

**ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS
SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU -**

(Autonomous)

Accredited by NAAC with “A” Grade

2020-21



DEPARTMENT OF ZOOLOGY

MINUTES OF BOARD OF STUDIES

29-03-2021 (EVEN SEMESTER)

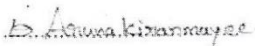
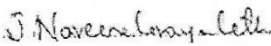


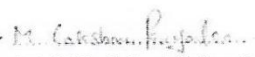
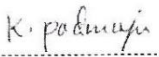
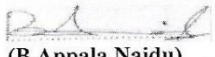
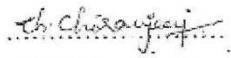


Minutes of the meeting of Board of studies in Zoology for the Autonomous courses of AG & SG Siddhartha Degree College of Arts & Science, Vuyyuru held at 3.00 PM on 29-03-2021 in the Department of Zoology.

Smt.D.A. Kiranmayee. ...

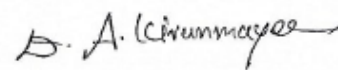
Presiding

Members Present:

- | | | | |
|----|--|-----------------------------|---|
| 1) | 
(Smt. D.A.Kiranmayee) | Chairperson | Head, Dept.of Zoology,
AG & SG S Degree College, Vuyyuru. |
| 2) | 
(Dr.J.N.Lavanya Latha) | University Nominee | Professor, Dept. of Bio-Tech.,
Krishna University,
Machilipatnam. |
| 3) | 
(Dr. K.Daniel) | Academic Council
Nominee | Head, Dept.of Zoology,
JKC College, Guntur. |
| 4) | 
(Dr.B. Elia) | Academic Council
Nominee | Head, Dept.of Zoology,
Govt. Degree College,
Pitapuram. |
| 5) | 
(Ms.M.Lakshmi Priyanka) | Member | Lecturer, Dept.of Zoology,
AG & SG S Degree College, Vuyyuru. |
| 6) | 
(Smt. K.Padmaja) | Member | Lecturer, Dept.of Zoology,
AG & SG S Degree College, Vuyyuru. |
| 7) | 
(B.Appala Naidu) | Industrialist | Asst. Project Manager,
RGCA, Manikonda. |
| 8) | 
(Ch.Chiranjeevi) | Student Represent | Ph.D, Research Scholar,
Dept.of Botany & Microbiology,
Acharya Nagarjuna University, Guntur |

Agenda for B.O.S Meeting.

1. To recommend the syllabi (Theory & Practical), Model question paper & Guide lines for Semester II of I B.Sc (BZC) in the academic year 2020-21.
2. To recommend the syllabi (Theory & Practical), Model question paper & Guide lines to the Paper setter for IV Semester of II B.Sc (BZC) for the academic year 2020-21.
3. To recommend the syllabi (Theory & Practical), Model question paper & Guide lines to the Paper setter for VI Semester of III B.Sc (BZC) for the academic year 2020-21.
4. To discuss to the syllabus of Elective & Clusters in VI semester for the academic year 2020-21.
5. To recommend the syllabi of Competitive Zoology as Unit- VI in II, IV Semesters for the Academic year 2020-2021.
6. To recommend the teaching and evaluation methods to be followed under Autonomous statutes.
- 7 To recommend a Certificate course – Organic farming for II year students in this academic year of 2020-2021.
8. Any other matter.



Chairman

RESOLUTIONS

1. It is resolved to implement the new syllabi (Theory & Practical) as prescribed by APSCHE for Zoology II semester of I B.Sc. (B.Z.C) under Choice Based Credit System (CBCS).

2. It is resolved to implement the changed syllabi in Zoology of IV Semester of II B.Sc. (B.Z.C) according to the suggestions of BOS members. In IV-unit water, Oxygen and CO₂ are added in Abiotic factors of Ecosystem. In the V unit Competition and Predation are added. The model question paper & guide lines to be followed by the question paper setters are approved.

3. It is resolved to follow the same syllabi & model papers under Choice Based Credit System (CBCS) of Zoology of VI semester of III B.Sc. (B.Z.C) approved by the Academic Council of 2020 -21.

4. It is resolved to follow Elective-A (Immunology) and Cluster –B (Aquaculture) in VI Semester from the Academic year 2020-21.

5. It is resolved to continue the same Blue prints of II, IV & VI Semesters of B.Sc Zoology for the Academic year 2020-21

6. It is resolved to follow the syllabus of Competitive Aquaculture as Unit- VI in II, IV Semesters for the Academic year 2020-2021. Questions from the VI-Unit will be given in IA-1, IA-II but not in semester end exams.

7. It is resolved to implement certificate course in Organic Farming for II Year students.

8 It is resolved to continue the following teaching & evaluation methods for the Academic year 2019-20.

Teaching methods:

Besides the conventional methods of teaching, we use modern technology i.e. Using of OHP and LCD projector to display on U boards etc; for better understanding of concepts.

Evaluation of a student is done by the following procedure:

- There are two components in the Valuation and Assessment of a student – Internal Assessment (IA) and Semester Examinations (SE).

(For the Batch of Students Admitted from 2019-2020– UG)

Internal Assessment (IA)

- The maximum mark for IA is 30 and SE is 70 for theory; and for practical papers 50.
- Each IA written examination is of 1^{1/2} hour's duration for 20 marks. The tests will be conducted centrally. The average of two such IA is calculated for 20 marks.
- Other Innovative Components will be for 5 Marks. The innovative component is for 5 marks, conducted during the class hours by the staff member/ in charge of the subject, in the form of assignments/ quiz/ seminars /ppt/ Open Book/Viva Voce/ Group work/ Mini Project/ Exhibition, etc. The topic and time for submission/ presentation will be announced by the staff member/ in charge of the subject in advance. Each student should explain and defend his/her presentation. For attendance 5 Marks are allotted.
- The semester examination will be of 3 hours with maximum 70 marks.
- There is no passing minimum for IA.

