

Bhakta Kavi Narsinh Mehta University, Junagadh



Bachelor of Science

(Semester -I & II)

FACULTY OF SCIENCE

ZOOLOGY SYLLABUS

On Effective From 2016

EXAMINATION CODING SYSTEM

Sr. No.

Name of Programme

B. Sc. Zoology

1	Title Of Paper	(In Sem -I) Non Chordates : Systematics, Forms & Functions, Cell biology & Histology, Ecology, Fisheries Biology& Wild life Biology	(In Sem -II) Chordate: Systematic, Forms & Functions, Genetics, Evolution, Physiology, Embryology, Applied Zoology, Reproductive Biology and Functional Anatomy of chordates
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2	Theory Credit	4	4
3	Practical Credit	3	3
4	Total Credit	7	7
5	External Marks Of Theory	70	70
6	Internal Marks Of Theory	30	30
7	Total Marks Of Theory	100	100
8	External Marks Of Practical	35	35
9	Internal Marks Of Practical	15	15
10	Total Marks Of Practical	50	50
11	Grand Total	150	150
12	External Exam Time Duration	2½ Hours	2½ Hours

Course / Paper Code

13	Year	1	6	1	6
14	Faculty	0	3	0	3
15	Subject	0	4	0	4
16	UG/PG	0	1	0	1
17	Semester	0	1	0	2
18	Paper	0	1	0	2
19	Core	0	0	0	0

BHAKTA KAVI NARSINH MEHTA UNIVERSITY, JUNAGADH

(CBCS Syllabus)

SEMESTER – I

ZOOLOGY

PAPER – Z-01

Non Chordates: Systematics, Forms & Functions, Cell biology & Histology, Ecology, Fisheries Biology & Wild life Biology

UNIT – 1: SYSTEMATICS

Salient feature & classification up to classes in Non-chordates, structural organization in different phylum of Non-chordates with examples.

Kingdom- Protista, Phylum-Porifera, Coelenterata, Platyhelminthes, Aschelminthes, Annelida, Arthropoda, Mollusca, Echinodermata, Hemichordata.

UNIT – 2: FORMS AND FUNCTIONS IN ANIMALS

General structures and morphology with functional anatomy of following type Animals.

2.1 PLATYHELMINTHES – Type study: Taenia solium.

2.2 ANNELIDA – Type Study: Earth worm.

2.3 ARTHROPODA – Type Study: Mosquito.

(i) Life cycle of Culex & Anopheles Mosquito.

(ii) Mouth parts of Culex & Anopheles mosquito.

UNIT – 3: CELL BIOLOGY AND HISTOLOGY

3.1 CELL BIOLOGY: Only Structure and Function of following organelles.

- (i) Mitochondria
- (ii) Nucleus
- (iii) Endoplasmic Reticulum
- (iv) Plasma membrane

3.2 HISTOLOGY: Histological structure and function of following organs of Mammals.

- (i) Stomach
- (ii) Intestine
- (iii) Liver
- (iv) Pancreas

UNIT – 4: ECOLOGY & FISHERIES BIOLOGY

4.1 Introduction of Ecology

4.2 Marine Ecosystem.

4.3 Fresh water – Pond Ecosystem.

4.4 Ecological Adaptations:

- (i) Fossorial Adaptation
- (ii) Aquatic Adaptation
- (iii) Arboreal Adaptation
- (iv) Volant Adaptation
- (v) Desert Adaptation

4.5 Introduction of fish morphology

4.6 Difference between Chondrichthyes and Osteichthyes

4.7 Scales in fishes

4.8 Types of fishing Boats & Nets

UNIT – 5: WILDLIFE BIOLOGY

5.1 Introduction & Importance of Wildlife.

5.2 Difference between National Parks & Sanctuaries

5.3 Wildlife in Gujarat:

(I) NATIONAL PARKS: (i) Gir National Park.

(ii) Marine National Park in Gulf of Kutch.

