BHAKT KAVI NARSINH MEHTA UNIVERSITY, JUNAGADH

FACULTY OF SCIENCE

[Three Years (6 Semesters) Full Time Course]

ZOOLOGY SYLLABUS

2019 - 20

Bhakt Kavi Narsinh Mehta University
Junagadh – 362 001
Gujarat, India

Website: www.bknmu.edu.in

BHAKT KAVI NARSINH MEHTA UNIVERSITY, JUNAGADH

ZOOLOGY

SYLLABUS

[SYLLABUS FOR THE CHOICE BASED CREDIT SYSTEM (CBCS)]

(S.Y. B.Sc.)

SEMESTER III – PAPER – Z-03

&

SEMESTER IV – PAPER – Z-04

New Syllabus

INFORCE FORM JUNE – 2019

BHAKT KAVI NARSINH MEHTA UNIVERSITY, JUNAGADH

[SYLLABUS FOR CHOICE BASED CRADIT SYSTEM (CBCS)]

INFORCE FORM JUNE – 2019

SUBJECT: ZOOLOGY

SEMESTER – III

ZOOLOGY PAPER – Z –03

Non Chordates: Systematics, Forms & Functions, Cell biology & Histology, Animal behaviour& Economic Zoology, Wild life Biology, Ecology & Instrumental Biology

SEMESTER – IV

ZOOLOGY PAPER – Z – 04

Chordate: Systematic, Forms & Functions, Embryology, Physiology &Reproductive Biology, Genetics & Inborn Errors of Metabolism, Evolution, Functional Anatomy of chordates & Fisheries Biology

FORWARD

Renewing and updating of the Curriculum is the prime important criteria in the University education system.

Syllabus provides an educational guide line and demarks the horizon of a subject. Syllabus of different Theory and Practical papers should have subjective harmony and gradual relationship within periphery of a subject.

Formulation of Curriculum for a particular subject requires the following criteria.

(A) Background of previous Curriculum.
(B) Relationship with other related subjects.
(C) Resources of Educational needs at regional level as well as national level.
(D) Financial and Statuary provisions of the State government.

All the above criteria are taken into consideration in formulation of this Curriculum.

This Curriculum is the result of prolonged discussions among the experienced teacher in this subject because after all, the college teachers are the real catalysts for implementation of this Syllabus.

The proposed Syllabus after required formalities will be implemented in the second year B.Sc.

Valuable guidelines and all facilities in this curriculum are provided by the authorities of the Bhakt Kavi Narsinh Mehta University, Junagadh.

Board of Studies, Zoology,
Bhakt Kavi Narsinh Mehta University,
Junagadh – 362 001

BHAKT KAVI NARSINH MEHTA UNIVERSITY, JUNAGADH

(CBCS Syllabus)

SEMESTER – III

ZOOLOGY

PAPER – Z-03

Non Chordates: Systematics, Forms & Functions, Cell biology & Histology, Animal behavior & Economic Zoology, Wild life Biology, Ecology & Instrumental Biology

UNIT – 1: SYSTEMATICS

Salient feature & classification up to classes in Non-chordates, structural organization in different phylum of Non-chordates with examples. Phylum-Protozoa, Porifera, Coelenterata, Platyhelminthes, Aschelminthes, Annelida, Arthropoda, Mollusca, Echinodermata, Hemichordata

UNIT – 2: FORMS AND FUNCTIONS IN ANIMALS

2.1 PORIFERA:
(i) General account of Canal System in Sponges
(ii) Economic Importance of Sponges

2.2 General structures and morphology with functional anatomy of following type

ANNELIDA: Type Study: Leech: Classification, External characters, Body Wall, Digestive system, Nervous system, Haemocoelomic system, Excretion and Reproductive system and development, Locomotion and Respiration

2.3 ARTHROPODA:
(i) Paripatus is as connecting link between Annelida & Arthropoda
(ii) Different types of Mouth parts in Insects