Semester Examinations (SE)

- A student should register himself/herself to appear for the Semester Examinations by payment of the prescribed fee.
- The Semester Examinations will be in the form of a comprehensive examination covering the entire syllabus in each subject. It will be of 3 hours duration & Foundation course 2 hours irrespective of the number of credits allotted to it.
- If a candidate fails to obtain pass marks even after the due to less mark in the IA examination, the marks of the next examination will be converted to be out of 100.
- Even though the candidate is absent for two IA exams/obtain zero marks the external marks are considered (if he/she gets 40/70) and the result shall be declared as 'PASS'
- The maximum marks for each Paper shall be 100.

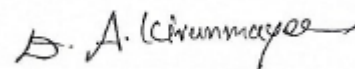
Evaluation of a student is done by the following procedure:

➤ **Internal Assessment Examinations:**

- The maximum mark for IA is 30 and SE is 70 for theory; and for practical papers 50.
- Each IA written examination is of 1^{1/2} hour's duration for 20 marks. The tests will be conducted centrally. The average of two such IA is calculated for 20 marks.
- Other Innovative Components will be for 5 Marks. The innovative component is for 5 marks, conducted during the class hours by the staff member/ in charge of the subject, in the form of assignments/ quiz/ seminars /ppt/ Open Book/Viva Voce/ Group work/ Mini Project/ Exhibition, etc. The topic and time for submission/ presentation will be announced by the staff member/ in charge of the subject in advance. Each student should explain and defend his/her presentation. For attendance 5 Marks are allotted.
- The semester examination will be of 3 hours with maximum 70 marks.
- There is no passing minimum for IA.

II. Semester-End Examinations:

- The maximum marks for II B.Sc Semester-End examination shall be 70 marks and duration of the examination shall be 3 Hours.
- The maximum marks for IV B.Sc Semester-End examinations shall be 70 marks and duration of the examination shall be 3 Hours.
- The maximum marks for III B.Sc Semester-End examinations shall be 70 marks and duration of the examination shall be 3 Hours.
- Semester-End examinations shall be conducted in theory papers at the end of every semester while in practical papers, these examinations are conducted at end of II, IV & VI semesters.
- Discussed and recommended for organizing Seminars, Guest lectures, Work-shops to upgrade the knowledge of students, for the approval of the Academic Council.



Chairman.

ZOOLOGY
SEMESTER -II

Class: I B.Scw.e.f. - 2020 - 21

No. of Hours per week: 4

Title of the Paper: -**Animal Diversity – Biology of Chordates** Code: ZOO -201 C

Credits: 3 Max.Marks: 70

UNIT – I 15hrs

- 1.1 General characters and classification of Chordata up to classes
- 1.2 Protochordata- Salient features of Cephalochordata, Affinities of Cephalochordata.
- 1.3 Salient features of Urochordata
- 1.4 Structure and life history of *Herdmania*
- 1.5 Retrogressive metamorphosis – Process and Significance

UNIT – II 15hrs

- 2.1 Cyclostomata, General characters, Comparison of *Petromyzon* and *Myxine*
- 2.2 Pisces: General characters of Fishes
- 2.3 *Scoliodon*: External features, Digestive system, Respiratory system, Structure and function of Heart, Structure and functions of the Brain.
- 2.4 Migration in Fishes
- 2.5 Types of Scales
- 2.6 Dipnoi

UNIT – III

10 hrs

- 3.1 General characters of Amphibia
- 3.2 Classification of Amphibia up to orders with examples.
- 3.3 *Rana hexadactyla*: External features, Digestive system, Respiratory system, Structure and function of Heart, structure and functions of the Brain
- 3.4 Reptilia: General characters of Reptilia, Classification of Reptilia up to orders with examples
- 3.5 *Calotes*: External features, Digestive system, Respiratory system, Structure and function of Heart, structure and function of Brain
- 3.6 Identification of Poisonous snakes and Skull in reptiles

UNIT – IV

12 hrs

- 4.1 Aves General characters of Aves
- 4.2 *Columbalivia*: External features, Digestive system, Respiratory system, Structure and function of Heart, structure and function of Brain
- 4.3 Migration in Birds
- 4.4 Flight adaptation in birds

UNIT – V

8 hrs

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

UNIT – VI – COMPETITIVE ZOOLOGY

- 6.1. *Basic Food Substances.*
- 6.2. *Glossary Biology*
- 6.3 *Zoology Evolution Facts.*

Title of the paper:Animal Diversity – Biology of Chordates

Code – Zoo-201C

Max. Marks: 70.

Time: 3hrs.

Section – A 4 x 5= 20.

Answer any **four** questions. Each question carries **five** marks. Draw neat labeled diagrams wherever necessary.

1. Structure of Branchiostoma
2. Migration in Fishes.
3. Arterial system in Scoliodon.
4. Parental care in Amphibians.
5. Structure of heart in Calotes.
6. Types of feathers in Birds.
7. Flight adaptations in Birds

8. Prototheria.

Section – B 5 x 10 =50.

Answer any **five** questions. Each question carries **Ten** marks. Draw neat labeled diagrams wherever necessary.

9. What is Retrogressive Meta morphosis? Describe this process in life history of Herdmania?
10. Differentiate between Petromyzon and Myxine?
11. Give an account of Dipnoi fishes.
12. Describe the structure and working of heart in Rana?
13. Give an account of brain of Calotes?
14. Write an essay on migration in birds?
15. Explain the respiratory system of Columba livia?
16. Write an essay on Dentition in mammals?

**A.G. & S.G.Siddhartha Degree College of Arts & Science, Vuyyuru– 521165, Krishna
Dt. A.P. (Autonomous)**

Semester -II

Guide lines to the Paper Setter.