(II): SANCTUARIES:

(i) Kutch desert wildlife sanctuary.

(ii) Barda wildlife sanctuary.

(iii) Nalsarovar bird sanctuary.

(iv) Khijadia bird sanctuary.

PRACTICALS RELATED TO PAPER – Z-01

Practical: 1 : Identification and classification of Invertebrate animals

- (i) Phylum: Protozoa : - Arcella, Ceratium, Vorticella, Plasmodium
- (ii) Phylum: Porifera : - Leucosolenia, Euplectella, Euspongia
- (iii) Phylum: Coelenterata : - Hydra, Rhizoastoma, Metridium

Practical: 2 : Identification and Classification of Invertebrate animals.

- (i) Phylum: Platyhelminthes : - Planaria, Liverfluke, Tape worm
- (ii) Phylum; Aschelminthes : - Ascaris, Hookworm
- (iii) Phylum: Annelida : - Aphrodite, Earthworm, Leech

Practical: 3 : Identification and Classification of Invertebrate animals

- (i) Phylum : Arthropoda :- Peripetus, Lobester, Millipede, Dragon fly, Scorpion
- (ii) Phylum: Mollusca : - Chiton, Pila, Unio, Octopus, Dentalium

Practical: 4 : Identification and Classification of Invertebrate animals

- (i) Phylum: Echinodermata: - Star fish, Brittle Star, Sea Urchin, Sea-Cucumber, Feather Star
- (ii) Phylum : Hemichordata : - Balanoglossus

Practical: 5 : Systems of Earth worm:

- (i) External Characters.
- (ii) Digestive System.
- (iii) Nervous System.
- (iv) Reproductive System
 - Through chart or Multimedia

Practical: 6 : Mounting of Earth worm:

- (i) Septal Nephridia
- (ii) Body Setae
- (iii) Blood Gland
- (iv) Ovary
 - Through chart or Multimedia or Slide

Practical: 7 : Study of permanent slides (Taenia solium):

- (i) Scolex
- (ii) Mature segment
- (iii) Gravid segment
- (iv) Bladder worm

Practical: 8 : Study of permanent slides (Earth worm):

- (i) T.S. Through Pharynx
- (ii) T.S. Through Gizzard
- (iii) T.S. Through Typhlosole

Practical: 9 : Study of permanent slides (Mosquito):

- (i) Life cycle of Culex Mosquito.
- (ii) Life cycle of Anopheles mosquito.
- (iii) Mouth Parts of Culex and Anopheles Mosquito.

Practical: 10 : Study of following cell organelles.

- (i) Mitochondria
 - (ii) Nucleus
 - (iii) Endoplasmic Reticulum
 - (iv) Cell Membrane
- By photograph, Chart, Model, or multimedia.

Practical: 11 : Study of Histological structures of following Mammalian Organs.

- (i) Stomach
- (ii) Intestine
- (iii) Liver
- (iv) Pancreas

Practical: 12 : Study of different animals for Ecological Adaptation.

- (i) Fossorial : Earthworm, Gryllotalpa, Snake, Rat.
- (ii) Aquatic : Labeo, Crocodile, Turtle, Loligo.
- (iii) Arboreal : Wall lizard, Chamelion, Squirrel, Monkey.
- (iv) Volant : Exocoetus, Draco, Flying frog.

(v) Desert : Uromastix, Phrynosoma.

Practical: 13 : Fisheries Biology:

- (i) Difference between Chondrichthyes and Osteichthyes
- (ii) Scales in fishes
- (iii) Types of fishing Boats & Nets

Practical: 14 : Study of Wild animals.

- (i) Study of National parks and Sanctuaries of Gujarat state.
- (ii) Study of following wild animals on the basis of zoo-geographical region as per theory
 - (a). Asiatic Lion
 - (b). Leopard
 - (c). Corals
 - (d). Jelly fish
 - (e). Chinkara
 - (f). Spotted deer
 - (g). Greater flamingo
 - (h). Painted stork
 - by photograph, Chart, stuffed animals or multimedia.

