

GOVERNMENT COLLEGE (AUTONOMOUS)

RAJAMAHENDRAVARAM

(ESTD : 1853, NAAC Re-Accredited with Grade 'A')

DEPARTMENT OF ZOOLOGY



BOARD OF STUDIES MEETING

2018 - 2019

PROCEEDINGS OF THE PRINCIPAL, GOVERNMENT AUTONOMOUS COLLEGE, RAJAMAHENDRAVARAM

Present : Dr. R. DAVID KUMAR SWAMY, *M.Sc., M.Phil., Ph.D.*

Rc. No. : Spl./Acad.Cell-GC[A]-RJY/BOS/2018-19, Dated 17-04-2018

Sub : Government Autonomous College, Rajamahendravaram – Boards of Studies (BOS) – Nomination of Members – Orders Issued.

Ref : UGC Guidelines for Autonomous Colleges – 2018.

ORDER :

The Principal, Government College (A), Rajamahendravaram is pleased to constitute Board of Studies in Zoology for framing the syllabi in Zoology subject for all semesters duly following the norms of the UGC Autonomous guidelines.

S.No.	Name	Designation
1.	Dr. J. SUNEETHA, Lecturer In-charge/HOD, Department of Zoology, Government College (A), Rajamahendravaram	Chairman
2.	All Faculty Members in the Department	Member
3.	Dr. P. RAGHAVA KUMARI, Lecturer in Zoology, SKR (W) College, Rajamahendravaram.	Subject Expert
4.	Dr. M. THEJOMOORTHY, Government Degree College, Yeleswaram	Subject Expert
5.	Dr. A. MATTA REDDY, Adikavi Nannaya University, Rajamahendravaram	University Nominee
6.	Dr. K. SARALA, Principal Scientist, Crop Improvements Division, CTRI, Rajamahendravaram.	Export from Industry / Corporate Sector
7.	Ms. K. SONIYA, M.Sc. (Zoology), Rajamahendravaram	Student Nominee

The above members are requested attend the BOS meetings and share their valuable views, suggestions on the following functionaries :

- a) Prepare syllabi for the subject keeping in view the objectives of the college, interest of the stake holders and national requirement for consideration and approval of the Academic Council.
- b) Suggest methodologies for innovate teaching and evaluation techniques.
- c) Suggest panel of names to the Academic council for appointment of examiners.
- d) Coordinate research, teaching, extension and other activities in the department of the college.

The term of the members will be three years from the date of nomination. The Chairman of the BOS (HOD/Lecturer in-charge of the Department) is directed to coordinate with the Principal of the College and conduct BOS meetings as and when necessary, but at least twice a year.

Principal

Government College (A)

Rajamahendravaram

Copy to :

1. The above individuals
2. File

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GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

DEPARTMENT OF ZOOLOGY

BOARD OF STUDIES MEETING

Consolidated Report for the Year 2018-19

The Board of Studies Meeting of the Department of **ZOOLOGY** was convened at **11:00 AM on 20-04-2018** under the Chairmanship of **Dr. J. SUNEETHA** with the following members.

S.No.	Name	Designation	Signature
1.	Dr. P. RAGHAVA KUMARI, Lecturer in Zoology, S.K.R. Women's College, Rajamahendravaram	Subject Expert	
2.	Dr. M. THEJOMOORTHY, Government Degree College, Yeleswaram.	Subject Expert	
3.	Dr. A. MATTA REDDY Adikavi Nannya University, Rajamahendravaram	University Nominee	
4.	Dr. K. SARALA, Crop Improvement Division, CTRI, Rajamahendravaram	Principal Scientist	
5.	Mrs. K. SONIYA, M.Sc. Zoology, Rajamahendravaram	Student Nominee	

The following documents are submitted to the Academic Coordinator and Controller of Examinations.

1. Resolutions of Board of Studies Meeting
2. Syllabus of I, III and V Semesters
3. Model Question Papers of Semesters which include both theory and practicals i.e. paper
4. List of Revised Examiners (if any)
5. Any other new proposals

CHAIRMAN
Board of Studies
Department of Zoology

GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

DEPARTMENT OF ZOOLOGY

BOARD OF STUDIES MEETING MINUTES

The Board of Studies Meeting in Zoology Subject for the year 2018 – 2019 was held in the Department of **ZOOLOGY** on **20-04-2018** at **11:00 AM** with **Dr. J. SUNEETHA**, Reader in Botany & Lecturer In-charge in the Chair along with the following members.

1. University Nominee : Dr. A. MATTA REDDY
Adikavi Nannya University, Rajamahendravaram
2. Subject Expert : Dr. P. RAGHAVA KUMARI,
Lecturer in Zoology,
S.K.R. Women's College, Rajamahendravaram
3. Subject Expert : Dr. M. THEJOMOORTHY,
Government Degree College, Yeleswaram.
4. Principal Scientist : Dr. K. SARALA,
Crop Improvement Division,
CTRI, Rajamahendravaram
5. Student Nominee : Mrs. K. SONIYA,
M.Sc. Zoology, Rajamahendravaram

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CHAIRMAN
Board of Studies
Department of Zoology