1. Chewing & Biting Type – Cockroach
2. Chewing & Lapping Type – Honey Bee
3. Piercing & Sucking Type – Mosquito
4. Sponging Type – Housefly
5. Siphoning Type – Butterfly

UNIT – 3: CELL BIOLOGY AND HISTOLOGY

3.1 CELL BIOLOGY: Only Structure and Function of following organelles
(i) Golgi Complex
(ii) Ribosome
(iii) Lysosme
(iv) Centrioles & Basal Bodies
(v) Cell junction: Gape Junction and Type Junction

3.2 HISTOLOGY: Histological structure and function of following organs of Mammals
(i) Pitutary gland
(ii) Thyroid gland
(iii) Adrenal gland
(iv) Ovary and Testis
(v) Kidney

UNIT – 4: ANIMAL BEHAVIOUR & ECONOMIC ZOOLOGY

4.1 Social Behaviour:
(i) Honey bee
(ii) Termite

4.2 Courtship & Reproductive Behaviour:
(i) Spider
(ii) Scorpion
(iii) Peacock

4.3 Parental Care Behaviour:
(i) Arius
(ii) Ichthyophis
(ii) Alytes

4.4 Household Insects:
(i) Insects affecting Human health: 1. House Fly. 2. Mosquito
(ii) Insects damaging Food Products: 1. Rice Weevil, 2. Wheat Weevil

(iii) Insects damaging Household Goods: 1. Termite, 2. Silver Fish
(iv) Insects damaging Storage grains: 1. Tribolium, 2. Pulse beetle

4.5 Insect Pest Management:
(i) Cultural Control
(ii) Biological Control
(iii) Chemical Control

UNIT – 5: WILD LIFE BIOLOGY, ECOLOGY & INSTRUMENTAL BIOLOGY

5.1 Wildlife in India & its Conservation

5.2 Reasons for depletion of Wild-life

5.3 Wild-life in Gujarat:

(I) NATIONAL PARKS:	(i) Vansda National Park
	(ii) Velavadar National Park
(II) SANCTUARIES:	(i) Ratanmahal Sloth bear Sanctuary
	(ii) Shoolpaneshwar Wild life Sanctuary

5.4 Threatened Wild animals of India:
(i) Mammals: Slender Loris, Black Nilgiri Langur, Cheetah, Asiatic Lion, Tiger, Snow leopard
(ii) Birds: Pink-Headed Duck, Himalayan Golden Eagle, Peacock, Great Indian Bustard, Greater Flamingo, Vulture (Long billed – Girnari Gidhdh)

5.5 Ecology:
(i) Energy Flow in Eco-system
(ii) Ecological pyramids

5.6 Instrumental Biology:
(i) Phase Contrast Microscope
(ii) Haemoglobinometer
(iii) Sphygmomanometer

PRACTICALS RELATED TO PAPER – Z-03

Practical: 1 : Identification and classification of Invertebrate animals

(i) Phylum: Protozoa : Noctiluca, Amoeba, Plasmodium, Opelina, Paramecium
(ii) Phylum: Porifera : Grantia, Hyalonema, Chalina

Practical: 2 : Identification and Classification of Invertebrate animals.

(i) Phylum: Coelenterata : Obelia, Aurelia, Gorgonia
(ii) Phylum: Platyhelminthes : Bipalium, Schistosoma, MonieziaExpansa
(iii) Phylum; Aschelminthes : Enterobiusvermicularis, Filarial worm, Guinea worm

Practical: 3 : Identification and Classification of Invertebrate animals

(i) Phylum: Annelida : Nereis, Lumbricus, Pontobdella,
(ii) Phylum : Arthropoda : Peripatus, Prawn, Centipede, Grasshopper, Spider, Limulus

Practical: 4 : Identification and Classification of Invertebrate animals

(i) Phylum: Mollusca :Chaetoderma, Mytilus, Aplysia, Dentelium, Loligo
(ii) Phylum: Echinodermata:Anthena (Star fish),Ophiocoma(Brittle Star), Echinocardium (Heart urchin), Holothuria (Sea Cucumber), Antedon (Feather Star)
(iii) Phylum: Hemichordata : Saccoglossus, Rhabdopleura