Practical: 15 : Instrumental Biology

Principle, structure & function of following instruments.

- (i) Light microscope
- (ii) Thermometer
- (iii) pH Meter
- (iv) Centrifuge

Practical: 16 : Visit to any one National Park or Sanctuary OR Fish processing plant OR Fishing area OR Reserve forest area.

DISTRIBUTION OF UNITS

SEMESTER – I

<u>PAPER – Z-01</u>			
Unit No.	Unit Title	Theory Period	Marks.
Unit : 1	Systematic	10	14
Unit : 2	Forms and Functions	18	14
Unit : 3	Cell Biology and Histology	14	14
Unit : 4	Ecology & Fisheries Biology	13	14
Unit : 5	Wildlife Biology	10	14
TOTAL :		65	70

- Above statement concerned to only Theory portion of the paper.
- Above mentioned third column ‘Theory Period’ indicates total number of theory lectures per unit.
- Total syllabus should be completed within 65 theory lectures.
- Each and every unit carries equal 14 marks.
- Total marks for theory examination are 70 marks.
- **PAPER SETTER MUST FOLLOW THE UNIT WISE MARK SETUP.**

BHAKTA KAVI NARSINH MEHTA UNIVERSITY, JUNAGADH
THEORY EXAMINATION

SEMESTER – I

ZOOLOGY

(Based on Paper – Z-01)

Time: 2½ Hours

Total Marks: **70**

Instructions:

1. Illustrate your answer with neat and labeled diagrams.
2. Figure to the right side indicates full marks of questions.

QUESTION-1 (THIS QUESTION IS TAKEN FROM UNIT-1)

QUESTION-2 (THIS QUESTION IS TAKEN FROM UNIT-2)

QUESTION-3 (THIS QUESTION IS TAKEN FROM UNIT-3)

QUESTION-4 (THIS QUESTION IS TAKEN FROM UNIT-4)

QUESTION-5 (THIS QUESTION IS TAKEN FROM UNIT-5)

- ANY TYPE OF MCQ IS NOT INCLUDED IN THIS PAPER
STYLE.

- EACH QUESTION CARRIES EQUAL MARKS – 14.

- THERE ARE 5 QUESTIONS CONTAINING SUBQUESTIONS
(A), (B), (C), (D).

QUESTION-1: (From UNIT-1) [14]

(A) Give the answer of following questions. [04]

Only short questions, Definitions and Fill in the blanks and NOT INCLUDED MCQs.

Each Question carries 1 Mark.

(1)

(2)

(3)

(4)

(B) Write any one out of Two. [02]

Each Question carries 2 Marks.

(1)

(2)

(C) Write any one out of Two. [03]

Each Question carries 3 Marks.

(1)

(2)

(D) Write any one out of Two. [05]

Each Question carries 5 Marks.

(1)

(2)

QUESTION-2: (As Above) (From UNIT-2) [14]

QUESTION-3: (As Above) (From UNIT-3) [14]

QUESTION-4: (As Above) (From UNIT-4) [14]

QUESTION-5: (As Above) (From UNIT-5) [14]

BHAKTA KAVI NARSINH MEHTA UNIVERSITY JUNAGADH

PRACTICAL EXAMINATION

SEMESTER – I

ZOOLOGY

(Based on Paper – Z-01)