Title of the paper: Animal Diversity – Biology of Chordates **Max. Marks: 70**

Time: 3hrsCode – Zoo-201C

1. Answer any **FOUR** questions out of eight in Section – A. Each question carries **five** marks.4x5 = 20M
2. Answer any **five** questions out of eight in Section – B. Each question carries **Ten** marks. 5x10= 50M

	Section	UNIT-I prochordata	UNIT-II (Cyclostomata & Pisces)	UNIT-III (Amphibia & Reptilia)	UNIT-IV (Aves)	UNIT-V (Mammalia)
5 Marks Questions	A	2	1	2	1	2
10 Marks Questions	B	1	2	2	2	1
Weightage		20	25	30	25	20

- Note:**
1. please provide the scheme of valuation for the paper.
 2. Question paper should be both in English and Telugu media.

**A. G.& S.G. SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYURU-521165,
KRISHNA Dt., A.P. (AUTONOMOUS)**

**ZOOLOGY
PRACTICAL - II**

w.e.f. 2020- 2021

I B.Sc

Code : ZOO - 201P

Hours / Week: 2

Max. Marks: 50

Credits: 2

External : 25

PAPER TITLE: ANIMAL DIVERSITY-BIOLOGY OF CHORDATES

Observation of the following slides / specimens / models:

Protochordata: Herdmania, Amphioxus, Amphioxus T.S. through pharynx.

Cyclostomata : Petromyzon, Myxine

Pisces :Pristis, Torpedo, Hippocampus, Exocoetus, Echinoids, Labeo, Catfish, Clarias, Channa, Anguilla.

Amphibia :Ichthyophis, Amblystoma, Axolotl larva, Hyla

Reptilia : Draco, Chamaeleon, Uromastix, Testudo, Trionyx, Russell's viper, Naja, Krait, Hydrophis, Crocodile.

Aves :: Psittacula, Eudynamis, Bubo, Alcedo.

Mammalia :Ornithorhynchus, Pteropus, Funambulus

Dissections-

1. Scoliodon IX and X, Cranial nerves
2. Scoliodon Brain
3. Mounting of fish scales

Note: 1. Dissections are to be demonstrated only by the faculty or virtual.

2. Laboratory Record work shall be submitted at the time of practical examination.

REFERENCE BOOKS:

1. S.S.Lal, Practical Zoology –Vertebrata
2. P.S.Verma, A manual of Practical Zoology – Chordata

A. G.& S.G. SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165
EXTERNAL PRACTICAL- II
w.e.f. 2020-2021.

(Animal Diversity-Biology of Chordates)
MODEL QUESTION PAPER -II

(2 hrs/week)
Code: ZOO-201P

Credits: 2.
Time: 3 hrs.

Max.marks: 25m.

-
- | | |
|--|---------|
| 1. Draw neat labeled diagram of IX & X Cranial nerves of Shark. | 7M |
| 2. Spotters: Identify, draw labeled diagram & write notes on
A, B, C, D & E | 5X3=15M |
| 3. Viva. | 3M |
| TOTAL: | 25M. |

Guide lines for the practical Examiners

I. **List of dissections** : (5marks for diagram & 2 marks for labeling)

1. V, VII, IX, X Cranial nerves of shark/ locally available fishes.
2. Mounting of fishscales

II. **Spotters:** 1Mark for identification, 1 Mark for labeled diagram & 1 Mark for notes for each spotter.
Chordate: 4 Specimens / Slides / Models
(Prochordates, Fishes, Amphibians, Reptiles, Birds&Mammals)

A. G.& S.G. SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165
INTERNAL PRACTICAL- II

w.e.f. 2020-2021.
(2hrs/week).

(Animal Diversity of vertebrates)Code: ZOO-201P.

MODEL QUESTION PAPER -II

Max.marks:25M.

Time: 3hrs.

- | | |
|-----------------------------------|------------|
| 1. Attendance | ----- 5M. |
| 2. Record | ----- 10M. |
| 3. Project (Earn while you learn) | -----10M. |

Total ----- 25M.

**ADUSUMILLI GOPALKRISHNAIAH & SUGARCANE GROWERS SIDDHARTHA DEGREE COLLEGE OF
ARTS & SCIENCE, VUYYURU- 521165, KRISHNA Dt., A.P. (AUTONOMOUS)**

SEMESTER - IV

w.e.f. - 2020 - 21

Class: II B.Sc (B.Z.C) Paper Code : ZOO -401C

Credits: 4

Max.Marks: 70

60 hrs. (4 hrs / week)

Title of the Paper: Embryology, Physiology and Ecology.

UNIT-I

- 1.1 Developmental biology and embryology
 - 1.1.1 Gametogenesis (Spermatogenesis, Oogenesis in mammals)
 - 1.1.2 Fertilization
 - 1.1.3 Types of eggs
 - 1.1.4 Types of cleavage
- 1.2 Formation and function of fetal membrane in chick embryo
- 1.3 Development, types 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 Structure of mammalian Lung & mechanism of respiration, transport of oxygen and carbon dioxide
 - 2.1.4 Circulation-structure and function of heart and cardiac cycle
 - 2.1.5 Excretion-structure of nephron, urine formation, counter current mechanism

UNIT-III

- 3.1 Physiology-II
 - 3.1.1 Structure & functional properties of Nerve Cell; Production & propagation of nerve Impulse. Synaptic transmission.
 - 3.1.2 Muscle contraction – ultra structure of muscle fiber, molecular and chemical basis of muscle contraction
 - 3.2.3 Endocrine glands – structure, secretions and the functions (of hormones) of pituitary gland, thyroid, parathyroid, adrenal gland and pancreas
 - 3.1.4 Hormonal control of reproduction in mammals

Unit IV

- 4.1 Ecology-I
 - 4.1.1 Important abiotic factors of ecosystem – temperature, light, water, oxygen and CO₂
 - 4.1.2 Nutrient cycles- Nitrogen, Carbon and Phosphorous
 - 4.1.3 Components of ecosystem (example: lake), food chains and food web, energy flow in ecosystem.