Practical: 5 : To Study Systems of Leech:

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

Practical: 6 : To Study Mounting of Leech:

(i) Jaws
(ii) Salivary Gland
(iii) Nephridia
(iv) Ovary
- Through chart or Multimedia or Slide

Practical: 7 : To Study Mouthparts of Insects:
(i) Chewing & Biting Type – Cockroach
(ii)Chewing & Lapping Type – Honey Bee
(iii) Piercing & Sucking Type – Mosquito
(iv) Sponging Type – Housefly
(v) Siphoning Type – Butterfly

Practical: 8 : To Study Cell Organelles:
(i) Golgi Complex
(ii) Ribosome
(iii) Lysosme
(iv) Centrioles & Basal Bodies

Practical: 9 : To Study Histological Structure of Mammalian Organs:
(i) Pitutary
(ii) Thyroid
(iii) Adrenal
(iv) Kidney

Practical: 10 : To Study Animal Behaviours:
1. Social Behaviour:
(i) Honey bee
(ii) Termite
2. Courtship & Reproductive Behaviour:
(i) Spider
(ii) Scorpion
(iii) Peacock
3. Parental Care Behaviour:
(i) Arius
(ii) Ichthyophis
(ii) Alytes

Practical: 11 : To StudyHosehold Insect:
(i) Insects affecting Human health: 1. House Fly 2. Mosquito
(ii) Insects damaging Food Products: 1. Rice Weevil, 2. Wheat Weevil
(iii) Insects damaging Household Goods: 1. Termite, 2. Silver Fish
(iv) Insects damaging Storage grains: 1. Tribolium, 2. Pulse bettle

Practical: 12 : To Study apparatus for collecting and killing method:
(i) Insect Net (iii) Killing Jar (ii) Aspirator

Practical: 13 : To Study National Parks and Sanctuaries of India:

(i) Vansda National Park
(ii) Velavadar National Park
(iii) Ratanmahal Sloth bear Sanctuary
(iv) Shoolpaneshwar Wild life Sanctuary

Practical: 14 : To Study Threatened Wild animals of India:

(i) Mammals: Slender Loris, Black Nilgiri Langur, Cheetah, Asiatic Lion, Tiger, Snow leopard
(ii) Birds: Pink Headed Duck, Himalayan Golden Eagle, Peacock, Great Indian Bustard, Greater Flamingo, Vulture
    - by photograph, Chart, stuffed animals or multimedia.

Practical: 15 : To Study Principle, Structure & Function of Following Instruments:

(i) Phase Contrast Microscope
(ii) Haemoglobinometer
(iii) Sphygmomanometer

Practical: 16 : Visit to any one National Park or Sanctuary OR Reserve forest area

DISTRIBUTION OF UNITS

SEMESTER – III

PAPER – Z-03

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**	10	14
Unit : 4	**Animal behaviour& Economic Zoology**	15	14
Unit : 5	**Wildlife Biology, Ecology & Instrumental Biology**	12	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 units are carries equal 14 marks.
- Total marks for theory examination are 70 marks.
- **PAPER SETTER MUST FOLLOW THE UNIT WISE MARK SETUP.**

BHAKT KAVI NARSINH MEHTA UNIVERSITY, JUNAGADH

THEORY EXAMINATION

SEMESTER – III

ZOOLOGY

(Based on Paper – Z-03)

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 MCQs IS NOT INCLUDED IN THIS PAPER STYLE.

- EACH QUESTION CARRIES EQUAL MARKS – 14.

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

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

(A) Answer the following question (write any two out of three) [10]

(1)

(2)

(3)

(B) Answer the following question (write any one out of two) [04]

(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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PRACTICAL EXAMINATION

SEMESTER – III

ZOOLOGY

(Based on Paper – Z-03)

Time: **3** Hours Total Marks: **35**

Que -1: Sketch and label _____ system of Leech. [06]

Que – 2: Sketch and label/Mountings of Leech _____.