Time: 3 Hours

Total Marks: 35

- Que -1: Sketch and label _____ system of Earth worm. [06]
- Que – 2: Sketch and label/Mountings of earth worm _____.
(Practical-6,7&8) [03]
- Que – 3: Do as per instruction and show it to examiner [03]
(Practical – 13)
- Que – 4: Do as per instruction and show it to examiner [03]
(Practical – 10)
- Que – 5: Write as per instruction. [14]
- (A) Identify and classify giving reasons.
(Lower invertebrate)
 - (B) Identify and classify giving reasons.
(Higher invertebrate)
 - (C) Identify and describe. (Practical- 9)
 - (D) Identify and describe. (Practical-11)
 - (E) Identify and describe (Practical-12)
 - (F) Identify and describe (Practical-14)
 - (G) Identify and describe (Practical-15)
- Que. – 5: Report and Viva-voice. [03]
- Que – 6: Certified Journal. [03]

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UNIVERSITY, JUNAGADH

**List of Slides, Specimens, Charts, Models &
Photographs**

SEMESTER – I ZOOLOGY

(Based on Paper – Z-01)

LIST OF SLIDES:

- (1) All animals from Protozoa. [Practical-1, (i)]
- (2) Mountings of Earthworms. [Practical-6]
- (3) Permanent slides of Taenia solium. [Practical-7]
- (4) Permanent slides of Earth worm. [Practical-8]
- (5) Permanent slides of Mosquitoes. [Practical-9]
- (6) Histological structure of Mammalian organs. [Practical-11]
- (7) Scales in Fishes. [Practical-13, (ii)]

LIST OF SPECIMENS:

- (1) All animal specimens from Phylum- Porifera to Phylum-Hemichordata. [Practical-1,(ii),(iii) to Practical-4]
- (2) All animal specimens for Ecological Adaptations. [Practical-12]
- (3) One animal of Chondrichthyes-Scoliodon & One specimen of Osteichthyes-Labeo/Catla/Pomfret. [Practical-13, (i)]

LIST OF CHARTS/MODELS/PHOTOGRAPHS:

- (1) National Parks & Sanctuaries of Gujarat State & Wild animals on the basis of Zoo-geographical region. [Practical-14,(i),(ii)]

LIST OF INSTRUMENTS:

- (1) Light Microscope (2) Thermometer (3) pH Meter (4) Centrifuge

SEMESTER – I

List of books For Unit-1 & 2

- 1 : Invertebrate Zoology.....E.L.Jordan &
Dr.P.S.Verma
- 2 : Invertebrate Zoology.....P.S.Dhami
&J.K.Dhami.
- 3 : A modern textbook of Zoology Invertebrat
Zoology.....R.L.Kotpal.
- 4 : A textbook of Practical Zoology
Invertebrates.....S.S.Lal
- 5 : Kotpal Series
Platyhelminthus.....R.L.Kotpal
- 6 : Kotpal Series –
Annelida.....R.L.Kotpal
- 7 : Kotpal Series –
Arthropoda.....R.L.Kotpal
- 8 : A Manual of Practical Zoology,
Invertebrates.....P.S.Verma

List of books For Unit-3

- 9 : Cell Biology.....Dr. Satyeshchandra
Roy.
- 10 : Cell
Biology.....C.B.Powe
r
- 11 : Cytology &
Genetics.....P.K.Gupta
- 12 : Cell & Molecular Biology.....De
Robertis.
- 13 : Biotechnological Cell
Biology.....V.B.Rastogi.
- 14 : Molecular
Biology.....V.B.Rastogi
- 15 :
Histology.....Atlas.
- 16 : Cell Biology, Genetics, Molecular Biology, Evolution and
Ecology.....P.S.Varma & V.K.Agrawal.
- 17 : Cytology.....P.S.Verma &
V.K.Agarwal
- 18 : Cytology, Genetics & Evolution.....P.K.Gupta

List of books for
Unit-4

- 19 : Ecology & Environmental
biology.....P.D.Sharma.
- 20 : Cell Biology, Genetics, Molecular Biology, Evolution and
Ecology.....P.S.Varma & V.K.Agrawal.
- 21 : Fundamentals of Ecology.....Odum E.P. & Barrett
G.W.
- 22 : Basic Concepts of Ecology.....A.
Arumugam
- 23 : Elements of Ecology.....Robert &
Thomas.
- 24 : Environmental Biology.....P.S.Verma & V.K.Aggrwal
- 25 : Fish and Fisheries of
India.....V.B.Jhingran.