UNIT-V

- 5.1 Ecology-II
 - 5.1.1 Community interactions- mutualism, commensalism, parasitism, competition, predation.
 - 5.1.2 Ecological succession
- 5.2 Zoogeography
 - 5.2.1 Study of physical faunal peculiarities of Oriental, Australian and Ethiopian regions.

UNIT – VI – COMPETITIVE ZOOLOGY

6.1 Zoology Cell Cycles.

6.2 Zoology Time Scale Archaeopterys.

6.3 Zoology Time Scale Mammals

**A.G. &S.G.Siddhartha Degree College of Arts & Science, Vuyyuru – 521165,
Krishna Dt. A.P. (Autonomous)**

Model question paperSemester- IV

Title of the paper:Embryology, Physiology and Ecology. **Code – Zoo-401C**

Time: 3hrs.

Max. Marks: 70.

Section – A4 x 5 = 20M.

Answer any **four** questions. Each question carries **Five** marks. Draw neat labeled diagrams wherever necessary.

1. Types of eggs.
2. Foetal membranes.
3. Counter current mechanism.
4. Synaptic transmission.
5. Pancreas.
6. Energy flow in Ecosystem.
7. Mutualism.
8. Parasitism.

Section – B5 x 10 =50M.

Answer any **five** questions. Each question carries **Ten** marks. Draw neat labeled diagrams wherever necessary.

9. Describe the process of Fertilization.
10. Write an essay on placenta.
11. Explain the mechanism of transport of oxygen and Carbon –dioxide in blood of mammals.
12. Describe the structure and working of mammalian heart.
13. Explain the structure and functions of pituitary gland.
14. Describe the Carbon and Nitrogen cycle.
15. Describe the process of Ecological succession in a pond.
16. Give an account of the fauna of oriental region.

**A.G. & S.G.Siddhartha Degree College of Arts & Science, Vuyyuru – 521165,
Krishna Dt. A.P. (Autonomous)**

Semester - IV

Zoology

Guide lines to the Paper Setter.

Title of the paper:Embryology, Physiology and Ecology. Code – Zoo-401C

Time: 3hrs.

Max. Marks: 70m.

--

1. Answer any **four** questions out of eight in Section .A. Each question carriesfive marks. 4x5=20m.

2. Answer any **five** questions out of eight in Section – B. Each question carries **Ten** marks. 5x10= 50M.

	PART	UNIT-I (E (Embryology)	UNIT-II (Physiology-I)	UNIT-III (Physiology	UNIT-IV (Ecology-I)	UNIT-V (EcologyII,Zoogeography)
5 Marks Questions	A	2	1	2	1	2
10 Marks Questions	B	2	2	1	1	2
Weightage		30	25	20	15	30

Note: 1. please provide the scheme of valuation for the paper.

2. Question paper should be both in English and Telugu media.

ZOOLOGY PRACTICAL SYLLABUS
SEMESTER - IV
PAPER – IV w.e.f : 2020 - 21

Periods: 24Max. Marks: 50

Paper Title: Embryology,Physiology & Ecology Paper Code: 401P

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 embryo 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.

A. G & S. G. S. DEGREE COLLEGE OF ARTS & SCIENCE, VUYURU 521165, KRISHNA Dt., A.P.
(AUTONOMOUS)
PAPER – IV

(Embryology, Physiology & Ecology)

Model question paper (External)

w.e.f.2020-21.

Max.Marks: 25 M.

Paper Code: ZOO-401C

I.Embryology:

1. Identify, draw neat labeled diagram & comment on . 1½ x 2 = 3M.

A & B

II. Physiology

2. Identify, draw neat labeled diagram & comment on . 1½ x 2 = 3M.

A & B

3. Identify the organic substances in the given samples A & B, each with two tests. 4x 1½ = 6M.

(Sample A- 2X2 ½ =5 Marks & sample B -- 2X2 ½ =5 Marks)

4. Identify the Excretory products in the given samples A & B, each with two tests. 4x 1½ = 6M.

(Sample A- 2X2 ½ =5 Marks & sample B -- 2X2 ½ =5 Marks)

III. Ecology:

5. Determine the P^H of given sample. 1x2=2M.

6. Estimate the dissolved oxygen in the given sample. 1x5=5M.

A. G.& S.G. SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYURU-521165
ZOOLOGY PRACTICAL -IV
(INTERNAL)

(Embryology, Physiology & Ecology) w.e.f. 2020-2021.

(2hrs/week).
Code: ZOO-401P.

Max.marks:25M

Time: 3hrs.

- | | | |
|---------------|-------|------|
| 1. Attendance | ----- | 5M. |
| 2. Record | ----- | 10M. |
| 3. Assignment | ----- | 10M. |

Total ----- 25M.

**ADUSUMILLI GOPALAKRISHNAIAH & SUGARCANE GROWERS SIDDHARTHA DEGREE
COLLEGE OF ARTS & SCIENCE, VUYYURU- 521165, KRISHNA Dt., A.P. (AUTONOMOUS)
SEMESTER - VI
ZOOLOGY –ELECTIVE PAPER: VII-(A)**

Class: III B.Sc (BZC)
60 hrs.
Credits: 3
Title of the paper: Immunology

w.e.f – 2017-2018
Paper code: ZOO -601 GE
External: 70

Objective of the course: To facilitate students to understand the role of immune system in the body, cells and organs of immune system, their structures and functioning.