(Practical-6) [03]

Que – 3: Do as per instruction and show it to examiner. [03]

(Practical – 8)

Que – 4: Do as per instruction and show it to examiner. [03]

(Practical – 15)

Que – 5: Write as per instruction. [14]

(A) Identify and classify giving reasons. (Lower invertebrate, Practical-1&2)
(B) Identify and classify giving reasons. (Higher invertebrate, Practical-3&4)
(C) Identify and describe. (Practical-7)
(D) Identify and describe. (Practical-9)
(E) Identify and describe (Practical-10)
(F) Identify and describe (Practical-11/12)
(G) Identify and describe (Practical-13/14)

Que. – 5: Report and Viva-voce. [03]

Que – 6: Certified Journal. [03]

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List of Slides, Specimens, Charts, Models & Photographs

SEMESTER – III

ZOOLOGY

(Based on Paper – Z-03)

LIST OF SLIDES:

(1) All animals from Protozoa [Practical-1, (i)]

(2) Obelia, Schistoma, Enterobius vermicularis, Filaria worm [Practical-2, (i), (ii), (iii)]

(3) Mountings of Leech [Practical-6]

(4) Mouth Parts of Insects [Practical-7]

(5) Histological Structure of mammalian organs [Practical-9]

(6) Termite [Practical-10, (i)]

(7) TseTse Fly, Mosquitoe, Rice Weevil, Wheat Weevil, Tribolium, Pulse bettle, Rice bug [Practical-11, (i), (ii), (iv), (v)]

LIST OF SPECIMENS:

(1) All animal specimens from Phylum- Porifera to Phylum-Hemichordata [Practical-1 to Practical-4, except Practical-1, (i) & Obelia, Schistoma, Enterobius vermicularis, Filaria worm]

(2) Animal Behaviour & Household Insects [Practical-10 & 11 except Termite, TseTse Fly, Mosquitoe, Rice Weevil, Wheat Weevil, Tribolium, Pulse bettle, Rice bug]

LIST OF CHARTS/MODELS/PHOTOGRAPHS:

(1) Systems of Leech [Practical-5]

(2) Cell Organelles [Practical-8]

(3)Apparatus for collecting and killing method [Practical-12]

(4) National Parks & Sanctuaries of Gujarat State &Threatened Mammals and Birds [Practical-13 & 14]

LIST OF INSTRUMENTS:

[Practical-15]
(i) Phase Contrast Microscope
(ii) Haemoglobinometer
(iii) Sphygmomanometer

REFERENCE BOOKS

SEMESTER – III

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 Invertebrate Zoology……..…..…….R.L.Kotpal.

4 : A textbook of Practical Zoology-Invertebrates…….S.S.Lal

5 : Kotpal Series – Porifera……..……..…….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.Power

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.Aggarwal

18 : Cytology, Genetics & Evolution……..…P.K.Gupta

List of books for Unit- 4 & 5

19 : Wild Life of Gujarat…….……H.S.Singh.

20 : Applied Zoology……... N Arumugam

21 : Applied Zoology……Nagendra S Pawar

22 : Applied Emtomology……. P G Fenemore

23 : Indian National Parks and Sanctuaries……..…Khati&Annand S.

24 : Modern textbook of Zoology Vertebrates…….R.L.Kotpal

25 : Vertebrate Zoology…….….E.L.Jordan&Dr.P.S.Verma

26 : Practical Zoology Vertebrate…….S.S.Lal

27 : Ecology & Environmental biology…….…….P.D.Sharma.

28 : Cell Biology, Genetics, Molecular Biology, Evolution and Ecology……..…P.S.Varma&V.K.Agrawal.

29 : Fundamentals of Ecology……..…..Odum E.P. & Barrett G.W.

30 : Basic Concepts of Ecology…….……A. Arumugam

31 : Elements of Ecology……....Robert & Thomas.

