any section. Each question carries 7 marks. Draw diagrams wherever necessary.

Section A

1. Discuss Connecting links and Missing links in favour of organic evolution 7
2. Discuss Lemarkism with the help of suitable examples 7

Section B

3. What are variations? Discuss its types with suitable examples. 7
4. Discuss following
 - a. Industrial melanism 3.5
 - b. Replica plating 3.5

Section C

5. What are the different isolating mechanisms? Briefly comment on each of them. 7
6. What is continental drift? Discuss the evidences to support Continental drift theory and mechanism of continental drift. 7

Section D

7. State Hardy Weinberg's law of equilibrium. Discuss its significance and salient features. 7
8. Discuss following
 - a. Evolution of Horse 3.5
 - b. Future course of evolution 3.5

Exam Code: 225004

Paper Code: 4223

Master of Science (Zoology) Semester- IV

Course Title: Animal Behaviour and Wildlife Conservation

Course code: MZOL-4481✓

Time Allowed: 3 Hours

Max Marks: 80

Note: Attempt FIVE questions in all, selecting at least one from each section (A to D). Fifth question can be attempted from any section. Each question carries 16 marks. Draw neat and well labelled diagrams wherever necessary.

Section – A

Q1. a) Describe Aggressive Behavior patterns in animals citing relevant examples.

b) Write a detailed note on Visual communications in animals. (8,8)

Q2. a) Discuss the role of Environmental in the development of behaviour citing suitable examples.

b) Write a detailed note on Analysis of behaviour. (10,6)

Section - B

Q3. Discuss mating systems in animals with suitable examples. (16)

Q4. Explain following:-

a) Flocking in Birds

b) Schooling in fishes (8,8)

Section - C

Q5. a) Discuss various causes of depletion of wildlife.

b) Elaborate the terms alpha, beta and gamma diversity with suitable examples. (8,8)

Q6. What do you know about:-

a) Different categories of IUCN

b) Red Data Book (10,6)

Section - D

Q7. Give an account of Status of wildlife in Punjab. Also name the state bird and state animal of Punjab. (16)

Q8. Discuss in detail the efforts done to conserve Tigers in India. (16)

Exam Code: 225004

Paper Code: 4224

Master of Science (Zoology) Semester-IV

Course Title: Molecular Genetics

Course code: MZOL-4482 ✓

Time Allowed: 3 Hours

Max Marks: 80

Note: Attempt FIVE questions in all, selecting at least one from each section (A to D). Fifth question can be attempted from any section. All questions carry 16 marks. Draw well labelled diagrams wherever necessary.

Section – A

- Q1. Discuss in detail the mechanism of eukaryotic DNA replication. (16)
Q2. a) Difference between Prokaryotic and Eukaryotic DNA replication.
b) Explain the SOS error prone repair in bacteria. (8,8)

Section - B

- Q3. a) Name various key enzymes involved in RNA transcription.
b) Discuss the mechanism of transcriptional regulation. (8,8)
Q4. Compare and contrast between Prokaryotic and Eukaryotic transcription. (16)

Section - C

- Q5. Write short notes on:-
a) Wobble hypothesis
b) Machinery for translation (8,8)
Q6. Explain in detail the co-translational and post translational modifications of proteins. (16)

Section - D

- Q7. Explain in brief:-
a) Causes of Cancer
b) Tumor Suppressor Genes (8,8)
Q8. Discuss the various molecular approaches to cancer treatment. (16)

Exam Code: 225004

Paper Code: 4225

Master of Science (Zoology) Semester-IV

Course Title: Concepts of Immunology

Course code: MZOL-4483

Time Allowed: 3 Hours

Max Marks: 80

Note: Attempt FIVE questions in all, selecting at least one from each section (A to D). Fifth question can be attempted from any section. Each question carries 16 marks. Draw diagrams wherever necessary.

Section A

1. Discuss primary lymphoid organs in detail. 16
2. Define and discuss GALT and CALT. 16

Section B

3. Give detailed structure and classes of MHC. 16
4. Explain classical pathway of complement system. 16

Section C

5. Discuss various immunodeficiency disorders. 16
6. Discuss Type IV Hypersensitive reactions. 16

Section D

7. Explain Enzyme Linked Immunosorbent Assay in detail. 16
8. Write a note following:-
 - a) Radioimmuno Assay 8
 - b) Immunoblot 8

Exam Code: 225004

Paper Code: 4226

Master of Science (Zoology) Semester-IV

Course Title: Developmental Biology-II

Course code: MZOL-4484 ✓

Time Allowed: 3 Hours

Max Marks: 80

Note: Attempt five questions in all, selecting at least one from each section. Fifth question can be attempted from any section. Each question carries 16 marks. Draw well labelled diagrams wherever necessary.

Section-A

Q1. What are Cell-Cell interactions? Give their role in cell differentiation during development. (16)

Q2. Write short notes on:

(a) Competence

(b) Primary and Secondary Inductions

(8,8)

Section-B

Q3. (a) Discuss the process of osteogenesis during development.

(b) Explain the developmental mechanism of neurons in brain as ectodermal derivative. (8,8)

Q4. Explain the phenomenon of transdifferentiation and dedifferentiation with suitable examples. (16)

Section-C

Q5. Explain the following in brief with suitable examples -

(a) Nucleo-cytoplasmic interactions during development

(b) Influence of extrinsic factors on genetic control of development

(8,8)

Q6. Discuss the Concept of organizers and induction along with their developmental significance. (16)

Section-D

Q7. Compare and contrast between amphibian and insect metamorphosis with reference to the role of hormones. (16)

Q8. Explain the events during the regeneration of the urodele limb. (16)

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Paper Code: 4227

Master of Science (Zoology) Semester-IV

Course Title: Biosystematics

Course code: MZOL-4485

Time Allowed: 3 Hours

Max Marks: 80

Note: Attempt FIVE questions in all, selecting at least one from each section (A to D). Fifth question can be attempted from any section. Each question carries 16 marks. Draw diagrams wherever necessary.

Section A

1. Discuss character weighing for classification of organisms. 16
2. Explain major aspects of chemotaxonomy. 16

Section B

3. Write a note on collection of organisms for taxonomy. 16
4. Discuss important rules of international code of Zoology. 16

Section C

5. a) Write the formation of taxonomic article. 8
- b) Write the requirements for preparation of publication. 8
6. a) What is difference between species and sub-species. Discuss in detail about various types of species and sub-species. 14
- b) Define Infra-species. 2

Section D

7. Write a note on outline of classification of kingdom animalia. 16
8. Write a note following minor phyla
 - a) Ectoprocta 8
 - b) Acanthocephala 8