Course out comes:

- Students grow in understanding of immune system, to improve their immunity and to protect them from pathogens.
- They identify their blood groups, their compatibility and the need to donate blood to save life.
- Students identify the classes, structures and functions of antibodies, antigen –antibody reactions.
- This study enables students to take care of themselves and take timely precautions against various diseases.
- They identify the cure of different diseases through various vaccines, the instruments involved in identification of immune reactions etc.

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 an antibody
- 3.1.2 Classes and functions of antibodies
- 3.1.3 Antigen and antibody interactions.
- 3.1.4 Monoclonal antibodies and their production.

Unit - IV

4.1 Working of an 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 mediator molecules. (cytokines, interferons and complement proteins).
- 4.1.4 Mechanisms of humoral and cell mediated immunities

Unit - IV

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

**A.G& S.G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU – 521165,
KRISHNA Dt.,A.P. (AUTONOMOUS)
SEMESTER-VI (Model Question paper)**

Paper Title: Immunology
Time: 3 hrs

Paper Code:ZOO-601GE

Max.Marks:70

SECTION-A

Answer **any four** questions out of eight in Part - A. Each question carries five marks. **4 X 5 = 20**

1. Active immunity
2. Monoclonal antibodies.
3. TCell Epitope
4. Structure of antibody.
5. Functions of major histocompatibility complexes (MHC)
6. Humoral immunity.
7. Causes of autoimmune diseases.
8. BCG Vaccine.

SECTION – B

Answer **any five** questions out of eight in Part – B. Each question carries ten marks. **5 X 10 = 50**

9. Give an account of innate immunity.
10. Write an essay on primary lymphoid organs.
11. Discuss about the basic properties of Antigen.
12. Write an essay on immunogenicity.
13. Describe about different types of immunoglobulins.
14. Give an account of basic properties and functions of Cytokines.
15. Define Hypersensitivity. Explain it in detail.
16. Explain different types of vaccines.

**A.G& S.G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU 521165, KRISHNA Dt., A.P.
(AUTONOMOUS)**

**SEMESTER-VI
ZOOLOGY ELECTIVE PAPER-VII (A)**

Guide lines to the paper setter

Paper Title: Immunology. Paper Code: ZOO-601GE

Time: 3 hrs Max.Marks:70

Note: 1. Answer **any four** questions out of eight in Part-A. Each question carries five marks.4 X 5= 20M.

2. Answer any **five** questions out of eight in Part-B. Each question carries 10 marks. 5 X 10= 50M.

	PART	Unit – I	Unit – II	Unit – III	Unit – IV	Unit – V
5 Marks Questions	A	1	1	2	2	2
10 Marks Questions	B	2	2	1	1	2
Weightage		25	25	20	20	30

Note: 1. please provide the scheme of valuation for the paper.

2. Question paper should be both in English and Telugu media.

ZOOLOGY PRACTICAL SYLLABUS

PAPERS – VI

Period: 24

Max.Marks:50

Credits: 2

Paper Title: Immunology.

Paper Code: ZOO-601GE (P)

Part – A

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

REFERENCES BOOKS

William F. Ganong, A Review of Medical Physiology, 22 ed, McGraw Hill, 2005
Sherwood, Klandrof, Yanc, Human Physiology, Thompson Brooks/Coole, 2005.
Knut Schmidt-Nielson, Animal Physiology, 5th ed, Cambridge Low Price Edition.
Richard A. Glodsby, Thomas J Kind, Barbara A. Osborne, Janis Kuby, Immunology, 5th ed, Freeman and Co. New York
Ivan Roitt, Immunology, 4th ed, JohanthanBrostoff, Mosby, London.
Thomas C. Chung, General Parasitology, Hardcourt Brace and Co ltd. Asia. New Delhi.
Gerard D. Schmidt and Larry S Roberts, Foundations of Parasitology, McGraw Hill
Kindt, T. J., Goldsby, R. A., Osborne, B. A., Kuby, J. (2006). VI Edition. Immunology. W.H. Freeman and Company.
Delves, P. J., Martin, S. J., Burton, D. R., Roitt, I.M. (2006). XI Edition. Roitt's Essential Immunology, Blackwell Publishing.

**A.G& S. G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU - 521165, KRISHNA Dt.,
A.P. (AUTONOMOUS)**

Immunology

Model Question Paper (External)

Paper Code: ZOO-601GE (P)

Practical - V

Max.marks:25m

1. Demonstration of lymphoid organs (as per UGC guidelines)5m
 2. Blood group determination 5m
 - 3.Study the following techniques given on photographs & Write notes on. 2x5=10m
A & B
 4. ELISA &. Immunoelectrophoresis (demonstration) on site or of site demonstration. 5m
- Total: 25m.

Guide lines for the Practical Examiners.

1. Demonstration of lymphoid organs
(5 marks for Procedure)
2. Blood group determination. .
(5 marks for Procedure)
3. Study the following techniques given on photographs& Write notes onA & B.
(1 mark for identification & 4 marks for diagram and notes, for each photographs)
4. ELISA (demonstration) on site or of site demonstration.
(5 marks for ELISAdemonstration)

A.G& S. G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU - 521165, KRISHNA Dt., A.P.
(AUTONOMOUS)

Immunology

Model Question Paper (Internal)

Paper Code: ZOO-601GE (P)

Practical - VMax. Marks: 25

- | | | |
|----------------|----------|-----|
| 1. Attendance | -- | 5 M |
| 2. Record | -- | 10M |
| 3. Assignments | -- | 10M |
| | Total -- | 25M |

**ADUSUMILLI GOPALAKRISHNAIAH & SUGARCANE GROWERS SIDDHARTHA DEGREE COLLEGE
OF ARTS & SCIENCE, VUYYURU- 521165, KRISHNA Dt., A.P. (AUTONOMOUS)**

SEMESTER - VI (CBCS)

Class: III B.Sc (B.Z.C) (Cluster Elective Paper: VIII-B-1)

w.e.f. - 2017 - 18

60 Hrs(4hrs/ week)

Paper Code : ZOO-602CE

Credits : 3

External : 70

Title of the Paper: **Principles of Aquaculture.**

Objective of the course: To introduce students into aquaculture practices

Course outcomes:

- ❖ Students get wider knowledge on aquaculture
- ❖ The study of students Types of Aquaculture ,culture systems and Culture Practices
- ❖ They learn about design and construction of aqua farms(pond formation)
- ❖ They study various economically important species
- ❖ Students get acquainted with sea weed and their benefits.