32 : Environmental Biology……...P.S.Verma&V.K.Aggrwal

List of Books for Viva-Voces

33 : Practical Zoology Invertebrate……..S.S.Lal

34 : Practical Zoology Vertebrate…….S.S.Lal

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(CBCS Syllabus)

SEMESTER - IV

ZOOLOGY

PAPER – Z-04

Chordate: Systematic, Forms & Functions, Embryology, Physiology &Reproductive Biology, Genetics & Inborn Errors of Metabolism, Evolution, Functional Anatomy of chordates & Fisheries Biology

UNIT- 1: SYSTEMATIC:

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

1.2 Archaeopteryx as a connecting link between Reptiles and Aves

1.3 General account of Ratitae

1.4 Platypus as connecting link between Aves & Mammals

UNIT- 2: FORMS AND FUNCTIONS IN ANIMALS:

2.1PISCES: General account of Migration in Fishes

2.2 General structure and morphology with functional anatomy of following Type

REPTILE: Type Study – *Calotes*: Classification, External Characters, Digestive system, Respiration, Arterial system, Venous system, Nervous (Brain), Urino-genital system and development

2.3 Difference between Poisonous & Non-Poisonous snakes

2.4 To Study Following Poisonous & Non-Poisonous Snakes:
1.Rat Snake, 2. Python, 3. Sand Boa, 4. Hydrophis, 5. King Cobra,
6. Cobra, 7. Krait, 8. Russel's Viper, 9. *Echiscarinata*

2.5 Snake bite, Anti-Venum, Preventive measures and First aid Treatment

UNIT- 3: EMBRYOLOGY, PHYSIOLOGY &REPRODUCTIVE BIOLOGY:

3.1 EMBRYOLOGY:

(i) Types of Eggs according to yolk
(ii) Types of Cleavage

3.2 EXCRECTION:

(i) Nitrogenous Waste
(ii) Structure of Nephrone
(iii) Formation of Urine
(iv) Control of Renal Function

3.3REPRODUCTIVE BIOLOGY:

(i) Manopause
(ii) Hormones of Ovary & Testis

UNIT- 4: GENETICS & INBORN ERRORS OF METABOLISM:

4.1GENETICS:

(i) Structure of Chromosome
(ii) Types of Chromosome according to Centromere
(iii) Human Chromosome and Karyotyping
(iv) Giant Chromosome:
    1. Polytene Chromosome
    2. Lampbrush Chromosome
(v) DNA Finger printing
(vi) Sex Determination in Drosophila, Human being and Bonelia
(vii) Cytoplasmic Inheritance:
    1. Kappa Particles in Paramecium
    2. 4 O' Clock Mirabilis Jalapa

4.2 INBORN ERRORS OF METABOLISM:

(i) Phenylketonuria (PKU)
(ii) Alkaptonuria
(iii) Albinism
(iv) Sickle-Cell anemia

UNIT-5: EVOLUTION, FUNCTIONAL ANATOMY OF CHORDATES & FISHERIES BIOLOGY

5.1 EVOLUTION:

(i) Origin and Evolution of Earth
(ii) Isolation
(iii) Speciation
(iv) Evolution of Man
(v) Morphological & Comparative anatomy of Homologous and Analogous Organs
(vi) Vestigial Organs of Human

5.2 FUNCTIONAL ANATOMY OF CHORDATES:

(i) Circulatory System: Origin & Evolution of Aortic arch

5.3FISHERIES BIOLOGY:

(i) Pomfret
(ii) Bombayduck
(iii) Prawn
(iv) Lobster
(v) Pearl Oyster

PRACTICAL RELATED TO PAPER – Z-04

Practical: 1 : Identification and classification of Chordate animals

(i) Sub-Phylum : Urochordata : Ascidia, Doliolum, Oikopleura
(ii) Sub-Phylum: Cephelochordata : Amphioxus
(iii) Class: Cyclostomata : Myxine
(iv) Super Class: Pisces : Tiger-Shark, Pristis, Trygon, Acipensor, Labeo, Protopterus

