

ZOOLOGY
SYLLABUS
FOR
2018- 2019

**BOARD OF STUDIES
MEETING**

2018- 2019

**SRI.Y.N.COLLEGE
(AUTONOMOUS)
NARSAPUR**

ZOOLOGY SYLLABUS

W.E.F. 2015-16 (REVISED IN APRIL, 2016)

SEMESTER

I

INVERTIBRATES

DEPARTMENT OF ZOOLOGY
ZOOLOGY SYLLABUS FOR I SEMESTER
ZOOLOGY - PAPER - I
ANIMAL DIVERSITY - NONCHORDATES

Periods: 60

Max. Marks: 100

UNIT - I

PROTOZOA

- 1.2.1 General characters
- 1.2.2 Classification of Protozoa up to classes with examples
- 1.2.3 *Elphidium* (type study)

PORIFERA

- 1.3.1 General characters
- 1.3.2 Classification of Porifera up to classes with examples
- 1.3.3 *Sycon* – External Characters, Types of cells,
- 1.3.4 Skelton in Sponges
- 1.3.5 Canal system in sponges

UNIT - II

COELENTERATA

- 2.1.1 General characters
- 2.1.2 Classification of Coelenterata up to classes with examples
- 2.1.3 *Obelia* - External Characters, Structure of Polyp and Medusa
- 2.1.4 Polymorphism in coelenterates
- 2.1.5 Corals and coral reef formation

PLATYHELMINTHES

- 2.1.1 General characters
- 2.1.2 Classification of Platyhelminthes upto classes with examples
- 2.1.3 *Fasciola hepatica* - External Characters, Excretory system, Reproductive System, Life History and pathogenicity

UNIT - III

NEMATHELMINTHES

- 3.1.1 General characters
- 3.1.2 Classification of Nematy helminthes up to classes with examples

ANNELIDA

- 3.2.1 General characters
- 3.2.2 Classification of Annelida up to classes with examples
- 3.2.3 *Hirudinaria granulosa* - External Characters, Digestive System, Excretory System and Reproductive System
- 3.2.4 Vermiculture - Vermicompost, economic importance of vermicompost

UNIT - IV

ARTHROPODA

- 4.1.1 General characters
- 4.1.2 Classification of Arthropoda up to classes with examples
- 4.1.3 Prawn - External Characters, Appendages, Respiratory system
- 4.1.4 *Peripatus* - Structure and affinities

MOLLUSCA

- 4.2.1 General characters
- 4.2.2 Classification of Mollusca up to classes with examples
- 4.2.3 Pearl formation in Pelecypoda
- 4.2.4 Torsion in gastropods

UNIT - V

ECHINODERMATA

- 5.1.1 General characters
- 5.1.2 Classification of Echinodermata up to classes with examples
- 5.1.3 Water vascular system in star fish

HEMICHORDATA

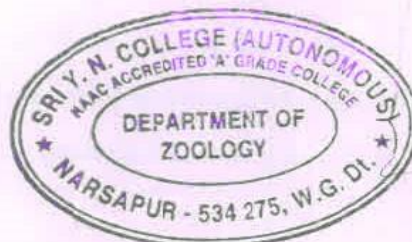
- 5.2.1 General characters
- 5.2.2 Classification of Hemichordata up to classes with examples
- 5.2.3 *Balanoglossus* - Structure and affinities

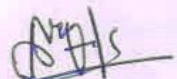
NON-CHORDATA LARVAL FORMS

- 5.3.1 Amphiblastula
- 5.3.2 Ephyra
- 5.3.3 Trochophore
- 5.3.4 Nauplius
- 5.3.5 Glochidium
- 5.3.6 Bipinnaria
- 5.3.7 Tornaria

- 1) K. Uthe Sani
- 2) B. K. M. Nishal
- 3) R. D. S.

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SRI YN COLLEGE(A),NARSAPUR
DEPARTMENT OF ZOOLOGY
ZOOLOGY MODEL QUESTION PAPER FOR I SEMESTER
ZOOLOGY – PAPER – I
ANIMAL DIVERSITY – BIOLOGY OF NONCHORDATES

Time: 3Hrs

Max.Marks:75

PART-I

Answer any FIVE of the following. Draw labeled diagrams wherever necessary

5 x 5 = 25M

- | | |
|---------------------|----------------------|
| 1. Nutrition | పోషణ |
| 2. Sponges | స్పంజికలు |
| 3. Coral reef | ప్రవాళావరోధము |
| 4. Parasites | పరాస్పజీవులు |
| 5. Coelom | శరీర కుహరము |
| 6. Arthropoda | ఆర్థ్రోపొడా |
| 7. Pelecypoda | పెలిసిపొడ |
| 8. Bipinnaria Larva | బైపిన్నేరియా డింభకము |

PART-II

Answer any FIVE of the following, choosing atleast two questions from each section.

Draw labeled diagrams wherever necessary.

5 x 10 = 50M

SECTION-A

9. Write the general characters and classification of Protozoa.

ప్రోటోజోవా యొక్క సాధారణ లక్షణాలు మరియు వర్గీకరణను వ్రాయుము.

10. Give an account on life history of Elphidium.

ఎల్ఫీడియం జీవిత చరిత్రను గూర్చి వ్రాయుము.

11. Write an essay on Canal System in Sponges.

స్పంజికలలో కుల్యా వ్యవస్థను గూర్చి ఒక వ్యాసము వ్రాయుము.

12. Describe the Polymorphism in Coelenterates.

సీలెంటరేటా జీవులలో బహురూపకతను గూర్చి వర్ణింపుము.

13. Describe the pathogenicity of Fasciola hepatica.

ఫాసియోలా హెపాటికా వ్యాధి సంక్రమణను గూర్చి వర్ణింపుము.

SECTION-B

14. Give an account on life history of Ascaris lumbricoides.

ఆస్కారిస్ లూంబ్రికాయిడిస్ యొక్క జీవిత చరిత్రను గూర్చి వ్రాయండి.

15. Write an essay on Vermiculture.

వెర్మికల్చర్ ను గూర్చి ఒక వ్యాసము వ్రాయుము.

16. Give an account on structure and affinities of Peripatus.

పెరిపేటస్ జీవి నిర్మాణము మరియు సంబంధ భాంధవ్యాలను గూర్చి వ్రాయుము.

17. Describe the water vascular system in star fish.

సముద్ర నక్షత్రములలో జల ప్రసరణ వ్యవస్థను గూర్చి వర్ణింపుము.

18. Give an account on structure and affinities of Balanoglossus.

బెలనోగ్లోస్ జీవి యొక్క నిర్మాణము మరియు సంబంధ భాంధవ్యాలను గూర్చి వ్రాయుము.

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SRI YN COLLEGE(A),NARSAPUR
DEPARTMENT OF ZOOLOGY
ZOOLOGY PAPER FOR I SEMESTER
ZOOLOGY – PAPER – I
ANIMAL DIVERSITY – BIOLOGY OF NONCHORDATES

Max.Marks:75

arks: 75

5 = 25 M

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0 = 50 M

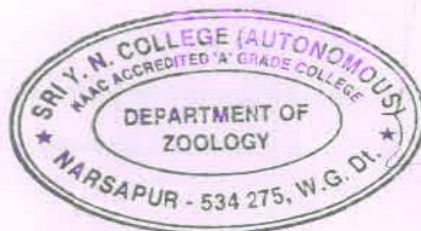
	Essay questions	Short Questions	Marks allotted to the Unit	Remarks
Unit - 1	2	1	25	2 Essay Questions
Unit - 2	2	2	30	2 Essay Questions
Unit - 3	2	1	25	2 Essay Questions
Unit - 4	2	2	30	2 Essay Questions
Unit - 5	2	2	30	2 Essay Questions
Total Marks including Choice			140	

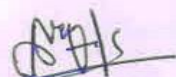
The question paper setters are requested to adhere to the format given below.

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- 1) K. Uthe Sani
- 2) B. K. R. Nishith
- 3) R. D. S.

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DEPARTMENT OF ZOOLOGY
ZOOLOGY PRACTICAL SYLLABUS FOR I SEMESTER
ZOOLOGY - PAPER - I
ANIMAL DIVERSITY - NONCHORDATES

Periods: 24

Max. Marks: 50

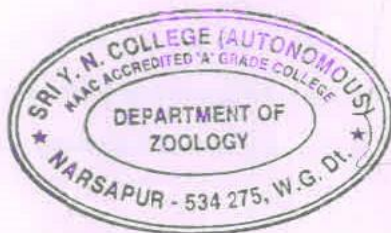
Protozoa	: <i>Elphidium, Paramecium</i> - Binary fission and conjugation
Porifera	: <i>Euspongia, Sycon, Sycon</i> - T.S and L.S
Coelenterata	: <i>Obelia</i> - colony and medusa, <i>Physalia, Velella, Corallium, Gorgonia, Pennatula</i>
Platyhelminthes	: <i>Planaria, Fasciola hepatica, Fasciola</i> larval forms - Miracidium, Redia, Cercaria, <i>Echinococcus granulosus</i>
Nemathelminthes	: <i>Ascaris</i> - Male and female, <i>Ancylostoma duodenale</i>
Annelida	: <i>Neries, Heteroneries, Aphrodite, Hirudo</i> , Trochophore larva
Arthropoda	: Mouth parts of male and female <i>Anopheles</i> and <i>Culex</i> , Nauplius, Mysis, Zoea larvae, crab, prawn, <i>Scolopendra, Sacculina, Limulus, Peripatus</i>
Mollusca	: <i>Chiton, Murex, Sepia, Loligo, Octopus, Nautilus</i> , Glochidium larva
Echinodermata	: <i>Ophiothrix, Echinus, Clypeaster, Cucumaria, Antedon, Asterias</i> , Bipinnaria larva
Hemichordata	: <i>Balanoglossus, Tornaria</i> larva

Demonstration of dissection / dissected / virtual dissection:

1. Leech / Prawn - Digestive system
 2. Prawn - Appendages
 3. Prawn - Nervous system
 4. *Pila* - Digestive system
 5. Mounting of Statocyst
 6. Mounting of Radula
- a. Laboratory record work shall be submitted at the time of practical examination
b. Compulsory one species to be adopted for demonstration only by the faculty

- 1) K. Uthe Sani
- 2) B. K. M. Nishu
- 3) R. D. H. S.