List of books for
Unit-5

- 26 : Wild Life of
Gujarat.....H.S.Singh.
- 27 : Indian National Parks and Sanctuaries.....Khatri & Annand S.
- 28 : Modern textbook of Zoology
Vertebrates.....R.L.Kotpal
- 29 : Vertebrate Zoology.....E.L.Jordan &
Dr.P.S.Verma
- 30 : Practical Zoology
Vertebrate.....S.S.Lal

List of Books for Viva-
Voices

- 31 : Practical Zoology
Invertebrate.....S.S.Lal
- 32 : Practical Zoology
Vertebrate.....S.S.Lal

BHAKTA KAVI NARSINH MEHTA UNIVERSITY, JUNAGADH

(CBCS Syllabus)

SEMESTER - II

ZOOLOGY

PAPER – Z-02

Chordate: Systematic, Forms & Functions, Genetics, Evolution, Physiology, Embryology, Applied Zoology, Reproductive Biology and Functional Anatomy of chordates

UNIT- 1: SYSTEMATIC, FORMS AND FUNCTIONS IN ANIMALS:

1.1 Salient features and classification up to class in Chordates with examples.

1.2 General structure and morphology with functional anatomy of following type.

(I) PROTOCHORDATA: Type study: Amphioxus

- (i) External Features
- (ii) Digestive system
- (iii) Endostyle
- (iv) T.S. through Pharynx region

(II) Embryonic development of Amphioxus:

- (i) Sperm
- (ii) Ovum
- (iii) Fertilization
- (iv) Blastulation
- (v) Gastrulation

UNIT- 2: GENETICS & EVOLUTION:

2.1 MULTIPLE ALLELES:

- (i) Characters of multiple alleles.
- (ii) The 'C' gene in Rabbit (Coat colour).
- (iii) A, B, AB and O blood groups in Humans.
- (iv) 'Rh' factor and Erythroblastosis foetalis.

2.2 EVOLUTION:

- (i) Introduction to Evolutionary Theories:** Lamarckism, Darwinism, Neo-darwinism
- (ii) Direct Evidences of Evolution:** Types of fossils, Incompleteness of fossil record, Phylogeny of Horse.

UNIT- 3: PHYSIOLOGY & EMBRYOLOGY:

3.1 DIGESTION:

- (i) Physiology of digestion in the alimentary Canal.
- (ii) Absorption of carbohydrates, proteins, lipids.

3.2 BLOOD:

- (i) composition of blood.
- (ii) physiology of coagulation of blood

3.3 SPERMATOGENESIS

3.4 OOGENESIS

UNIT- 4: APPLIED ZOOLOGY:

4.1 A study of general structure and characters of following pathogenic animals:

- (i) Entamoeba.
- (ii) Trypanosoma.
- (iii) Filarial worm.
- (iv) Guinea worm.
- (v) Round worm.
- (vi) Pin worm.

4.2 A study of general characters and structure of following harmful parasitic Insects of mankind:

- (i) Human louse.
- (ii) Bed bug.
- (iii) Flea.

4.3 Poultry science:

- (i) A general account of poultry science.
- (ii) A type of poultry house.
- (iii) Different apparatus used in poultry house.
- (iv) A visit of poultry farm.

4.4 A study of fresh water aquarium.

UNIT-5: REPRODUCTIVE BIOLOGY & FUNCTIONAL ANATOMY OF CHORDATES

5.1 Menstrual cycle

5.2 Estrus cycle

5.3 Integumentary System: Derivatives of integument: Glands and digital tips, Nails, Claws, Horns, Hoofs

5.4 Circulatory system: Origin & Evolution of heart.

PRACTICAL RELATED ON PAPER – Z-02

Practical: 1 : Identification and classification of Chordate animals.