Practical: 2 : Identification and classification of Chordate animals

(i) Class: Amphibia : Uraeotyphlus, Siren, Axolotal Larva, Rhacophorus, Hyla
(ii) Class : Reptiles : Testudo, Sphenodon, Phrynosoma, Cobra, Crocodylus(Muggar), Gavialis(Ghariyal), Ophiosaurus

Practical: 3 :

(i) Class: Aves : Pigeon, Flamingo, Duck, Crow, Ostrich
(ii) Class : Mammal : Spiny Anteater, Loris, Shrew, Rhesus Monkey

Practical: 4 : To Study systems of *Catoles*:

(i) External Characters
(ii) Digestive System
(iii) Arterial System
(iv) Venous System
(v) Urinogenital System
(vi) Brain
- Through chart or Multimedia

Practical: 5 : To Study Mountings of *Calotes*:

(i) Pecten
(ii) Blood
(iii) Striated Muscle

Practical: 6 : To study Archaeopteryx as connecting link between Reptiles & Aves:

-By charts or Multimedia.

Practical: 7 : To Study Migration in Fishes:
(i) Anadromous Type: Salmon
(ii) Catadromous Type: Eel

Practical: 8 : To Study diference between Poisonous & Non-Poisonous Snakes
1. Rat Snake, 2. Python, 3. Sand Boa, 4. Hydrophis, 5. King Cobra, 6.Cobra, 7. Krait, 8. Russel's Viper, 9. *Echis carinata*

Practical: 9 : To study types of eggs according to Yolk

Practical: 10 : To study types of Cleavage

Practical: 11 : To study the chemical constituents of Normal and abnormal urine

Practical: 12 : To study types of Chromosomes according to Centromere

Practical: 13 : To study Giant Chromosome

Practical: 14 : To Study Human Chromosome & Its Karyotyping

Practical: 15 : To study Evolution of Man

Practical: 16 : To Study Haemologus & Analogus organs
(i) Talpa
(ii) Flying Fox
(iii) Rhesus Monkey
(iv) Whale
(v) Horse
(vi) Ichthyophis
(vii) Blind Snake

Practical: 17 : To Study comparative account of aortic arches

Practical: 18 : To study of Important fisheries:
(i) Pomfret
(ii) Bombayduck
(iii) Prawn
(iv) Lobster
(v) Pearl Oyster

DISTRIBUTION OF UNITS

SEMESTER – IV

PAPER – Z-04			
Unit No.	**Unit Title**	**Theory Period**	**Marks**
Unit : 1	**Systematic**	10	14
Unit : 2	**Forms and Functions**	17	14
Unit : 3	**Embryology, Physiology & Reproductive Biology**	11	14
Unit : 4	**Genetics & Inborn Errors of Metabolism**	16	14
Unit : 5	**Evolution, Functional Anatomy of chordates & Fisheries Biology**	11	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 units are carries equal 14 marks.
- Total marks for theory examination are 70 marks.
- **PAPER SETTER MUST FOLLOW THE UNIT WISE MARK SETUPS.**

BHAKT KAVI NARSINH MEHTA UNIVERSITY,JUNAGADH

THEORY EXAMINATION

SEMESTER – IV

ZOOLOGY

(Based on Paper – Z-04)

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 MCQs IS NOT INCLUDED IN THIS PAPER STYLE.

- EACH QUESTION CARRIES EQUAL MARKS – 14.