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SEMESTER

II

VERTIBRATES

DEPARTMENT OF ZOOLOGY
ZOOLOGY SYLLABUS FOR II SEMESTER

ZOOLOGY - PAPER – II

ANIMAL DIVERSITY - CHORDATES

Periods: 60

Max. Marks: 100

UNIT - I

- 1.1 General characters of Chordata
- 1.2 PROCHORDATA
 - 1.2.1 Salient features of Cephalochordata
 - 1.2.2 Structure of *Branchiostoma*
 - 1.2.3 Salient features of Urochordata
 - 1.2.4 Structure and life history of *Herdmania*
 - 1.2.5 Significance of Retrogressive metamorphosis

UNIT - II

- 2.1 CYCLOSTOMATA
 - 2.1.1 General characters of Cyclostomata
 - 2.1.2 Comparison of the *Petromyzon* and *Myxine*
- 2.2 PISCES
 - 2.2.1 General characters of Fishes
 - 2.2.2 Classification of fishes up to sub - class level with examples
 - 2.2.3 *Scoliodon* – External features, Digestive system, Heart.
 - 2.2.4 Migration in Fishes
 - 2.2.5 Dipnoi

UNIT - III

- 3.1 AMPHIBIA
 - 3.1.1 General characters of Amphibian
 - 3.1.2 Classification of Amphibia up to orders with examples.
 - 3.1.3 *Rana hexadactyla* - External features, Digestive system, Respiratory system, Heart.
 - 3.1.4 Parental care in Amphibia

- 3.2 REPTILIA
3.2.1 General characters of Reptilia
3.2.2 Classification of Reptilia up to orders with examples
3.2.3 Calotes - External features, Digestive system, Brain
3.2.4 Identification of Poisonous Non-poisonous snakes

UNIT - IV

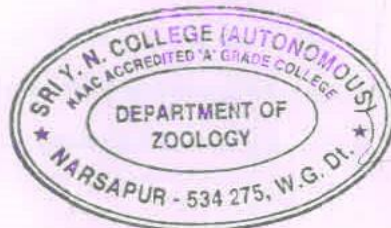
- 4.1 AVES
4.1.1 General characters of Aves
4.1.2 Classification of Aves up to subclasses with examples.
4.1.3 *Columba livia* - External features, Digestive system, Respiratory system.
4.1.4 Migration in Birds
4.1.5 Flight adaptation in birds

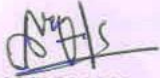
UNIT - V

- 5.1 MAMMALIA
5.1.1 General characters of Mammalia
5.1.2 Classification of Mammalia up to sub - classes with examples
5.2 Comparison of Prototherians, Metatherians and Eutherians
5.3 Dentition in mammals

- 1) K. Uthe Sani
2) B. K. M. Nishith
3) R. D. Thim

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SRI YN COLLEGE(A),NARSAPUR
DEPARTMENT OF ZOOLOGY
ZOOLOGY MODEL QUESTION PAPER FOR II SEMESTER
ZOOLOGY – PAPER – II
ANIMAL DIVERSITY – BIOLOGY OF NONCHORDATES

Time: 3Hrs

Max.Marks:75

PART-I

Answer any FIVE of the following. Draw labeled diagrams wherever necessary

5 x 5 = 25M

- | | |
|---------------------------------------|--------------------------|
| 1. Urochordata | యూరోకార్డేటా |
| 2. Myxine | మిక్సీన్ |
| 3. Draco | డ్రాకో |
| 4. Identification of Poisonous Snakes | విష సర్పములను గుర్తించుట |
| 5. Quil feather | క్విల్ ఈక |
| 6. Migration | వలస |
| 7. Mammalian characters | క్షీరద లక్షణములు |
| 8. Prototheria | ప్రోటోథీరియా |

PART-II

Answer any FIVE of the following, choosing atleast two questions from each section.

5 x 10 = 50M

Draw labeled diagrams wherever necessary.

SECTION-A

- I. Explain the general characters of chordates.
ప్రధాన జీవుల సాధారణ లక్షణములను గూర్చి వివరింపుము.
- II. Describe the life history of Herdmania.
హెర్డ్మెనియా జీవిత చరిత్రను గూర్చి వర్ణింపుము.
- III. Describe the structure and functions of heart of Scoliodon.
స్కోలియోడన్ గుండె నిర్మాణము మరియు విధులను గూర్చి వర్ణింపుము.

12. Write an essay on Migration in Fishes.

చేపలలో వలస విధానమును గూర్చి ఒక వ్యాసము వ్రాయుము.

13. Describe the Respiratory system of Rana hexadactyla.

కప్ప శ్వాస వ్యవస్థను గూర్చి వర్ణింపుము.

SECTION-B

14. Explain the structure and functions of Brain in Calotes.

తొండ మెదడు నిర్మాణము మరియు విధులను గూర్చి వివరింపుము.

15. Give an account on Digestive system of Columba livia.

పావురము యొక్క జీర్ణ వ్యవస్థను గూర్చి వ్రాయుము.

16. Write an essay on flight adaptations in birds.

పక్షులలో ఉడ్యయక అనుకూలనాలను గూర్చి ఒక వ్యాసము వ్రాయుము.

17. Compare the characters of Metatheria and Eutheria.

మెటాథీరియా మరియు యూథీరియా లక్షణములను పోల్చుము.

18. Write an essay on dentition in mammals.

క్షీరదాలలో దంత విన్యాసమును గూర్చి ఒక వ్యాసము వ్రాయుము.

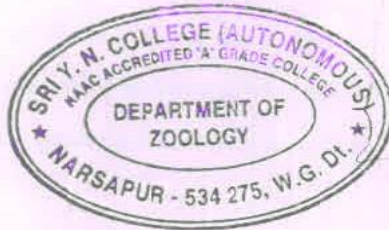
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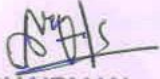
1) K. The Lawi

2) B. K. M. N. S. S.

3) R. S. S.

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DEPARTMENT OF ZOOLOGY

ZOOLOGY PAPER FOR II SEMESTER ZOOLOGY - PAPER - II

ANIMAL DIVERSITY – BIOLOGY OF CHORDATES

3 hrs

Max. Marks: 75

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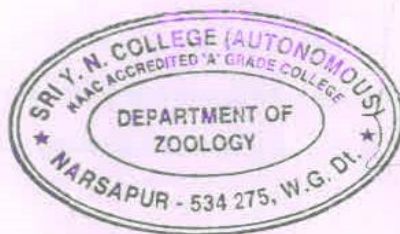
Unit No.	Essay Questions	Short Questions	Marks allotted to the Unit	Remarks
Unit - 1	2	1	25	2 Essay Questions
Unit - 2	2	1	25	2 Essay Questions
Unit - 3	2	2	30	2 Essay Question
Unit - 4	2	2	30	2 Essay Questions
Unit - 5	2	2	30	2 Essay Questions
Total Marks including Choice			140	

The Question Paper setters are requested to adhere to the format given above.

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- 1) K. Uthe Savi
- 2) B. K. R. Nishith
- 3) R. D. S.

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NARSAPUR - 534 275

DEPARTMENT OF ZOOLOGY
ZOOLOGY PRACTICAL SYLLABUS FOR II SEMESTER

ZOOLOGY - PAPER - II

ANIMAL DIVERSITY - CHORDATES

Periods: 24

Max. Marks: 50

Protochordata	: <i>Herdmania, Amphioxus, Amphioxus T.S.</i> through pharynx
Cyclostomata	: <i>Petromyzon, Myxine</i>
Pisces	: <i>Pristis, Torpedo, Channa, Hippocampus, Exocoetus, Etheus, Labeo, Catla, Clarius, Anguilla.</i> Scales - Placoid, Cycloid and Ctenoid
Amphibia	: <i>Ichthyophis, Amblystoma, Siren, Hyla, Rachophorus</i> Axolotl larva
Reptilia	: <i>Draco, Chamaeleon, Uromastix, Vipera russeli, Naja, Bungarus, Enhydrina, Testudo, Crocodilus</i>
Aves	: <i>Passer, Psittacula, Bubo, Columba, Corvus, Pavo.</i> Types of feathers: Quill, Contour, Filoplume down
Mammalia	: <i>Ornithorynchus, Pteropus, Funambulus, Manis, Loris,</i> Hedgehog
Osteology	: Appendicular skeletons: Varanus, Pigeon Rabbit - fore and hind limbs and girdles

Demonstration of dissection / dissected / virtual dissection:

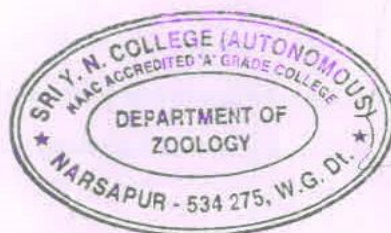
1. V, VII, IX, X cranial nerves of shark / locally available fishes
2. Arterial system, venous system of Shark.
3. Digestive system of fish

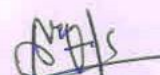
a Laboratory record work shall be submitted at the time of practical examination

b Compulsory one species to be adopted for demonstration only be the faculty

- 1) K. Uthe Sani
- 2) B. K. M. Nishad
- 3) R. D. D. D.

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SEMESTER

III

CYTOLOGY, GENETICS AND EVOLUTION

DEPARTMENT OF ZOOLOGY
ZOOLOGY SYLLABUS FOR III SEMESTER
ZOOLOGY - PAPER – III
CYTOLOGY, GENETICS AND EVOLUTION

Periods: 60

Max. Marks: 100

UNIT - I

1. CYTOLOGY

- 1.1 Definition, history, prokaryotic and eukaryotic cells.
- 1.2 Electron microscopic structure of eukaryotic cell.
- 1.3 Plasma membrane –Fluid Mosaic model of plasma membrane.

UNIT – II

2. CELL ORGANELLES

- 2.1 Structure and functions of Endoplasmic Reticulum
- 2.2 Structure and functions of Golgi apparatus
- 2.3 Structure and functions of Lysosomes
- 2.4 Structure and functions of Ribosomes
- 2.5 Structure and functions of Mitochondria
- 2.6 Nucleus
- 2.7 Chromosomes - Structure, types, functions

UNIT - III

3.1 GENETICS – I

- 3.1.1 Mendel's work on transmission on traits
- 3.1.2 Principles of inheritance
- 3.1.3 Incomplete dominance and co-dominance
- 3.1.4 Epistasis, Pleiotropy

UNIT - IV

4.1 GENETICS – II

- 4.1.1 Sex determination
- 4.1.2 Sex linked inheritance
- 4.1.3 Extra chromosomal inheritance
- 4.1.4 Human Karyotyping

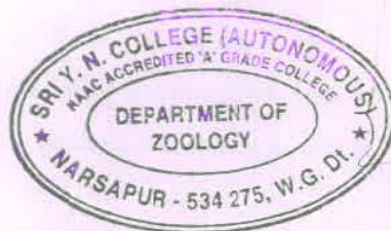
UNIT – V

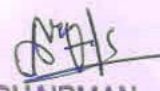
5.1 EVOLUTION

- 5.1.1 Lamarckism, Darwinism, Neo – Darwinism, Hardy-Weinberg Equilibrium.
- 5.1.2 Variations, isolating mechanisms, natural selection
- 5.1.3 Types of natural selection (directional, stabilizing, disruptive)
- 5.1.4 Speciation (Allopatric and Sympatric)
- 5.1.5 Macro evolutionary principles (Example: Darwin's finches)

- 1) K. The Law
- 2) B. K. M. Nishida
- 3) Rhythm

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SRI YN COLLEGE(A),NARSAPUR
DEPARTMENT OF ZOOLOGY
ZOOLOGY MODEL QUESTION PAPER FOR III SEMESTER
ZOOLOGY – PAPER – III
CYTOLOGY, GENETICS AND EVOLUTION

Time: 3Hrs

Max.Marks:75

PART-I

Answer any FIVE of the following. Draw labeled diagrams wherever necessary

5 x 5 = 25M

- | | |
|---------------------------------|--------------------------------|
| 1. Prokaryotic Cell | కేంద్రక పూర్వకణము |
| 2. Nucleus | కేంద్రకము |
| 3. Incomplete dominance | అసంపూర్ణ బహిర్గతత్వం |
| 4. Epistasis | ఎపిస్టాసిస్ |
| 5. Sex Linkage | లింగ సంహలగ్నత |
| 6. Human Karyotyping | మానవ కారియోటైపింగ్ |
| 7. Hardy – Wienberg equilibrium | హార్డీ - వీన్బెర్గ్ సమతాస్థితి |
| 8. Darwin's Finches | డార్విన్ ఫిచ్ పక్షులు |

PART-II

Answer any FIVE of the following, choosing atleast two questions from each section.