- (i) Sub-Phylum : Urochordata : Herdmania
- (ii) Sub-Phylum: Cephalochordata : Amphioxus.
- (iii) Class: Cyclostomata : Petromyzon.
- (iv) Super Class: Pisces : Shark, Electric Ray, Eel, Sea-horse.

Practical: 2 : Identification and classification of Chordate animals.

- (i) Class: Amphibia : Ichthyophis, Bufo, Salamander.
- (ii) Class : Reptiles : Turtle, Draco, Chamaeleon, Mabuia (Skink), Varanus, Snake, Crocodile.
- (iii) Class: Aves : Weaver Bird, Parrot, Owl, Wood pecker.
- (iv) Class : Mammal : Duck-bill, Kangaroo, Hedge hog, Bat, Dolphin

Practical: 3 : Forms and Function in Animals :

- (i) Amphioxus: External characters
- (ii) Amphioxus: Lateral view with digestive system
- (iii) Amphioxus: Food & feeding mechanism with endostyle
- (iv) T.S. of pharynx in Amphioxus.

-By slides or charts or Multimedia.

Practical: 4 : Embryology of Amphioxus :

- (i) Sperm
- (ii) Ova
- (iii) Fertilization
- (iv) Cleavage (v)
- Blastulation (vi)
- Gastrulation

-By slides or charts or Multimedia.

Practical: 5 : Examples of Genetics.

Examples should be taken from theory portion of Multiple Alleles only.

Practical: 6 : To determine own blood group & Rh factor.

Practical: 7 : To study of following Evolutionary charts / models/ pictures:

- (i) Study of fossil evidence from plaster cast models and pictures

- (ii) Study of homology and analogy from suitable specimens/ pictures
- (iii) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors
- (iv) Darwin's finches with diagrams/ cut outs of beaks of different species.

Practical: 8 : Test of salivary Amylase for digestion of Starch.

Practical: 9 : General Emryology:

Study of oogenesis and spermatogenesis by chart or model.

Practical: 10 : Study of following pathogenic animals.

- (i) Entamoeba
- (ii) Trypanosoma
- (iii) Filaria worm
- (iv) Guinea worm
- (v) Ascaris lumbricoides (Round worm)
- (vi) Enterobius vermicularis (Pin-worm)

Practical: 11 : Study of following harmful parasitic insects.

- (i) Human louse.
- (ii) Bed bug.
- (iii) Flea.

Practical: 12 : Study of following poultry apparatus.

- (i) Types of poultry farms
- (ii) Apparatus used in poultry farm: Feeder, Brooder, Waterer.
-By photographs, charts or by Multi-media.

Practical: 13 : To study of Integumentary derivatives: Glands, Claws, Hoofs, Nails, Horns.

Practical: 14 : Origin & Evolution of heart and comparative account of it.

Practical: 15 : Visit to poultry farm/ Pathology Laboratory/ Natural History Museum And Submission Of Report.

DISTRIBUTION OF UNITS

SEMESTER – II

PAPER – Z-02			
Unit No.	Unit Title	Theory Period	Marks.
Unit : 1	Systematics, Forms and Functions	15	14
Unit : 2	Genetics & Evolution	14	14
Unit : 3	Physiology & Embryology	13	14
Unit : 4	Applied Zoology	09	14
Unit : 5	Reproductive Biology & Functional Anatomy of chordates	14	14
TOTAL :		65	70

- Above statement concerned to only Theory portion of the paper.
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- Total syllabus should be completed within 65 theory lectures.
- Each and every unit carries equal 14 marks.
- Total marks for theory examination are 70 marks.
- **PAPER SETTER MUST FOLLOW THE UNIT WISE MARK SETUP.**

**BHAKTA KAVI NARSINH MEHTA UNIVERSITY,
JUNAGADH**

SEMESTER – II

ZOOLOGY

(Based on Paper – Z-02)