UNIT –I

- 1.1 Introduction / Basics of Aquaculture:- Definition, Significance and History of Aquaculture
- 1.2 Present status of Aquaculture – Global and National scenario
- 1.3 Major cultivable species for aquaculture: freshwater, brackish water and marine.
- 1.4 Criteria for the selection of species for culture

Unit – II

- 2.1 Types of Aquaculture:** - Freshwater, Brackishwater and Marine
- 2.2 Concept of Monoculture, Polyculture, Composite culture, Monosex culture and integrated fish farming
- 2.3 Culture systems:** - Ponds, Raceways, Cages, Pens, Rafts and water recirculating systems
- 2.4 Culture practices:**-Traditional, extensive, modified extensive, semi-intensive and intensive cultures of Fish and shrimp.

Unit – III

- 3.1 Design and construction of aqua farms :-**Criteria for the selection of site for freshwater and brackish Water pond farms, Design and construction of fish and shrimp farms
- 3.2 Seed resources:** - Natural seed resources and Procurement of seed for stocking: Carp and shrimp
- 3.3 Nutrition and feeds:** - Nutritional requirements of a cultivable fish and shellfish
- 3.4 Natural food and Artificial feeds and their importance in fish and shrimp culture

Unit – IV

- 4.1 Management of carp culture ponds:-** Culture of Indian major carps: Pre-stocking management – Dewatering, drying, 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.

SEMESTER-VI (Model Question paper)
Cluster Electives paper –VIII-B-1

Time: 3 hrs

Max.Marks:70

Paper Title: Principles of Aquaculture.

Paper Code: ZOO-602CE

Part - A

Answer **any four** questions out of eight in Part - A. Each question carries five marks. **4 X 5 = 20**

1. Aquaculture History- .
2. National Status of Aquaculture.
3. Monoculture. .
4. Cage culture
5. Criteria for selection of site for fresh water culture.
6. Seed resources of carp fish.
7. Pre- Stocking Management of carps.
8. Byproducts of sea weeds.

Part – B

Answer **any five** questions out of eight in Part – B. Each question carries Ten marks. **5 X 10 = 50**

9. Describe any three cultivable species of fresh water ponds.
10. Write the criteria for the selection of species for culture.
11. Write an essay on water recirculated system.
12. Write an essay on types of Aquaculture which you have studied.
13. Give an account of design and construction of Aquaculture.
14. Explain natural and artificial feeds and their importance in fish feeding.
15. Give an account of post- stock Management of carps.
16. Give an account of culture of penaeus monodon.

**ADUSUMILLI GOPALAKRISHNAIAH & SUGARCANE GROWERS SIDDHARTHA DEGREE COLLEGE
OF ARTS & SCIENCE, VUYYURU- 521165, KRISHNA Dt., A.P. (AUTONOMOUS)**

**SEMESTER-VI
Cluster Electives paper –VIII-B-1**

Guide lines to the paper setter

Time: 3 hrs

Max.Marks:70

Paper Title: Principles of Aquaculture.

Paper Code: ZOO-602CE

Note: 1. Answer **any four** questions out of eight in Part-A. Each question carries five marks. 4 X 5 = 20M.

2. Answer any **five** questions out of eight in Part-B. Each question carries 10 marks. 5 X 10 = 50M.

	PART	Unit – I	Unit – II	Unit – III	Unit – IV	Unit – V
5 Marks Questions	A	2	2	2	1	1
10Marks Questions	B	2	2	2	1	1
Weightage		30	30	30	15	15

Note: 1. please provide the scheme of valuation for the paper.

2. Question paper should be both in English and Telugu media.

Paper Title: Aquaculture (*Principles of Aquaculture*) **Code:** ZOO-C-I

Credits:2Max.Marks:50

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.

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.

1. Water Quality -Determination of temperature, pH, salinity in the pond water sample; Estimation of dissolved oxygen, free carbon dioxide, 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

Practical - VI **w.e.f. 2020-21.**
(Principles of Aquaculture) Max. Marks: 25
Model Question Paper (External) **Paper Code: ZOO-C-I**

1. Spotters: Identify, draw neat labeled diagram and comment on A, B, C & D 4X2=8m

2. Identification and study of fish and shrimp diseases- Using specimens/ Pictures
A & B 2x2=4m

- | | |
|--|--------|
| 3. External examination of the diseased fish –diagnostic features and procedure. | 3m |
| 4. Determination of dosages of chemicals and drugs for treating common diseases | 1x3=3m |

5. Identification and study of common zooplankton, aquatic insects and aquatic weeds. 2x2=4m
A & B

6. Salinity in the pond water sample. 3m

Total -- 25M

A.G& S. G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU - 521165, KRISHNA Dt., A.P.
(AUTONOMOUS)

Guide lines for the Practical Examiners. ***w.e.f. 2020–21.***

1. Spotters:Identify and comment on A, B, C & D (Charts / Photographs).4X2=8m

(Identification - $\frac{1}{2}$ mark, neat labeled diagram and Comments -1 $\frac{1}{2}$ m)

2. Identifyand comment on A & B (Charts / Photographs) 2x2=4m

(Identification - $\frac{1}{2}$ mark & Comments- 1 $\frac{1}{2}$ m)