Draw labeled diagrams wherever necessary.

5 x 10 = 50M

SECTION-A

9. Write an essay on electron microscopic structure of a typical animal cell.

సాధారణ జంతు కణ నిర్మాణమును గూర్చి ఒక వ్యాసము వ్రాయుము.

10. Give an account on Fluid Mosaic model of Plasma Membrane.

ప్లాస్మా త్వచము యొక్క ద్రవ మోసాయిక్ నమూనాను గూర్చి వ్రాయుము.

11. Describe the structure and functions of Endoplasmic Reticulum.

ఆంతర్జీవ ద్రవ్య జాలకము యొక్క నిర్మాణము మరియు విధులను గూర్చి వర్ణింపుము.

12. Give an account on structure and functions of Mitochondria.

మైటోకాండ్రీయా యొక్క నిర్మాణము మరియు విధులను గూర్చి వ్రాయుము.

13. Describe the Mendel's work on transmission of traits.

లక్షణముల అనువంశికతను గూర్చి మెండల్ చేసిన ప్రయోగములను గూర్చి పర్ణింపుము.

SECTION-B

14. Write an essay on Principles of Inheritance.

అనువంశిక నియమములను గూర్చి ఒక వ్యాసము వ్రాయుము.

15. Give an account on Sex Determination in animals.

జంతువులలో లింగ నిర్ధారణను గూర్చి వ్రాయుము.

16. Write an essay on Extra Chromosomal Inheritance.

క్రోమోజోమేతర అనువంశికతను గూర్చి ఒక వ్యాసము వ్రాయుము.

17. Describe the Evolutionary Theory of Darwin.

డార్విన్ పరిణామ సిద్ధాంతమును గూర్చి పర్ణింపుము.

18. Give an account on different types of Speciation.

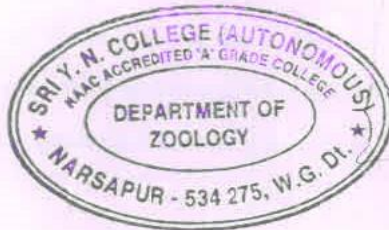
జాతులు ఏర్పడు వివిధ రకముల పద్ధతులను గూర్చి వ్రాయుము.

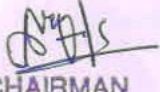
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2) B. K. M. N. S. S.

3) R. D. S.

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DEPARTMENT OF ZOOLOGY

ZOOLOGY PAPER FOR III SEMESTER
ZOOLOGY - PAPER - III

CYTOLOGY, GENETICS AND EVOLUTION

Time: 3 hrs

Max. Marks: 75

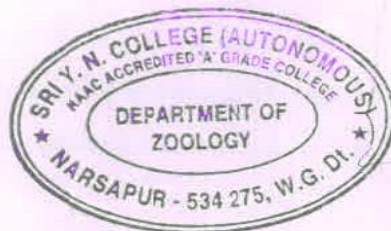
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Unit No.	Essay Questions	Short Questions	Marks allotted to the Unit	Remarks
Unit - 1	2	1	25	2 Essay Questions
Unit - 2	2	1	25	2 Essay Questions
Unit - 3	2	2	30	2 Essay Question
Unit - 4	2	2	30	2 Essay Questions
Unit - 5	2	2	30	2 Essay Questions
Total Marks including Choice			140	

Note: - The Question Paper setters are requested to adhere to the format given above.

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- 2) B. K. M. Nishad
- 3) R. D. Sani

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DEPARTMENT OF ZOOLOGY
ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER
ZOOLOGY - PAPER – III
CYTOLOGY, GENETICS AND EVOLUTION

Periods: 24

Max. Marks: 50

I. CYTOLOGY

1. Preparation of temporary slides of Mitotic divisions with onion root tips
2. Observation of various stages of Mitosis and Meiosis with prepared slides
3. Mounting of salivary gland chromosomes of *Chironomus*

II. GENETICS

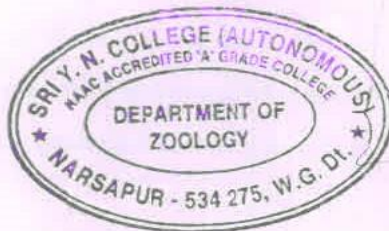
1. Study of Mendelian inheritance using suitable examples
2. Study of linkage recombination, gene mapping using the data
3. Study of human karyotypes

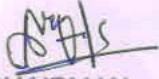
III. EVOLUTION

1. Study of fossil evidences
2. Study of homology and analogy from suitable specimens and pictures
3. Phylogeny of horse with pictures
4. Darwin's finches (pictures)
5. Visit to natural history museum and submission of report

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- 2) B. K. M. Nishith
- 3) R. D. Thim

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SEMESTER

IV

PAPER IV

**Embryology,
Physiology &
Ecology**

DEPARTMENT OF ZOOLOGY
ZOOLOGY SYLLABUS FOR IV SEMESTER
ZOOLOGY - PAPER – IV
EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY

Periods: 60

Max. Marks: 100

UNIT - I

I.1 DEVELOPMENTAL BIOLOGY AND EMBRYOLOGY

- 1.1.1 Gametogenesis
- 1.1.2 Fertilization
- 1.1.3 Types of eggs
- 1.1.4 Types of cleavages
- 1.2 Formation and functions of Foetal membrane in chick embryo
- 1.3 Types and functions of Placenta in mammals

UNIT - II

2.1 PHYSIOLOGY – I

- 2.1.1 Elementary study of process of digestion
- 2.1.2 Absorption of digested food
- 2.1.3 Respiration - Transport of oxygen and carbondioxide
- 2.1.4 Circulation - Structure and functioning of heart, Cardiac cycle
- 2.1.5 Excretion - Structure of nephron, urine formation, counter current mechanism

UNIT - III

3.1 PHYSIOLOGY - II

- 3.1.1 Nerve impulse transmission - Resting membrane potential, origin and propagation of action potentials along myelinated and non-myelinated nerve fibers

- 3.1.2 Muscle contraction - Ultra structure of muscle fibre, molecular and chemical basis of muscle contraction
- 3.1.3 Endocrine glands - Structure, secretions and the functions (of hormones) of pituitary, thyroid, parathyroid, adrenal glands and pancreas
- 3.1.4 Hormonal control of reproduction in a mammal

UNIT - IV

4.1 ECOLOGY - I

- 4.1.1 Meaning and scope of Ecology
- 4.1.2 Important abiotic factors of Ecosystem - Temperature, light, water, oxygen and Carbon dioxide.
- 4.1.3 Nutrient cycles - Nitrogen, carbon and phosphorus
- 4.1.4 Components of Ecosystem (Example: lake), food chains and food web, energy flow in ecosystem

UNIT - V

5.1 ECOLOGY - II

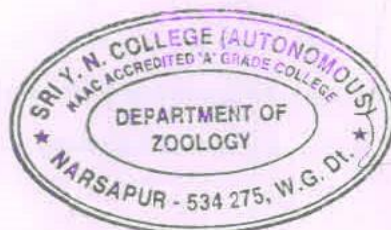
- 5.1.1 Habitat and ecological niche
- 5.1.2 Community interactions - Mutualism, commensalism, parasitism, competition, predation
- 5.1.3 Ecological succession
- 5.1.4 Population studies

6.1 ZOOGEOGRAPHY

- 6.1.1 Zoogeographical regions
- 6.1.1 Study of physical and faunal peculiarities of Oriental, Australian and Ethiopian regions

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- 3) R. D. S.

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DEPARTMENT OF ZOOLOGY
ZOOLOGY MODEL QUESTION PAPER FOR IV SEMESTER
ZOOLOGY – PAPER – IV
EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY

Time: 3Hrs

Max.Marks:75

PART-I

Answer any FIVE of the following. Draw labeled diagrams wherever necessary

5 x 5 = 25M

- | | |
|---------------------------|-----------------------|
| 1. Spermatogenesis | శుక్ర కణోత్పత్తి |
| 2. Cardiac Cycle | హృదయ వలయము |
| 3. Nerve Impulse | నాడీ ప్రచోదనము |
| 4. Pancreas | క్లోమము |
| 5. Light | కాంతి |
| 6. Food Chain | అహారపు గొలుసు |
| 7. Competition | పోటీతత్వము |
| 8. Zoogeographical Region | జంతు భౌగోళిక ప్రాంతము |

PART-II

Answer any FIVE of the following, choosing atleast two questions from each section.

Draw labeled diagrams wherever necessary.

5 x 10 = 50M

SECTION-A

9. Write an essay on different types of Cleavages.

వివిధ రకముల విదళనమయలను గూర్చి ఒక వ్యాసము వ్రాయుము.

10. Give an account on types and functions of Placentia in Mammals.

క్లీరదాలలో జరాయువు రకములు మరియు విధులను గూర్చి వ్రాయుము.

11. Describe the process of Digestion.

శీర్షక్రియా విధానమును గూర్చి వర్ణింపుము.

12. Give an account on structure and functions of Nephron.
నెఫ్రాను యొక్క నిర్మాణము మరియు విధులను గూర్చి వ్రాయుము.

13. Describe the Ultra structure of muscle fibre.
కండరపు ఫైబరు యొక్క సూక్ష్మ నిర్మాణమును గూర్చి వర్ణింపుము.

SECTION-B

14. Write an essay on Hormonal control of reproduction in Mammals.
క్షీరదాలలో ప్రత్యుత్పత్తి యొక్క హార్మోనుల నియంత్రణను గూర్చి ఒక వ్యాసము వ్రాయుము.

15. Give an account on Temperature as an Ecological factor.
ఉష్ణోగ్రత ఒక జీవావరణ కారకమును గూర్చి వ్రాయుము.

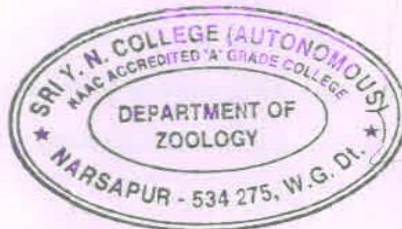
16. Write an essay on Ecosystem by taking a Lake as an example.
ఒక సరస్సును ఉదాహరిస్తూ జీవావరణ వ్యవస్థను గూర్చి ఒక వ్యాసము వ్రాయుము.