Time: 2½ Hours

Total Marks: 70

Instructions:

1. Illustrate your answer with neat and labeled diagrams.
2. Figure to the right side indicates full marks of questions.

QUESTION-1 (THIS QUESTION IS TAKEN FROM UNIT-1)

QUESTION-2 (THIS QUESTION IS TAKEN FROM UNIT-2)

QUESTION-3 (THIS QUESTION IS TAKEN FROM UNIT-3)

QUESTION-4 (THIS QUESTION IS TAKEN FROM UNIT-4)

QUESTION-5 (THIS QUESTION IS TAKEN FROM UNIT-5)

**- ANY TYPE OF MCQ IS NOT INCLUDED IN THIS PAPER
STYLE.**

- EACH QUESTION CARRIES EQUAL MARKS – 14.

**- THERE ARE 5 QUESTIONS CONTAINING SUBQUESTIONS
(A), (B), (C), (D).**

QUESTION-1: (From UNIT-1) [14]

(A) Give the answer of following questions. [04]

Only short questions, Definitions and Fill in the blanks and NOT INCLUDED MCQs.

Each Question carries 1 Mark.

(1)

(2)

(3)

(4)

(B) Write any one out of Two. [02]

Each Question carries 2 Marks.

(1)

(2)

(C) Write any one out of Two. [03]

Each Question carries 3 Marks.

(1)

(2)

(D) Write any one out of Two. [05]

Each Question carries 5 Marks.

(1)

(2)

QUESTION-2: (As Above) (From UNIT-2) [14]

QUESTION-3: (As Above) (From UNIT-3) [14]

QUESTION-4: (As Above) (From UNIT-4) [14]

QUESTION-5: (As Above) (From UNIT-5) [14]

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SEMESTER – II

ZOOLOGY

(Based on Paper – Z-02)

Time : **3** Hours

Total Marks : 35

Que – 1 : Sketch and label _____ system of Amphioxus. [05]

(Practical-3)

Que – 2 : Sketch and label _____ (Practical-4 & 9) OR

Do as per instruction & show it to examiner.(Practical-6 & 8) [04]

Que – 3 : Solve the given example of Genetics. (Practical- 5)

Any two examples, Each from Coat colour of Rabbit & Blood Group. [04]

Que – 4 : Identify and Describe about comparative account of it.
(Practical- 14) [04]

Que – 5 : Write as per instruction. [12]

- (A) Identify and classify giving reasons.(Lower chordate) (B)
- Identify and classify giving reasons. (Higher Chordate) (C)
- Identify and describe. (Practical-8)
- (D) Identify and describe. (Practical-10 or 11)
- (E) Identify and describe. (Practical-12)
- (F) Identify and describe. (Practical-13)

Que – 6 : Tour Report & Viva – voice. [03]

Que – 7 ; Certified Journal. [03]

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**List of Slides, Specimens, Charts, Models &
Photographs**

SEMESTER – II

ZOOLOGY

(Based on Paper – Z-02)

LIST OF SLIDES:

(1) T.S. of Pharynx in Amphioxus. [Practical-3,(IV)] , Also available in Chart. (2)

All slides of Embryology of Amphioxus. [Practical-4] , Also available in Chart.

(3) Slides of Pathogenic animals-Entamoeba, Trypanosoma, Pin-Worm.
[Practical-10]

(4) Slides of harmful Parasitic Insects-Human louse, Bed-bug, Flea [Practical-11]

LIST OF SPECIMENS:

(1) All animal specimens from Sub-Phylum-Hemichordata to Class- Mammals.
[Practical-1&2]

(2) Specimens of pathogenic animals- Filaria-worm, Guinea-worm, Ascaris.
[Practical-10]

(3) Integumentary Derivatives- Glands, Claws, Hoofs, Nails & Horns.
[Practical-13], Also available in chart.