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

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

(A) Answer the following question (write any two out of three) **[10]**

(1)

(2)

(3)

(B) Answer the following question (write any one out of two) **[04]**

(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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PRACTICAL EXAMINATION

SEMESTER – IV

ZOOLOGY

(Based on Paper – Z-04)

Time :**3** Hours Total Marks : 35

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

(Practical-4)

Que – 2 : Mounting _____ (Practical-5) [03]

Que – 3 : Identify and Describe about comparative account of it. (Practical-16) [04]

Que – 4 : Do as per instruction and show it to examiner [03]

(Practical – 11/12/13)

Que – 4 : Write as per instruction. [14]

(A) Identify and classify giving reasons.(Lower chordate)
(B) Identify and classify giving reasons. (Higher Chordate)
(C) Identify and describe. (Practical-6/7)
(D) Identify and describe. (Practical-8)
(E) Identify and describe. (Practical-9/10)
(F) Identify and describe. (Practical-14/15)
(G) Identify and describe. (Practical-17)

Que – 6 : Viva – voce. [03]

Que – 7 : Certified Journal. [03]

BHAKT KAVI NARSINH MEHTA UNIVERSITY, JUNAGADH

List of Slides, Specimens, Charts, Models & Photographs

SEMESTER – IV

ZOOLOGY

(Based on Paper – Z-04)

LIST OF SLIDES:

(1)Doliolum, Oikopleura [Practical-1,(i)]

(2)Mountings [Practical-5],Also available in Chart

(3) Types of eggs according to Yolk [Practical – 9]

(4) Types of Cleavage. [Practical – 10]

(5) Giant Chromosome. [Practical – 12]

LIST OF SPECIMENS:

(1) All animal specimens from Sub-Phylum-Hemi Chordata to Class- Mammals [Practical-1&2 except Doliolum&Oikopleura]

(2) Salmon & Eel [Practical-7]

(3) Snakes [Practical-8]

(4) Homologus&Analogus Organs[Practical-15]

(5) Fisheries [Practical-17]

LIST OF CHARTS/MODELS/PHOTOGRAPHS:

(1) Systems of *Calotes* [Practical-4]

(2) Archaeopteryx [Practical-6]

(3) Types of Chromosome according to centromere [Practical-11]

(4) Giant Chromosomes [Practical-12]

(5) Human Chromosomes & Its Karyotyping [Practical-13]

(6) Evolution of Man [Practical-14]

(7) Aortic arches: Origin, Evolution & Comparative account of it [Practical-16]

REFERENCE BOOKS

SEMESTER – IV

List of Books for Unit -1& 2

1 : Chordate Zoology……...E.L.Jordan&Dr.P.S.Verma

2 : Modern textbook of Zoology Vertebrates ……..…….R.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 - 3

6 : Animal Physiology…….……..……P.K.Gupta.

7 : Animal Physiology……..V.K.Agrawal.

8 : Animal Physiology…….……..…M.P.Arora

9 : A textbook of Animal Physiology……..……..TyagiPrasum

10 : Human Physiology, Vol- I & II…….……..…….Chatterjee C.C.

11 : A text book of Animal Physiology……..….A.K.Berry&K.Berry

12 : Animal Physiology & Bio-Chemistry……..R.A.Aggrawal& Anil k. Shrivastva&Kaushal Kumar

13 : Chordate Embryology……P.S.Verma&V.K.Agraval

List of Books for Unit – 4

14 : Principle of Genetics……..……..…Gardner.

15 : Genetics…….....P.S.Varma&V.K.Agrawal.

16 : Problems on Genetics, Molecular Genetics & Evolutionary Genetics….

……..……..…..Dr. P.K.Banergee.

17 : Genetics & Biostatistics……..……..……..Meyyan.

18 : Cell Biology, Genetics, Molecular Biology, Evolution & Ecology……..P.S.Verma&V.K.Aggarval.

19 : Cytology, Genetics & Evolution……..…P.K.Gupta

List of Books for Unit – 5

20 : Organic Evolution …….…..Dr. N. Arumugam.

21 : Evolution……VeerbalaRastogi.

22 : Chordate Zoology……...E.L.Jordan&Dr.P.S.Verma

23 : Modern textbook of Zoology Vertebrates ……..…….R.L.Kotpal.

24 : Fisheries Biology……S SKhanna& H R Singh

List of Books for Viva-Voce

35 : Practical Zoology Invertebrate……..S.S.Lal

36 : Practical Zoology Vertebrate…….S.S.Lal