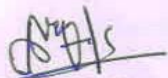
17. Describe the process of Ecological Succession.
జీవావరణ అనుక్రమమును గూర్చి వర్ణింపుము.

18. Give an account on Physical and Faunal characters of Oriental Region.
ఓరియంటల్ ప్రాంతపు భౌతిక మరియు జంతు లక్షణములను గూర్చి వ్రాయుము.

- 1) K. The Lawi
- 2) B. K. M. Nishith
- 3) R. D. Nishith

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DEPARTMENT OF ZOOLOGY

ZOOLOGY PAPER FOR IV SEMESTER
ZOOLOGY - PAPER - IV

EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY

Time: 3 hrs

Max. Marks: 75

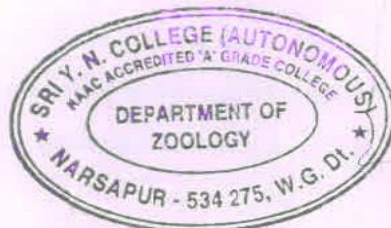
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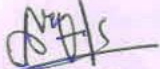
Unit No.	Essay Questions	Short Questions	Marks allotted to the Unit	Remarks
Unit - 1	2	1	25	2 Essay Questions
Unit - 2	2	1	25	2 Essay Questions
Unit - 3	2	2	30	2 Essay Question
Unit - 4	2	2	30	2 Essay Questions
Unit - 5	2	2	30	2 Essay Questions
Total Marks including Choice				140

Note: - The Question Paper setters are requested to adhere to the format given above.

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- 3) R. D. Sani

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DEPARTMENT OF ZOOLOGY
ZOOLOGY PRACTICAL SYLLABUS FOR IV SEMESTER
ZOOLOGY - PAPER – IV
EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY

Periods: 24

Max. Marks: 50

I. EMBRYOLOGY

1. Study of T.S. of testis, ovary of a mammal
2. Study of different stages of cleavages (2, 4, 8 cell stages)
3. Study of chick embryos of 18 hours, 24 hours, 33 hours and 48 hours of incubation

II. PHYSIOLOGY

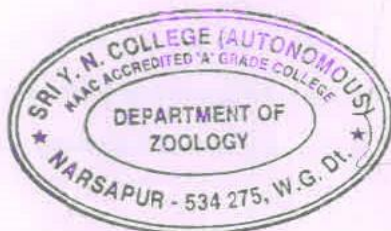
1. Qualitative tests for identification of carbohydrates, proteins and fats
2. Qualitative tests for identification of ammonia, urea and uric acid
3. Study of activity of salivary amylase under optimum conditions
4. Study of prepared slides of T.S. of duodenum, liver, lung, kidney, spinal cord, bone and cartilage

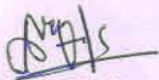
III. ECOLOGY

1. Determination of pH of given sample
2. Estimation of dissolved oxygen of given sample
3. Estimation of total alkalinity of given sample
4. Estimation of salinity of given sample

- 1) K. Uhe Lawi
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SEMESTER

V

PAPER V & VI

DEPARTMENT OF ZOOLOGY
ZOOLOGY SYLLABUS FOR V SEMESTER
ZOOLOGY - PAPER – V
ANIMAL BIOTECHNOLOGY

Periods: 60

Max. Marks: 100

UNIT - I

Tools of Recombinant DNA technology - Enzymes and Vectors
Restriction modification systems: Types I, II and III.
Application of Type II restriction enzymes in Genetic Engineering.
Cloning Vectors - Plasmid vectors, pBR and pUC series.

UNIT - II

Techniques of Recombinant DNA technology
Gene delivery: Microinjection, Electroporation, Biolistic method (gene gun), liposome and viral-mediated delivery
PCR: Basics of PCR.
Hybridization techniques - Southern and Northern.
Genomic and cDNA libraries - Preparation and Uses

UNIT - III

Animal Cell Technology
Cell culture media: Natural and Synthetic
Cell cultures: primary culture, secondary culture, continuous cell lines, Protocols for Primary Cell Culture - Organ culture and Cryopreservation.
Hybridoma Technology-Cell fusion, Production of Monoclonal antibodies (mAb), Applications of mAb
Stem cells: Types of stem cells, applications

UNIT - IV

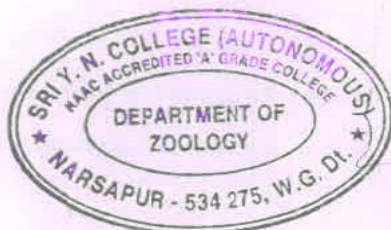
Reproductive Technologies & Transgenic Animals
Manipulation of reproduction in animals - Artificial Insemination, *In vitro* fertilization, super ovulation, Embryo transfer, Embryo Cloning
Transgenic Animals: Strategies of Gene transfer; Transgenic - sheep, - fish and applications

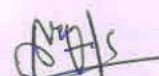
UNIT - V

Agriculture: fisheries – monoculture in fishes, polyploidy in fishes; DNA fingerprinting

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- 2) B. K. M. Nishith
- 3) R. D. Thim

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DEPARTMENT OF ZOOLOGY
ZOOLOGY MODEL QUESTION PAPER FOR V SEMESTER
ZOOLOGY – PAPER – V
ANIMAL BIOTECHNOLOGY

Time: 3Hrs

Max.Marks:75

PART-I

Answer any FIVE of the following. Draw labeled diagrams wherever necessary

5 x 5 = 25M

- | | |
|---------------------------------|------------------------|
| 1. p ^{BR} | p ^{BR} |
| 2. Microinjection | మైక్రో ఇంజక్షన్ |
| 3. Cell Lines | కణ వనరులు |
| 4. Monoclonal Anti Bodies (mAb) | ఏక సంతత ప్రతి రక్షకాలు |
| 5. Transgenesis | ట్రాన్స్ జెనిసిస్ |
| 6. Super Ovulation | అధి అండోత్పత్తి |
| 7. Monoculture | ఏకసంవర్ధనము |
| 8. Polyploidy | పాలి ప్లాయిడి |

PART-II

Answer any FIVE of the following, choosing atleast two questions from each section.

Draw labeled diagrams wherever necessary.

5 x 10 = 50M

SECTION-A

9. Describe various types of Restriction modification system.
వివిధ రకముల రిస్ట్రిక్షన్ మార్పు వ్యవస్థలను గూర్చి వర్ణింపుము.
10. Explain different types of vectors used in Biotechnology.
జీవ సాంకేతికత శాస్త్రములో వినియోగింపబడు వివిధ రకాల వెక్టర్లను గూర్చి వివరింపుము.
11. Give an account on Gene cloning.
జన్యు క్లోనింగ్ విధానమును గూర్చి వ్రాయుము.

12. Write an essay on PCR Technique.

పి.సి.ఆర్. సాంకేతికతను గూర్చి ఒక వ్యాసము వ్రాయుము.

13. Explain various types of culture media used for Animal cell culture.

జంతు కణ సంవర్ధనములో వినియోగించు వివిధ రకముల మాద్యమములను గూర్చి వివరింపుము.

SECTION-B

14. Write an essay on methods used for Organ culture.

అంగ సంవర్ధనములో వినియోగించు వివిధ పద్ధతులను గూర్చి ఒక వ్యాసము వ్రాయుము.

15. Describe Artificial Insemination followed in animals.

జంతువులలో అవలింభించు కృత్రిమ గర్భధారణను గూర్చి వర్ణింపుము.

16. Write an essay on Transgenic Animals.

ట్రాన్స్ జెనిక్ జంతువులను గూర్చి ఒక వ్యాసము వ్రాయుము.

17. Describe the Monoculture in fishes.

చేపలలో ఏకసంవర్ధనమును గూర్చి వర్ణింపుము.

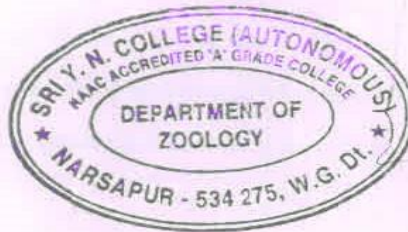
18. Give an account on DNA fingerprinting technology.

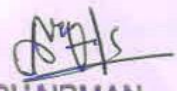
డి.ఎన్.ఎ. ఫింగర్ ప్రింటింగ్ సాంకేతికతను గూర్చి వ్రాయుము.

10 - 500

- 1) K. The Lawi
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- 3) R. D. S.

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DEPARTMENT OF ZOOLOGY

ZOOLOGY PAPER FOR V SEMESTER
ZOOLOGY - PAPER - V

ANIMAL BIOTECHNOLOGY

Time: 3 hrs

Max. Marks: 75

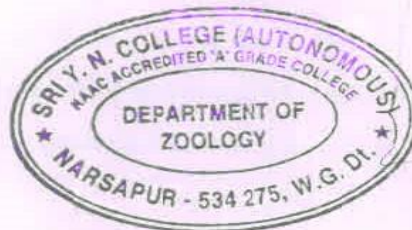
BLUE PRINT

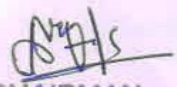
Unit No.	Essay Questions	Short Questions	Marks allotted to the Unit	Remarks
Unit - 1	2	1	25	2 Essay Questions
Unit - 2	2	1	25	2 Essay Questions
Unit - 3	2	2	30	2 Essay Question
Unit - 4	2	2	30	2 Essay Questions
Unit - 5	2	2	30	2 Essay Questions
Total Marks including Choice				140

Note: - The Question Paper setters are requested to adhere to the format given above.

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- 2) B. K. M. Nishu
- 3) R. D. S. S.

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DEPARTMENT OF ZOOLOGY
ZOOLOGY PRACTICAL SYLLABUS FOR V SEMESTER
ZOOLOGY - PAPER - V
ANIMAL BIOTECHNOLOGY

Periods: 24

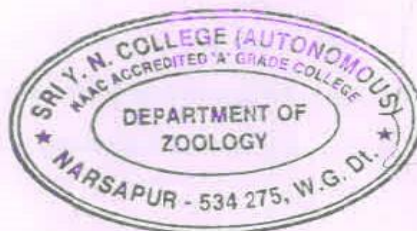
Max. Marks: 50

ANY SIX OF THE FOLLOWING:

1. Maintenance and storage of *E. coli* DH5 alpha cells.
2. Isolation of Plasmid DNA from *E. coli* *minos*.
3. Preparation of genomic DNA from *E. coli*/animals/ human.
4. DNA quantification using Agarose gel electrophoresis (by using lambda DNA as standard). *majoo*
5. Restriction digestion of lambda (λ) DNA using EcoRI and Hind III.
6. Preparation for insertion and vector for ligation.
7. Performance of ligation reaction using T4 DNA Ligase.
8. Preparation of competent cells
9. Transformation of *E. coli* with plasmid DNA using CaCl₂,
10. Selection of transformants on X-gal and IPTG
11. Techniques: Western Blot, Southern Hybridization, DNA Fingerprinting
12. Interpretation of sequencing gel electropherograms
13. Amplification of DNA by PCR
14. Packing and sterilization of glass and plastic wares for cell culture.
15. Preparation of culture media.