LIST OF CHARTS/MODELS/PHOTOGRAPHS:

(1) Amphioxus: External characters, Lateral view with Digestive System, Food & Feeding Mechanism with Endostyle, T.S. of Pharynx [Practical-3].

(2) Evolutionary Study of Fossil evidence, Homology and Analogy, Phylogeny of Horse, Darwin's Finches. [Practical-7]

(3) Spermatogenesis & Oogenesis. [Practical-9]

(4) Types of Poultry Farms, Feeder, Brooder & Waterer as Poultry apparatus.
[Practical-12], Also available in Instruments.

(5) Integumentary Derivatives- Glands, Claws, Hoofs, Nails & Horns.
[Practical-13]

(6) Heart: Origin, Evolution & Comparative account of it. [Practical-14]

LIST OF INSTRUMENTS/CHEMICALS & MATERIALS:

(1) Light Microscope

(2) Dissection Box, Serum A, Serum B, Serum D, Spirit & Cotton. [Practical-6] (3)

Saliva, Iodine (I₂), Starch-Solution, Cavity plate, Dropper.[Practical-7]

(4) Types of Poultry Farms, Feeder, Brooder & Waterer as Poultry apparatus.
[Practical-12]

SEMESTER – II

List of Books for Unit -1

- 1 : Chordate Zoology.....E.L.Jordan & Dr.P.S.Verma
- 2 : Modern textbook of Zoology VertebratesR.L.Kotpal.
- 3 : Chordate Embryology.....P.S.Verma & V.K.Agraval
- 4 : A manual of practical Zoology, Vertebrates.....P.S.Verma
- 5 : Practical Zoology, Vertebrates.....S.S.Lal

List of Books for Unit - 2

- 6 : Principal of Genetics.....Gardner.
- 7 : Genetics.....P.S.Varma &V.K.Agrawal.
- 8 : Problems on Genetics, Molecular Genetics & Evolutionary Genetics....
.....Dr. P.K.Banergee.
- 9 : Genetics & Biostatistics.....Meyyan.
- 10 : Cell Biology, Genetics, Molecular Biology, Evolution & Ecology.....P.S.Verma &
V.K.Agarwal.
- 11 : Cytology, Genetics & Evolution.....P.K.Gupta
- 12 : Organic EvolutionDr. N. Arumugam.
- 13 : Evolution.....Veerbala Rastogi.

List of Books for Unit - 3

- 14 : Animal Physiology.....P.K.Gupta.
- 15 : Animal Physiology.....V.K.Agrawal.
- 16 : Animal Physiology.....M.P.Arora
- 17 : A textbook of Animal Physiology.....Tyagi Prasm
- 18 : Human Physiology, Vol- I & II.....Chatterjee C.C.
- 19 : A text book of Animal Physiology.....A.K.Berry & K.Berry
- 20 : Animal Physiology & Bio-Chemistry.....R.A.Agrawal &
Anil k. Shrivastva & Kaushal Kumar
- 21 : Chordate Embryology.....P.S.Verma & V.K.Agraval

List of Books for Unit – 4

- 22 : Applied Zoology.....Arumugam, T. Murugan, Rajeshwar, Ram Prabhu.
- 23 : Economic Zoology.....Shukla &Upadhyay.
- 24 : Economic Zoology.....Venkitaraman.

List of Books for Unit – 5

- 25 : Reproductive Physiology.....A.V.Nalbandow.
- 26 : Chordate Zoology.....E.L.Jordan & Dr.P.S.Verma
- 27 : Modern textbook of Zoology VertebratesR.L.Kotpal.
- 28 : Animal Physiology.....M.P.Arora
- 29 : Animal Physiology & Bio-Chemistry.....R.A.Aggrawal & Anil k. Shrivastva & Kaushal Kumar

List of Books for Viva-Voice

- 33 : Practical Zoology Invertebrate.....S.S.Lal
- 34 : Practical Zoology Vertebrate.....S.S.Lal