3. External examination of the diseased fish –diagnostic features and procedure. 3m
(3 marks for Procedure)

4. Determination of dosages of chemicals and drugs for treating common diseases 1x3= 3m

5. Identification and study of common zooplankton, aquatic insects and aquatic weeds. 2x2=4m

(Identification - $\frac{1}{2}$ mark & Comments- 1 $\frac{1}{2}$ m

6. Salinity in the pond water sample. 3m

A.G& S. G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU - 521165, KRISHNA Dt., A.P.
(AUTONOMOUS)

Practical - VI

(Principles of Aquaculture)

Max. Marks: 25

Model Question Paper (Internal)

Code: ZOO-C-I

1. Attendance	--	5 M
2. Record	--	10M
3. Assignments	--	10M
Total --		25M

SEMESTER - VI w.e.f. - 2017 - 18

Class: III B.Sc (B.Z.C)

(Cluster Elective Paper: VIII-B-2)

60 Hrs. (4hrs/Week)

Paper Code : ZOO-603CE

Credits : 3

External : 75

Title of the Paper: Aquaculture Management.

Objectives of the course: To instruct students on aquaculture managerial skills.

Course outcomes:

- ❖ Students get know about breeding technology of fishes, Hatching and hatching methodology.
- ❖ Students learn to analyse the quality of water and soil.
- ❖ They are trained on feed storage, Feeding strategies: Feeding devices, feeding schedules and ration size.
- ❖ They gain knowledge on diseases of fish and shrimp and the strategies involved in marketing.
- ❖ They study economics and Marketing , **Fisheries Extension and** important of fish genetics.

Unit – I

1.1 Breeding and Hatchery Management:- 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

2.1 Water quality Management:- 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 Liming materials, Organic manures and Inorganic fertilizers commonly used and Their implications in fish ponds

Unit – III

3.1 Feed Management :- 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. Feed formulation and manufacturing; Feed storage

3.3 Feeding strategies: Feeding devices, feeding schedules and ration size; Feed evaluation- feed conversion efficiencies and ratios

Unit – IV

4.1 Disease Management :- 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

4.5 Etiology, Symptoms, prophylaxis and therapy of common shrimp diseases in shrimp ponds

Unit – V

5.1 Economics and Marketing :- Principles of aquaculture economics – variable costs, cost-benefit analysis ,Fish marketing methods in India; Basic concepts in demand and price analysis.

5.2 Fisheries Extension : Fisheries Training and Education in India; Role of extension in community development.

5.3 Fish Genetics Genetic improvement of fish stocks – Hybridization of fish. Gynogenesis, Androgenesis, Polyploidy, Transgenic fish, Cryopreservation of gametes,

SEMESTER-VI (Model Question paper)

Cluster Electives paper –VIII-B-2

Time: 3 hrs Max.Marks:70

Paper Title: Aquaculture Management. Paper Code: ZOO-603CE

Part - A

1. Answer **any four** questions out of eight in Part - A. Each question carries five marks. **4 X 5 = 25**

1. Bundh Breeding.
2. Types of hatcheries.
3. Liming Material.
4. Organic Manures.
5. Feed evaluation.
6. Supplementary feeds.
7. Sympptoms of fish diseases.
8. Gynogenesis

Part – B

2. Answer **any five** questions out of eight in Part – B. Each question carries ten marks. **5 X 10 = 50**

9. Describe the induced breeding of carps by Hypophystion
10. Give an account of breeding and Hatchery management of panaeus monodon.
11. Describe the water quality characteristics of fish ponds
12. Describe the identification of oxygen depletion problems and control mechanisms in culture ponds.
13. Give an account of Feed formulation and manufacturing.
14. Write an essay on feeding strategies.
15. Describe symptoms therapy and prophylaxis of any three diseases related to prawn.
16. Write an essay on transgenic fish.

A.G& S.G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU 521165, KRISHNA Dt., A.P.
(AUTONOMOUS)

SEMESTER-VI
Cluster Electives paper –VIII-B-2

Guide lines to the paper setter

Time: 3 hrs

Max.Marks:70

Paper Title: Aquaculture Management**Paper Code: ZOO-603CE**

Note: 1. Answer **any four** questions out of eight in Part-A. Each question carries five marks. 4 X 5 = 20M.

2. Answer any **five** questions out of eight in Part-B. Each question carries 10 marks. 5 X 10 = 50M.

	PAR T	Unit – I	Unit – II	Unit – III	Unit – IV	Unit – V
5 Marks Questions	A	2	1	2	1	2
10 Marks Questions	B	2	2	2	1	1
Weightage		30	25	30	15	20

Note: 1. Please provide the scheme of valuation for the paper.

2. Question paper should be both in English and Telugu media.

**A. G & S. G. S. DEGREE COLLEGE OF ARTS & SCIENCE, VUYURU 521165, KRISHNA Dt.,
A.P. (AUTONOMOUS)**

ZOOLOGY PRACTICAL

Credits: 2

Period: 24

Max.Marks:50

Paper Title: Aquaculturemanagement

Code : ZOO-C-II

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.
4. 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.

A.G& S. G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYURU - 521165, KRISHNA Dt., A.P.
(AUTONOMOUS)

Practical - VI

(Aquaculture management)

Max. Marks: 25

Model Question Paper (External)

Paper Code: ZOO-C-II

I. Nutrition:

1. Identification and study of Live food organisms- A & B 2X2=4m
2. Estimation of Proximate composition of aquaculture feeds – A & B 2x2^{1/2}=5m

II. Post harvest Technology:

3. Curd and fermented fish products (Procedure) 5m
4. Preparation of isinglass, collagen and chitosan from shrimp and crab shell. 5m
5. Identification of hazards & Comment on A & B. 2x3=6m

Total-----25m

A.G& S. G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU - 521165, KRISHNA Dt., A.P.
(AUTONOMOUS)

Guide lines for the Practical Examiners.