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- 2) B. K. R. M. Nishith
- 3) R. D. Thirum

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DEPARTMENT OF ZOOLOGY
ZOOLOGY SYLLABUS FOR V SEMESTER

ZOOLOGY - PAPER – VI

ANIMAL HUSBANDRY

Periods: 60

Max. Marks: 100

UNIT – I

General introduction to Principles of poultry housing.
Poultry houses.
Management of chicks, growers and layers.
Management of Broilers. poultry farming.

UNIT – II

Poultry feed management – Principles of feeding.
Nutrient requirements for different stages of layers and broilers. Methods of feeding.
Poultry diseases – viral, bacterial, fungal and parasitic (two each) symptoms, control and management.

UNIT – III

Selection, care and handling of hatching eggs. Egg testing.
Methods of hatching. Brooding and rearing.
Sexing of chicks.

UNIT- IV

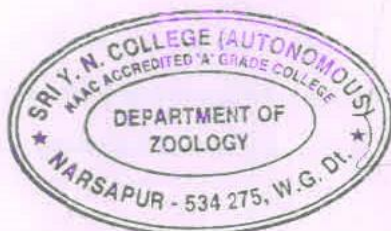
Breeds of Dairy Cattle and Buffaloes – Definition of breed, Classification of Indian Cattle breeds, Exotic breeds and Indian buffalo breeds.
Systems of inbreeding and crossbreeding.
Housing of dairy animals – Selection of site for dairy farm systems of housing.
Conventional dairy barn. Cleaning and sanitation of dairy farm.
Weaning of calf. Deworming and Vaccination programme.
Records to be maintained in a dairy farm.

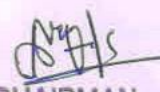
UNIT - V

Care and management of dairy animals.
Care and management of calf, heifer, milk animal, dry and pregnant animal, bulls and bullocks.

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- 2) B. K. M. Nishith Reddy
- 3) Rhythm

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SRI YN COLLEGE(A),NARSAPUR
DEPARTMENT OF ZOOLOGY
ZOOLOGY MODEL QUESTION PAPER FOR V SEMESTER
ZOOLOGY – PAPER – VI
ANIMAL HUSBANDRY

Time: 3Hrs

Max.Marks:75

PART-I

Answer any FIVE of the following. Draw labeled diagrams wherever necessary

5 x 5 = 25M

- | | |
|---------------------|------------------------------|
| 1. Poultry Houses | పౌల్ట్రీఫామ్ |
| 2. Broilers | మాంసమును ఉత్పత్తి చేయుకోళ్ళు |
| 3. Egg Testing | గుడ్ల పరీక్ష |
| 4. Sexing of Chicks | కోళ్ళ లింగత్వము |
| 5. Exotic Breeds | విదేశీ జాతులు |
| 6. Weaning of Calf | దూడల వీనింగ్ |
| 7. Dairy Animals | పాలను ఉత్పత్తి చేయు జంతువులు |
| 8. Bulls | ఎద్దులు |

PART-II

Answer any FIVE of the following, choosing atleast two questions from each section.

Draw labeled diagrams wherever necessary.

5 x 10 = 50M

SECTION-A

9. Describe the basic principles of Poultry Housing.
పౌల్ట్రీఫామ్ యొక్క మూల నియమములను గూర్చి వర్ణింపుము.
10. Explain the management of Growers and Layers.
గ్రోయర్స్ మరియు లేయర్స్ యొక్క యాజమాన్యంను గూర్చి వివరింపుము.
11. Give an account on principles of Poultry Feeding.
పౌల్ట్రీ జీవుల పోషణ నియమములను గూర్చి వ్రాయుము.

12. Write an essay on Bacterial and Fungal diseases occurs in Poultry Birds.
పౌల్ట్రీ జీవులకు సంభవించు బాక్టీరియల్ మరియు ఫంగల్ వ్యాధులను గూర్చి ఒక వ్యాసము వ్రాయుము.

13. Explain about selection and caring of hatching eggs.
పొదుగు గుడ్ల ఎంపిక మరియు జాగ్రత్తలను గూర్చి వివరింపుము.

SECTION-B

14. Write an essay on different methods of hatching eggs.
గుడ్లను పొదిగించుటకు అవలంబించు వివిధ పద్ధతులను గూర్చి ఒక వ్యాసము వ్రాయుము.

15. Describe the systems of Inbreeding and Crossbreeding.
అంతప్రజననము మరియు పరాగప్రజనన వ్యవస్థలను గూర్చి వర్ణింపుము.

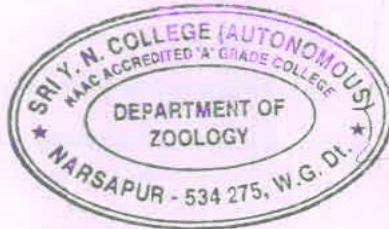
16. Write an essay on maintenance of records in Dairy Farm.
డైరీ ఫామ్ నందు నిర్వహించవలసిన రికార్డులను గూర్చి ఒక వ్యాసము వ్రాయుము.

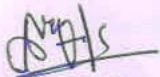
17. Describe the Care and Management of Dairy Animals.
డైరీ పశువుల జాగ్రత్తలు మరియు యాజమాన్యంను గూర్చి వర్ణింపుము.

18. Give an account on Care and Management of Dry and Pregnant Animals.
వట్టిపోయిన మరియు నూడి పశువుల జాగ్రత్తలు మరియు యాజమాన్యంను గూర్చి వ్రాయుము.

- 1) K. The Lawi
- 2) B. K. M. N. S. S.
- 3) R. D. S.

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DEPARTMENT OF ZOOLOGY

ZOOLOGY PAPER FOR V SEMESTER

ZOOLOGY - PAPER - VI

ANIMAL HUSBANDRY

Time: 3 hrs

Max. Marks: 75

Marks: 75

5 x 5 = 25 M

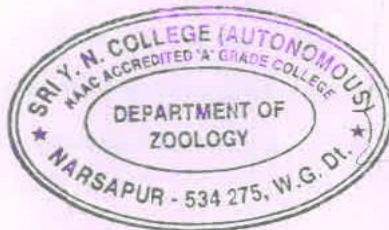
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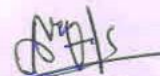
Unit No.	Essay Questions	Short Questions	Marks allotted to the Unit	Remarks
Unit - 1	2	1	25	2 Essay Questions
Unit - 2	2	1	25	2 Essay Questions
Unit - 3	2	2	30	2 Essay Question
Unit - 4	2	2	30	2 Essay Questions
Unit - 5	2	2	30	2 Essay Questions
Total Marks including Choice			140	

Note: - The Question Paper setters are requested to adhere to the format given above.

- 1) K. Uthe Sani
- 2) B. K. M. Nishith
- 3) R. D. Sani

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DEPARTMENT OF ZOOLOGY
ZOOLOGY PRACTICAL SYLLABUS FOR V SEMESTER

ZOOLOGY - PAPER - VI

ANIMAL HUSBANDRY

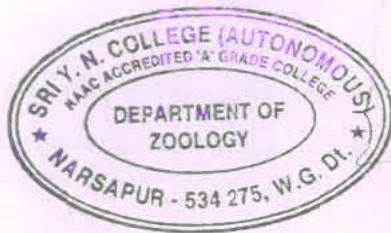
Periods: 24

Max. Marks: 50

1. Study of various breeds of layers and broilers (photographs) - $10 + 13 = 23$ ✓
2. Identification of disease causing organisms in poultry birds (as per theory) ✓ $7 + 8 + 3 + 1 = 19$ ✓
3. Study of the anatomy of a poultry bird by way of dissecting a bird. (Demonstration) - 2
4. Study of various activities in a poultry farm (layers and broilers) and submission of a report. ✓
5. Study of various breeds of cattle (photographs/microfilms) ✓
6. Study of various activities carried out in a dairy farm and submission of a report. ✓
- Indian breeds -
Exotic - 6
- 2

- 1) K. Uthe Sai
2) B. K. M. Nishu
3) R. D. D. D.

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SEMESTER

VI

**Elective and
Cluster Papers**

DEPARTMENT OF ZOOLOGY
ZOOLOGY SYLLABUS FOR VI SEMESTER
ZOOLOGY –ELECTIVE PAPER: VII - (A)

IMMUNOLOGY

Periods: 60

Max. Marks: 100

UNIT – I

1.1 OVERVIEW OF IMMUNE SYSTEM

- 1.1.1 Introduction to basic concepts in Immunology
- 1.1.2 Innate and adaptive immunity
- 1.2 Cells and organs of Immune system
 - 1.2.1 Cells of immune system
 - 1.2.2 Organs of immune system

UNIT – II

2.1 ANTIGENS

- 2.1.1 Basic properties of antigens
- 2.1.2 B and T cell epitopes, haptens and adjuvants
- 2.1.3 Factors influencing immunogenicity

UNIT – III

3.1 ANTIBODIES

- 3.1.1 Structure of antibody
- 3.1.2 Classes and functions of antibodies
- 3.1.3 Monoclonal antibodies

UNIT – IV

4.1 WORKING OF IMMUNE SYSTEM

- 4.1.1 Structure and functions of major histocompatibility complexes
- 4.1.2 Exogenous and Endogenous pathways of antigen presentation and processing
- 4.1.3 Basic properties and functions of cytokines

UNIT – V

5.1 IMMUNE SYSTEM IN HEALTH AND DISEASE

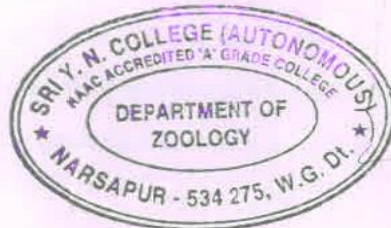
- 5.1.1 Classification and brief description of various types of hyper sensitivities
- 5.1.2 Introduction to concepts of autoimmunity and immunodeficiency

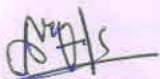
5.2 VACCINES

- 5.2.1 General introduction to vaccines
- 5.2.2 Types of vaccines

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- 2) B. K. M. Nishitha
- 3) R. D. S.

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SRI YN COLLEGE(A),NARSAPUR
DEPARTMENT OF ZOOLOGY
ZOOLOGY MODEL QUESTION PAPER FOR VI SEMESTER
ZOOLOGY – PAPER – VII
IMMUNOLOGY

Time: 3Hrs

Max.Marks:75

PART-I

Answer any FIVE of the following. Draw labeled diagrams wherever necessary

5 x 5 = 25M

- | | |
|---------------------------|-------------------------------|
| 1. Concepts of Immunology | రోగనిరోధకశాస్త్రము యొక్క భావన |
| 2. Haptanes | హేప్టేనులు |
| 3. Antibody | ప్రతిరక్షకము |
| 4. Monoclonal Antibodies | ఏకసంతత ప్రతిరక్షకాలు |
| 5. Exogenes | ఎక్సో జీనులు |
| 6. Cytokines | సైటోకైన్స్ |
| 7. Hypersensitivity | అధిసున్నితత్వము |
| 8. Vaccines | టీకాలు |

PART-II

Answer any FIVE of the following, choosing atleast two questions from each section.

Draw labeled diagrams wherever necessary.

5 x 10 = 50M

SECTION-A

9. Describe the different types of Immunity.

వివిధ రకముల రోగనిరోధకతలను గూర్చి వర్ణింపుము.

10. Explain the cells on Immune System.

రోగనిరోధక వ్యవస్థ యొక్క కణములను గూర్చి వివరింపుము.

11. Give an account on basic properties of Antigens.

ప్రతిజనకాల మూల ధర్మములను గూర్చి వ్రాయుము.

12. Write an essay on factors influencing Immunogenicity.

ఇమ్యునోజెనిసిటీను ప్రభావితం చేయు కారకాలను గూర్చి ఒక వ్యాసము వ్రాయుము.

13. Explain about the structure of Antibody.

ప్రతిరక్షకము యొక్క నిర్మాణమును గూర్చి వివరింపుము.

SECTION-B

14. Write an essay on classes and functions of Antibodies.

ప్రతిరక్షకాల వర్గములు మరియు విధులను గూర్చి ఒక వ్యాసము వ్రాయుము.

15. Describe the structure and functions of major histocompatibility complexes.

మేజర్ హిస్టోకాంపేటబిలిటీసంక్లిప్టు యొక్క నిర్మాణము మరియు విధులను గూర్చి వర్ణింపుము.

16. Write an essay on basic properties and functions of Cytokines.

సైటోకైన్స్ మూల ధర్మములను మరియు విధులను గూర్చి ఒక వ్యాసము వ్రాయుము.

17. Describe the classification of various types of Hypersensitivity.

వివిధ రకముల అధిసున్ని తత్వముల వర్గీకరణను గూర్చి వర్ణింపుము.

18. Give an account on various types of Vaccines.

వివిధ రకముల టీకాలను గూర్చి వ్రాయుము.

ks: 75

= 25 M

= 50 M

ు.

DEPARTMENT OF ZOOLOGY

ZOOLOGY PAPER FOR VI SEMESTER
ZOOLOGY - PAPER - VII

IMMUNOLOGY

Time: 3 hrs

Max. Marks: 75

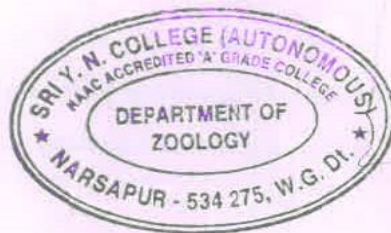
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Unit No.	Essay Questions	Short Questions	Marks allotted to the Unit	Remarks
Unit - 1	2	1	25	2 Essay Questions
Unit - 2	2	1	25	2 Essay Questions
Unit - 3	2	2	30	2 Essay Question
Unit - 4	2	2	30	2 Essay Questions
Unit - 5	2	2	30	2 Essay Questions
Total Marks including Choice			140	

Note: - The Question Paper setters are requested to adhere to the format given above.

- 1) K. Uhe Lawi
- 2) B. K. M. Nishad
- 3) R. D. Thim

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ZOOLOGY PRACTICAL SYLLABUS FOR VI SEMESTER
ZOOLOGY –ELECTIVE PAPER: VII - (A)
IMMUNOLOGY

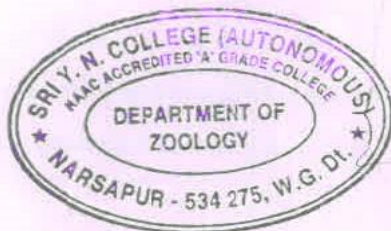
Periods: 24

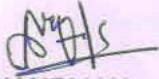
Max. Marks: 50

1. Demonstration of lymphoid organs (as per UGC guidelines)
2. Histological study of spleen, thymus and lymph nodes (through prepared slides)
3. Blood group determination
4. Demonstration of
 - a. ELISA
 - b. Immunoelectrophoresis

- 1) K. Uthe Sani
- 2) B. K. M. Nishu
- 3) R. D. Thum

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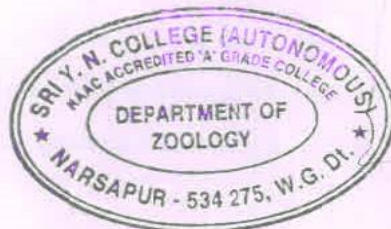
DEPARTMENT OF ZOOLOGY
ZOOLOGY PRACTICAL MODEL PAPER FOR VI SEMESTER
ZOOLOGY – ELECTIVE PAPER: VII - (A)
IMMUNOLOGY

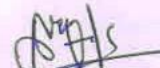
Max. Marks: 50

Q. 1. Identify the blood group in the given sample of blood and write the procedure adopted for it.	10 + 5 = 15 M
Q. 2. Write the procedure for ELISA test	10 M
Q. 3. Identify, Sketch and comment on A. B.	2 x 5 = 10 M
Q. 4. Record and Viva Voce	10 M
Q. 5. Project Work Report	5 M
Total	50 M

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- 2) B. K. M. Nishith
- 3) Rhythm

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DEPARTMENT OF ZOOLOGY

ZOOLOGY SYLLABUS FOR VI SEMESTER ZOOLOGY – CLUSTER ELECTIVE PAPER: VIII - (A)

PRINCIPLES OF AQUACULTURE

Periods: 60

Max. Marks: 75

UNIT – I

1.1 INTRODUCTION / BASICS OF AQUACULTURE

- 1.1.1 Definition, Significance and History of Aquaculture
- 1.1.2 Present status of Aquaculture – Global and National scenario
- 1.1.3 Major cultivable species for aquaculture: freshwater, brackish water and marine.
- 1.1.4 Criteria for the selection of species for culture

UNIT – II

2.1 TYPES OF AQUACULTURE

- 2.1.1 Concept of Monoculture, Poly culture, Composite culture, Mono sex culture and Integrated fish farming
- 2.2 Ponds, Raceways, Cages, Pens, Rafts and water re-circulating systems
- 2.3 Traditional, extensive, modified extensive, semi-intensive and intensive cultures of fish and shrimp.

UNIT – III

3.1 DESIGN AND CONSTRUCTION OF AQUA FARMS

- 3.1.1 Criteria for the selection of site for freshwater and brackish water pond farms
- 3.1.2 Design and construction of fish and shrimp farms
- 3.2 Seed resources
 - 3.2.1 Natural seed resources and Procurement of seed for stocking: Carp and shrimp
- 3.3 Nutrition and feeds
 - 3.3.1 Nutritional requirements of a cultivable fish and shellfish
 - 3.3.2 Natural food and Artificial feeds and their importance in fish and shrimp culture

UNIT – IV

4.1 MANAGEMENT OF CARP CULTURE PONDS

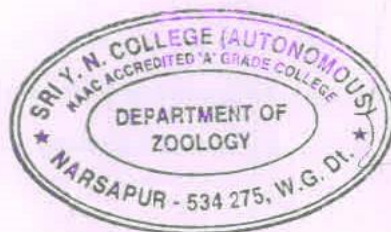
- 4.1.1 Culture of Indian major carps: Pre-stocking management – Dewatering, drying, ploughing / de silting Predators, weeds and algal blooms and their control, Liming and fertilization, Stocking management – Stocking density and stocking; Post-stocking management – Feeding, water quality, growth and health care and Harvesting of ponds.
- 4.2 Culture of giant freshwater prawn, *Macrobrachium rosenbergii*

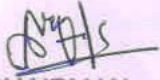
UNIT – V

- 5.1 Culture of shrimp (*Penaeus monodon* or *Litopenaeus vannamei*)
- 5.2 Culture of pearl oysters
- 5.3 Culture of seaweeds-species cultured, culture techniques, important by-products, prospects
- 5.4 Culture of ornamental fishes – Setting up and maintenance of aquarium; and breeding.

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- 2) B. K. M. Nishad
- 3) R. B. Thum

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SRI YN COLLEGE(A),NARSAPUR
DEPARTMENT OF ZOOLOGY
ZOOLOGY MODEL QUESTION PAPER FOR VI SEMESTER
ZOOLOGY – PAPER – VIII A
PRINCIPLES OF AQUACULTURE

Time: 3Hrs

Max.Marks:75

PART-I

Answer any FIVE of the following. Draw labeled diagrams wherever necessary

5 x 5 = 25M

- | | |
|----------------------|----------------|
| 1. Catla catla | కట్లా కట్లా |
| 2. Poly culture | బహుళ సంవర్ధనము |
| 3. Seed resources | విత్తన వనరులు |
| 4. Natural Food | సహజ ఆహారము |
| 5. Predators | పరభక్షులు |
| 6. Water Quality | నీటి నాణ్యత |
| 7. Pearl Oyster | ముత్యపు చిప్ప |
| 8. Ornamental Fishes | అలంకరణ చేపలు |

PART-II

Answer any FIVE of the following, choosing atleast two questions from each section.

Draw labeled diagrams wherever necessary. 5 x 10 = 50M

SECTION-A

9. Describe the significance of Aquaculture.
నీటి సంవర్ధనము యొక్క ప్రాముఖ్యతను గూర్చి వర్ణింపుము.
10. Write an essay on major cultivable species of fresh water.
మంచి నీటి ముఖ్య పెంపకపు చేపలను గూర్చి ఒక వ్యాసము వ్రాయుము.
11. Give an account on Integrated Fish Farming.
సమగ్ర చేపల పెంపకమును గూర్చి వ్రాయుము.

12. Write an essay on semi – intensive and intensive cultures of shrimp.
రొయ్య సెమి-ఇంటెన్సివ్ మరియు ఇంటెన్సివ్ సంవర్ధనమును గూర్చి ఒక వ్యాసము వ్రాయుము.

13. Explain about the Design and Construction of a fish pond.
చేపల కుంట నమూనా మరియు నిర్మాణమును గూర్చి వివరింపుము.

SECTION-B

14. Write an essay on Nutritional requirements of Cultivable fish.
పెంపకపు చేపల పోషణా అవసరములను గూర్చి ఒక వ్యాసము వ్రాయుము.

15. Describe the Weeds and their control in a culture pond.
సంవర్ధనపు కుంటలో కలుపు మొక్కలు మరియు వాటి నివారణను గూర్చి వర్ణింపుము.

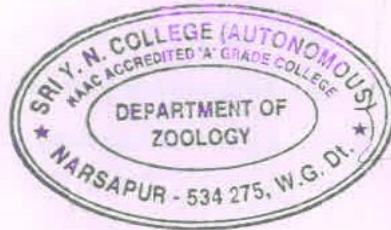
16. Write an essay on cultural of giant fresh water prawn.
మంచి నీటి అని పెద్ద రొయ్య సంవర్ధనమును గూర్చి ఒక వ్యాసము వ్రాయుము.