Max. Marks: 25

1. Identify and comment on A & B (Charts / Photographs).
(Identification - $\frac{1}{2}$ mark and Comments - $1\frac{1}{2}$ m)
2. Estimation of Proximate composition of aquaculture feeds – A & B
(Composition – A- $2\frac{1}{2}$ Composition – B- $2\frac{1}{2}$)
3. Curd and fermented fish products (Procedure)
(5 marks for Procedure)
4. Preparation of isinglass, collagen and chitosan from shrimp and crab shell.
(If any one Procedure – 5 marks)
5. Identification of hazards & Comment on A & B
(Identification - 1 mark & Comments- 2m)

A.G& S. G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU - 521165, KRISHNA Dt., A.P.
(AUTONOMOUS)

Practical - VI

(Aquaculture management) Max. Marks: 25

Model Question Paper (Internal)

Code: ZOO-C-II

1. Attendance	--	5 M
2. Record	--	10M
3. Assignments	--	10M
Total --		25M

SEMESTER - VI (CBCS)

Class: III B.Sc (B.Z.C) (Cluster Elective Paper: VIII-B-3) w.e.f. - 2017- 2018

Hrs(4hrs/Week) Paper Code: ZOO-604CE

Credits: 3

External: 70

Title of the Paper: **Postharvest Technology.**

Objective of the course: To prepare students to become future aqua culturists.

Course outcomes:

- ❖ Students are given techniques to handle fresh fish, storage, preservation and transport.
- ❖ They learn to extract maximum from fish and produce fish productions.
- ❖ They can earn while they learn.
- ❖ They are taught rules and regulations pertaining to quality control.
- ❖ Students get know about Quality Assurance, Management and Certification

Unit – I

1.1 Handling and Principles of fish Preservation: - Handling of fresh fish, storage and transport of fresh fish, post mortem changes (Rigor mortis and spoilage), spoilage in marine fish and freshwater fish.

1.2 Principles of preservation– cleaning, lowering of temperature, rising of temperature, use of salt, use of fish preservatives, exposure to low radiation .

Unit – II

2.1 Methods of fish Preservation :- Traditional methods - sun drying, salt curing, pickling and smoking.

2.1.2 Advanced methods – chilling or icing, refrigerated sea water, freezing, canning, Irradiation and Accelerated Freeze drying (AFD).

Unit – III

3.1 Processing and preservation of fish and fish by-products:- Fish products – fish minced meat, fish meal, fish oil, fish liquid (ensilage), fish protein concentrate, fish chowder, 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 Seaweed Products: -Preparation of agar, algin and carrageen. Use of seaweeds as food for human consumption.

Unit – IV

4.1. Sanitation and Quality control :- Sanitation in processing plants - Environmental hygiene 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.

4.3. Regulatory affairs in industries

Unit – V

5.1 Quality Assurance, Management and Certification :- 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 seafood safety.

5.2 National and International standards – ISO 9000: 2000 Series of Quality Assurance System.

A.G& S.G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU 521165, KRISHNA Dt., A.P.
(AUTONOMOUS)

SEMESTER-VI (Model Question paper)

Cluster Electives paper –VIII-B-3

Time: 3 hrs Max.Marks:70

Paper Title: Postharvest Technology. Paper Code: ZOO-604CE

Part - A

Answer **any four** questions out of eight in Part - A. Each question carries five marks.**4 X 5 = 25**

1. Storage of fish.
2. Exposure of fish to low radiation of gamma rays.
3. Accelerated freeze drying.
4. Pickling of fish
5. Fish oils.
6. Fish meal.
7. Pre- processing control of fishery products.
8. Codex Alimentarius.

Part – B

Answer **any five** questions out of eight in Part – B. Each question carries ten marks.**5 X 10 = 50**

9. Write the principles of fish preservation.
10. Write about spoilage in marine fish and fresh water fish.
11. Write about the Traditional methods of fish preservation like sun drying ,salt curing and smoking .
12. Give an account of advanced methods of preservation like chilling, freezing & canning.
13. Write an essay on any five fish byproducts.
14. Explain how sea weeds are useful in disease treatment and preparation of therapeutic drug.
15. Write an essay on environmental hygiene in processing plants.
16. Explain about the concept of hazard analysis & critical control points in sea food safety.

A.G& S.G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU 521165, KRISHNA Dt., A.P.
(AUTONOMOUS)

SEMESTER-VI
Cluster Electives paper –VIII-B-3

Guide lines to the paper setterTime: 3 hrs

Max.Marks:70

Paper Title:Postharvest Technology.**Paper Code: ZOO-604CE**

*Note:*1. Answer **any four** questions out of eight in Part-A. Each question carries five marks.4X 5 = 20M.

2. Answer any **five** questions out of eight in Part-B. Each question carries 10 marks.5 X 10 = 50M.

	PART	Unit –I	Unit – II	Unit-III	Unit – IV	Unit – V
5 Marks Questions	A	2	2	2	1	1
10 Marks Questions	B	2	2	2	1	1
Weightage		30	30	30	15	15

- Note:**
1. please provide the scheme of valuation for the paper.
 2. Question paper should be both in English and Telugu media.

**A. G & S. G. S. DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU 521165, KRISHNA Dt.,
A.P. (AUTONOMOUS)**

ZOOLOGY PRACTICAL

Period: 24

Credits: 2 Paper Title: Post-harvest Technology

Code : ZOO-C-III (PROJECT)

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

A.G& S. G.S.DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU - 521165, KRISHNA Dt., A.P.
(AUTONOMOUS)

Practical - VI

(Post-harvest Technology)

Max. Marks: 25

Model Question Paper (Internal)

Code: ZOO-C-III (PROJECT)

1. Attendance	--	5 M
2. Project Record – (Fish form)	--	20M
Total	--	25M