17. Describe the culture of Penaeus monodon.
పినయస్ మోనోడాన్ సంవర్ధనమును గూర్చి వర్ణింపుము.

18. Give an account on setting up and maintenance of an aquarium.
గాజు తొట్టె నిర్మాణము మరియు యాజమాన్యంను గూర్చి వ్రాయుము.

- 1) K. The Lawi
- 2) B. Kamrishi
- 3) Rhythm

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DEPARTMENT OF ZOOLOGY
VI SEMESTER
ZOOLOGY – CLUSTER ELECTIVE PAPER: VIII - (A)
PRINCIPLES OF AQUACULTURE

Time: 3 hrs

Max. Marks: 75

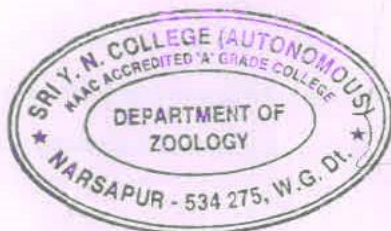
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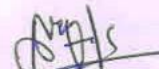
Unit No.	Essay Questions	Short Questions	Marks allotted to the Unit	Remarks
Unit – 1	2	1	25	2 Essay Questions
Unit – 2	2	1	25	2 Essay Questions
Unit – 3	2	2	30	2 Essay Question
Unit – 4	2	2	30	2 Essay Questions
Unit – 5	2	2	30	2 Essay Questions
Total Marks including Choice			140	

Note: - The Question Paper setters are requested to adhere to the format given above.

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- 2) B. K. M. Nishith
- 3) R. D. Sani

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ZOOLOGY – ELECTIVE PAPER: VIII - (A)

PRINCIPLES OF AQUACULTURE

Periods: 24

Max. Marks: 50

Cultivable fishes

1. Identification and study of important cultivable and edible fishes - Any ten
2. Identification and study of important cultivable and edible crustaceans - Any five
3. Identification and study of common aquarium fishes – Any five
4. General description and recording biometric data of a given fish.

Diseases

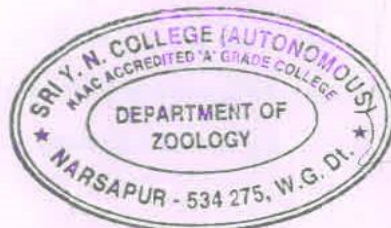
1. Identification and study of fish and shrimp diseases - Using specimens / pictures
2. External examination of the diseased fish – diagnostic features and procedure.
3. Autopsy of fish – Examination of the internal organs.
4. Determination of dosages of chemicals and drugs for treating common diseases.

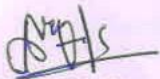
Pond Management

1. Water Quality -Determination of temperature, pH, salinity in the pond water sample; Estimation of dissolved oxygen, free carbondioxide, total alkalinity, total hardness, phosphates and nitrites.
2. Soil analysis – Determination of soil texture, pH, conductivity, available nitrogen, available phosphorus and organic carbon.
3. Identification and study of common zooplankton, aquatic insects and aquatic weeds – Each 5

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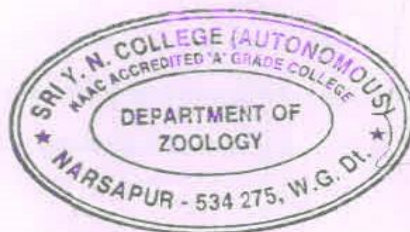
DEPARTMENT OF ZOOLOGY
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ZOOLOGY – ELECTIVE PAPER: VIII - (B)
PRINCIPLES OF AQUACULTURE

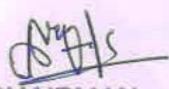
Max. Marks: 50

Q. 1. Analyses the gut contents of the specimen given to you	10 + 5 = 15 M
Q. 2. Write the procedure for preparation of Aquatic Feeds	10 M
Q. 3. Fish byproducts	5 x 3 = 15 M
Q. 4. Record and Viva Voce	10 M
Total	50 M

- 1) K. Uthe Sani
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- 3) R. D. S.

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ZOOLOGY SYLLABUS FOR VI SEMESTER ZOOLOGY – CLUSTER ELECTIVE PAPER: VIII - (A)

AQUACULTURE MANAGEMENT

Periods: 60

Max. Marks: 75

UNIT – I

BREEDING AND HATCHERY MANAGEMENT:

- 1.1 Bundh Breeding and Induced breeding of carp by Hypophysation and use of synthetic hormones
- 1.2 Types of fish hatcheries; Hatchery management of Indian major carps
- 1.3 Breeding and Hatchery management of *Penaeus monodon*/ *Litopenaeus vannamei*
- 1.4 Breeding and Hatchery management of giant freshwater prawn.

UNIT – II

WATER QUALITY MANAGEMENT:

- 2.1 Water quality and soil characteristics suitable for fish and shrimp culture
- 2.2 Identification of oxygen depletion problems and control mechanisms in culture ponds
- 2.3 Aeration: Principles of aeration and Emergency aeration
- 2.4 Liming materials, Organic manures and Inorganic fertilizers commonly used and their implications in fish ponds

UNIT – III

FEED MANAGEMENT:

- 3.1 Live Foods and their role in shrimp larval nutrition.
- 3.2 Supplementary feeds, Principal foods in artificial diets, Types of feeds, feed additives and Preservatives, role of probiotics.
- 3.3 Feed formulation and manufacturing, Feed storage, feeding strategies. Feeding devices, feeding schedules and ration size, Feed Evaluation - feed conversion efficiencies and ratios

UNIT – IV

DISEASE MANAGEMENT:

- 4.1 Principles of disease diagnosis and health management
- 4.2 Prophylaxis, Hygiene and Therapy of fish diseases
- 4.3 Specific and non-specific defense systems in fish, Fish immunization and vaccination
- 4.4 Etiology, Symptoms, prophylaxis and therapy of common fish diseases in fish ponds and common shrimp diseases in shrimp ponds

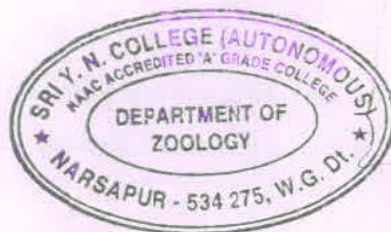
UNIT – V

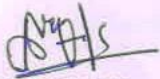
ECONOMICS AND MARKETING:

- 5.1 Principles of aquaculture economics – Capital costs, variable costs, cost-benefit analysis
- 5.2 Fish marketing methods in India. Basic concepts in demand and price analysis.
- 5.3 Fisheries Extension
- 5.3 Fisheries training and education in India. Role of extension in community development.
- 5.4 Genetic improvement of fish stocks – Hybridization of fish.
- 5.5 Gynogenesis, Androgenesis, Polyploidy, Transgenic fish, Cryopreservation of gametes, Production of monosex and sterile fishes and their significance in aquaculture.

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- 2) B. K. M. Nishal
- 3) R. D. Thim

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DEPARTMENT OF ZOOLOGY
ZOOLOGY MODEL QUESTION PAPER FOR VI SEMESTER
ZOOLOGY – PAPER – VIII B
AQUACULTURE MANAGEMENT

Time: 3Hrs

Max.Marks:75

PART-I

Answer any FIVE of the following. Draw labeled diagrams wherever necessary

5 x 5 = 25M

- | | |
|--------------------|--------------------|
| 1. Bundh Breeding | బండ్ ప్రజననం |
| 2. Liming | సున్నం చల్లుట |
| 3. Live Foods | జీవ ఆహారములు |
| 4. Probiotics | సూక్ష్మ జీవకాలు |
| 5. Prophylaxis | రోగనిరోధనము |
| 6. Vaccination | టీకాలు వేయుట |
| 7. Fish marketing | చేపల విపణి |
| 8. Transgenic Fish | ట్రాన్స్జెనిక్ చేప |

PART-II

Answer any FIVE of the following, choosing atleast two questions from each section.

Draw labeled diagrams wherever necessary.

5 x 10 = 50M

SECTION-A

9. Write an essay on Induced Breeding technique in fishes.

చేపలలో ప్రేరేపిత ప్రజనన సాంకేతిక విధానమును గూర్చి ఒక వ్యాసము వ్రాయుము..

10. Describe the Breeding and Hatchery Management of *Penaeus monodon*.

పిన్యస్ మోనోడాన్ ప్రజననం మరియు హేచరీ యాజమాన్యంను గూర్చి వర్ణింపుము.

11. Give an account on Water Quality Management for Shrimp culture.

ష్రింప్ సంవర్ధనములో నీటి నాణ్యతా యాజమాన్యమును గూర్చి వ్రాయుము.

12. Write an essay on principles of aeration and emergency aeration.

ఏరేషన్ నియమములు మరియు అత్యవసర ఏరేషన్ లను గూర్చి ఒక వ్యాసము వ్రాయుము.

13. Explain about the supplementary feeds used in culture ponds.

చేపలకు కుంటలలో వినియోగించు అనుబంధ ఆహారములను గూర్చి వివరింపుము.

SECTION-B

14. Give an account on Feed Formulation and Feed manufacturing.

మేతల సంఘటనలు మరియు మేతల తయారీ విధానములను గూర్చి వ్రాయుము.

15. Describe the principles of Disease Diagnosis and Health Management.

వ్యాధుల నిర్ధారణ నియమములు మరియు ఆరోగ్య యాజమాన్యములను గూర్చి వర్ణింపుము.

16. Write an essay on specific and non – specific defense systems of fish.

నిర్దిష్ట మరియు నిర్దిష్టము కాని నిరోధక వ్యవస్థలను గూర్చి ఒక వ్యాసము వ్రాయుము.

17. Describe the principles of Aquaculture economics.

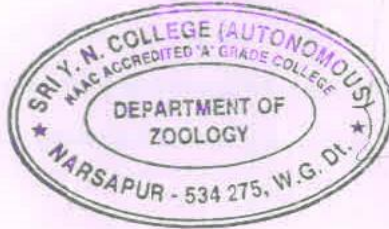
నీటిసంవర్ధనము యొక్క ఆర్థికతా నియమములను గూర్చి వర్ణింపుము.

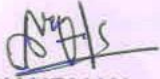
18. Write an essay on Genetic improvement of fish stocks.

చేపల సమూహముల యొక్క జన్యు అభివృద్ధిని గూర్చి ఒక వ్యాసము వ్రాయుము.

- 1) K. The Lawi
- 2) B. K. M. Nishith
- 3) R. D. Nishith

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DEPARTMENT OF ZOOLOGY
VI SEMESTER
ZOOLOGY – CLUSTER ELECTIVE PAPER: VIII - (A)
AQUACULTURE MANAGEMENT

Time: 3 hrs

Max. Marks: 75

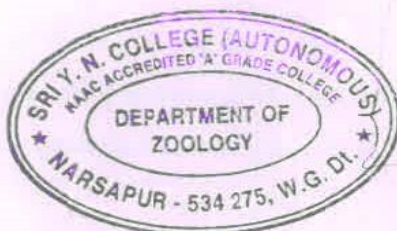
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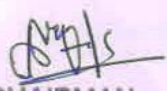
Unit No.	Essay Questions	Short Questions	Marks allotted to the Unit	Remarks
Unit – 1	2	1	25	2 Essay Questions
Unit – 2	2	1	25	2 Essay Questions
Unit – 3	2	2	30	2 Essay Question
Unit – 4	2	2	30	2 Essay Questions
Unit – 5	2	2	30	2 Essay Questions
Total Marks including Choice				140

Note: - The Question Paper setters are requested to adhere to the format given above.

- 1) K. Vhe Sani
- 2) B. K. R. Nishu
- 3) R. D. Sani

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ZOOLOGY PRACTICAL SYLLABUS FOR VI SEMESTER
ZOOLOGY – CLUSTER ELECTIVE PAPER: VIII - (A)

AQUACULTURE MANAGEMENT

Periods: 24

Max. Marks: 50

Nutrition

1. Identification and study of live food organisms – Any five
2. Formulation and preparation of a balanced fish feed
3. Estimation of Proximate composition of aquaculture feeds – Proteins, carbohydrates, lipids, moisture, ash content.
1. Gut content analysis to study artificial and natural food intake.

Post harvest Technology

1. Evaluation of fish/ fishery products for organoleptic, chemical and microbial quality.
2. Preparation of dried, cured and fermented fish products, examination of salt, protein, moisture in dried / cured products, examination of spoilage of dried / cured fish products, marinades, pickles, sauce.
3. Preparation of isinglass, collagen and chitosan from shrimp and crab shell.
4. Developing flow charts and exercises in identification of hazards – preparation of hazard analysis worksheet, plan form and corrective action procedures in processing of fish.

MODEL PAPER

Aquaculture Management Practicals – VI Th Semester

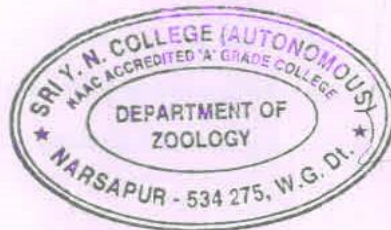
Time: 3 Hrs

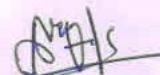
Max. Marks: 50

- 1) Estimate The amount of _____ Present in the given Feed Sample and write the procedure adopted 15 M
- 2) Analyse gut Contents of given specimen and estimate The Natural and artificial food Present. and write the 15 M
Notes
- 3) Identify draw and comment on live food organisms. given as spotters. A, B, C and D . . . 4 x 2½ 10 M
- 4 Record and Viva 7+3 10 M
- Total 50 M

- 1) K. Uthasai
- 2) B. K. M. Nishad
- 3) R. D. D. D.

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DEPARTMENT OF ZOOLOGY
ZOOLOGY SYLLABUS FOR VI SEMESTER
CLUSTER ELECTIVE PAPER - III
POSTHARVEST TECHNOLOGY

Periods: 60

Max. Marks: 75

UNIT – I

1. HANDLING AND PRINCIPLES OF FISH PRESERVATION

- 1.1 Handling of fresh fish, storage and transport of fresh fish, post mortem changes (rigor mortis and spoilage), spoilage in marine fish and fresh water fish.
- 1.2 Principles of preservation– cleaning, lowering of temperature, rising of temperature, denudation, use of salt, use of fish preservatives.

UNIT – II

2. METHODS OF FISH PRESERVATION

- 2.1 Traditional methods - Sun drying, Salt curing, Pickling and Smoking.
- 2.2 Advanced methods – Chilling or Icing, Refrigerated sea water, Freezing and Canning.

UNIT – III

3. PROCESSING AND PRESERVATION OF FISH AND FISH BY-PRODUCTS

- 3.1 Fish products – Fish minced meat, Fish meal, Fish oil, Fish liquid (ensilage), Fish protein concentrate, Fish cake, Fish sauce, Fish salads, fish powder, Pet food from trash fish, Fish manure.
- 3.2 Fish by-products – Fish glue, Ising glass, Chitosan, Pearl essence, Shark fins, Fish leather and Fish maws.
- 3.3 Sea weed Products - Preparation of Agar, Algin and Carrageen. Use of Seaweeds as food for human consumption in disease treatment and preparation of therapeutic drugs.

UNIT – IV

4. SANITATION AND QUALITY CONTROL

- 4.1 Sanitation in processing plants - Environmental and Personal hygiene in processing plants.
- 4.2 Quality Control of fish and fishery products – pre-processing control, control during processing and control after processing.

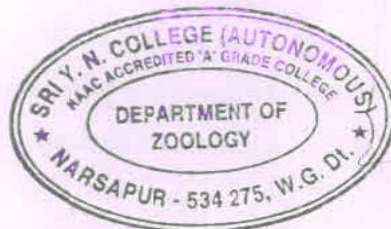
UNIT – V

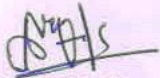
5. QUALITY ASSURANCE AND MANAGEMENT

5.1 Seafood Quality Assurance and Systems: Good Manufacturing Practices (GMPs); Good Laboratory Practices (GLPs); Standard Operating Procedures (SOPs); Concept of Hazard Analysis and Critical Control Points (HACCP) in sea food safety.

- 1) K. Uhe Lawi
- 2) B. K. M. Nishad
- 3) Rhythm

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DEPARTMENT OF ZOOLOGY
ZOOLOGY MODEL PAPER FOR VI SEMESTER
CLUSTER ELECTIVE PAPER - III
POSTHARVEST TECHNOLOGY

Time: 3 Hrs.

Max. Marks: 75

PART I

I. Answer any FIVE of the following. Draw labeled diagrams wherever necessary. 5x5=25

1. Postmortem changes in fish - చేప మరణాంతరం జరిగే మార్పులు
2. Fish preservatives - చేపలను నిల్వచేసే పదార్థములు
3. Smoking - పొగచూరించుట
4. Chilling - శీతలీకరణము
5. Fish meal - చేపల నుండి ఆహారం
6. Seaweeds - సముద్రపు కలుపు మొక్కలు
7. Personal hygiene in fish processing plants - చేపలను శుద్ధిచేయు స్థావరములలో వ్యక్తిగత పరిశుభ్రత
8. Concept of HACCP in sea food safety - సముద్ర ఆహారపు పరిరక్షణలో HACCP యొక్క భావన

PART II
SECTION A

II. Answer any **FIVE** of the following choosing at two questions from each section. Draw labeled diagrams wherever necessary. 5x10=50

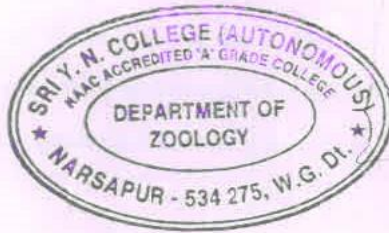
9. Describe the principles of fish preservation.
చేపలను నిల్వచేయుటకు పాటించవలసిన నియమములను గూర్చి వర్ణింపుము.
10. Write an essay on different mechanisms of fish spoilage.
చేపలు చెడిపోవు టకు గల వివిధ కారణములను గూర్చి ఒక వ్యాసము వ్రాయుము.
11. Give an account on traditional methods of fish preservation.
చేపలను నిల్వచేయుటకు గల వివిధ సాంప్రదాయ పద్ధతులను గూర్చి వ్రాయుము.
12. Explain about the advanced methods of fish preservation.
చేపలను నిల్వచేయుటకు గల వివిధ ఆధునిక పద్ధతులను గూర్చి వివరింపుము.
13. Write an essay on any four fish products.
చేపల నుండి ఉత్పన్నమగు ఏవేని నాలుగు ఉత్పత్తులను గూర్చి ఒక వ్యాసము వ్రాయుము.

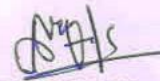
SECTION B

14. Give an account on fish by-products.
చేపల నుండి ఉత్పన్నమగు అనుబంధ-ఉత్పత్తులను గూర్చి వ్రాయుము.
15. Write an essay on sanitation in processing plants.
చేపలను శుద్ధిచేయు కర్మగారములందు పాటించదగు శుభ్రతను గూర్చి ఒక వ్యాసము వ్రాయుము.
16. Give an account on quality control of fish and fishery products.
చేపలు మరియు చేపల ఉత్పత్తుల యొక్క స్వచ్ఛత నియంత్రణను గూర్చి వివరింపుము.
17. Give an account on any two quality assurance systems.
చేపలయొక్క ఏవేని రెండు స్వచ్ఛతా ప్రమాణ వ్యవస్థలను గూర్చి వివరింపుము.
18. Explain about the concept of HACCP in seafood safety.
సముద్ర ఉత్పత్తుల పరిరక్షణలో భద్రతా భావన మరియు క్షిప్ర నియంత్రణ నియమములను గూర్చి విశదీకరింపుము.

- 1) K. Uthe Sani
- 2) B. K. M. Nishith
- 3) R. D. S. S.

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SRI YN COLLEGE(A),NARSAPUR
DEPARTMENT OF ZOOLOGY
ZOOLOGY PAPER FOR VI SEMESTER
ZOOLOGY – CLUSTER ELECTIVE PAPER – VIII C
POST HARVEST TECHNOLOGY

Time: 3Hrs

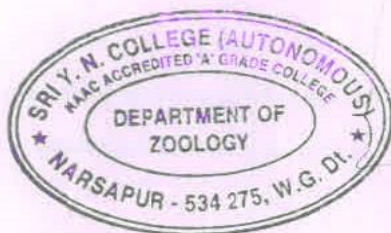
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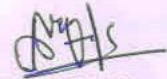
Unit No.	Essay questions	Short Questions	Marks allotted to the Unit	
Unit - 1	2	1	25	2
Unit – 2	2	2	30	2
Unit – 3	2	2	30	2
Unit – 4	2	1	25	2
Unit - 5	2	2	30	2
Total Marks including Choice			140	

Note: The question paper setters are requested to adhere to the format given

- 1) K. Uthe Sani
- 2) B. K. M. Nishith
- 3) R. D. S. S.

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DEPARTMENT OF ZOOLOGY
ZOOLOGY PRACTICAL SYLLABUS FOR VI SEMESTER
ZOOLOGY – CLUSTER ELECTIVE PAPER: VIII - (A)

POST HARVEST TECHNOLOGY

Periods: 24

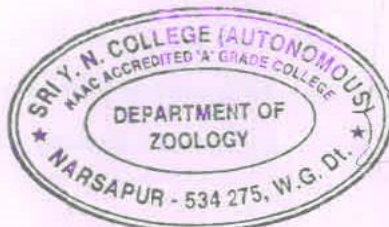
Max. Marks: 50

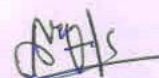
Project Work

- Visit to a fish breeding centre / fish farms and submit a project report
or
Visit to a feed manufacturing unit and submit a project report
or
Visit to a shrimp hatchery / shrimp farms and submit a project report
or
Visit to a shrimp processing unit and submit a project report

- 1) K. Uthe Sani
- 2) B. K. M. Nishith
- 3) R. D. Thim

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