S.No.	Name of the Faculty	Signature
1.	D. SATISH, <i>M.Sc., B.Ed.,</i>	
2.	B. VIJAYA KUMAR, <i>M.Sc., B.Ed.,</i>	
3.	K. SUBHASHINI DEVI, <i>M.Sc., M.Sc., B.Ed., SET</i>	
4.	N. VARAKUMARI, <i>M.Sc.,</i>	
5.	S.K. BAJEE, <i>M.Sc., M.Phil.,</i>	
6.	B.N. SIREESHA, <i>M.Sc.,</i>	
7.	A. RAMA KUMARI, <i>M.Sc., B.Ed.,</i>	
8.	K. SONIYA, <i>M.Sc., B.Ed.,</i>	

CHAIRMAN
Board of Studies
Department of Zoology

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM

DEPARTMENT OF ZOOLOGY

BOARD OF STUDIES (BOS)

The members present discussed various aspects of the Syllabi, Model question papers of both Theory and practical for three years B.Sc., Degree Course in Zoology, that is to be implemented for the academic year 2018-2019 and resolved the following.

Resolutions :

- 1) It is resolved to introduce and implement New Job Oriented Restructured Course - **Zoology, Chemistry and Aquaculture Technology (ZCAT)** and to prescribe syllabus the said courses as per CBCS for I year B.Sc. from the Academic Year 2018 – 19.
- 2) It is resolved to Implementing Certificate Course on **“Vermicompost”**.
- 3) It is resolved to adapt the new curriculum prescribed by Andhra Pradesh State council of Higher Education (Revised common framework of CBCS for Colleges in Andhra Pradesh) for 1st, 2nd and 3rd year B.Sc. Zoology and 1st B.Sc., Aquaculture Technology 2018-2019.
- 4) It is resolved to adapt the curriculum under Cluster and CBCS system prescribed by CCE A.P. for 3rd B.Sc. Zoology.
- 5) As the course is run on semester system in this College, the syllabi for 3rd year is divided equally for each semester.
- 6) It is resolved to introduce Advance elective-1 and Advance elective-2 (CBCS) in the place of paper-III –VII semester for 3rd year students. One of the two papers can be opted by the students.
- 7) It is resolved to adapt Cluster paper-1, Cluster paper-2 (CBCS) in the place of paper-4 and VIII semester for B.Sc. III year students. One of the two papers can be opted by the students.

- 8) Implementing Research based Pedagogical evaluation methods in the curriculum for internal assessment.
- 9) The modules are framed on par with the University Syllabus to accommodate student exchange programmes with other affiliated colleges.

1) The assessment component is designed as follows:

For I year students (CBCS pattern) theory examination:

Total - 100 M

External exam	-	60 M
Internal exam	-	40 M

Internal :

Written examination	-	25M
Assignment for marks	-	5M
Seminar for marks	-	5M
Viva – Voce for marks	-	5M

For II and III year students (CBCS pattern) theory examination:

Total - 100M

External exam	-	60M
Internal exam	-	40M

Internal:

Assignment for marks	-	5M
Seminar for marks	-	5M
Viva – voce for marks	-	5M
Written examination	-	25M

2) Practical exam would be conducted at the end of the each semester for B.Sc. I and II year.

Internal exam at the end of 1, 3, 5 semester	-	50M
2, 4,6 th semester end exam-External	-	50M

Total - 100M

Signature of the members present:

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**CHAIRMAN
Board of Studies
Department of Zoology**

GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM
(NAAC Re-accredited at A)

BOARD OF STUDIES MEETING 2018 – 19.

Department of Zoology – Approved List of Examiners / Paper Setters

Sl. No.	Name of the Assistant Professor / Associate Professor	College
1.	Smt. G. MANI	M.R. College, Vizianagaram
2.	Smt. S. USHA MANI ANAND	M.R. College, Vizianagaram
3.	Smt. D. PADMAVATHI	M.S.N. Charities, Kakinada
4.	Smt. M. NIRMALA DEVI	G.D. College, Vinukonda
5.	Smt. C. MAMATHA	A.V.N. College, Visakhapatnam
6.	Smt. K. PADMAJA	S.S.N. College, Narasaraopeta
7.	Sri L. CHANDRA SEKHAR	S.S.N. College, Narasaraopeta
8.	Sri K. RAMAKRISHNA	S.K.S.D. Mahila Kalasala, Tanuku
9.	Sri K.S. VENKATA REDDY	G.B.R. College, Anaparthi
10.	Sri D.V.B.K.R.L. SAI BABA	S.K.B.R. College, Amalapuram
11.	Sri A. VENKATAPATHI RAJU	S.K.B.R. College, Amalapuram
12.	Smt. K. USHA RANI	D.N.R. College, Bhimavaram
13.	Smt. V.V. PADMAVATHI	St. Theresa, Eluru
14.	Sri K. RAMESH BABU	St. Theresa, Eluru
15.	Dr. K.R. SESHAGIRI RAO	G.D.C. Women's College, Guntur
16.	Sri N. SITA RAMA RAO	Y.N. College, Narasapur
17.	Dr. MANIKYALA RAO	A.N.R. College, Gudivada
18.	Dr. MADHUSUDHANA SASTRY	Sri Sharon College, Ongole

Date : 21-04-2018

Members :

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CHAIRMAN
Board of Studies
Department of Zoology

GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM
DEPARTMENT OF ZOOLOGY
AP STATE COUNCIL OF HIGHER EDUCATION
CBCS STRUCTURE For B.SC. ZOOLOGY w.e.f. 2015 - 16
(Revised in April 2016)

Year	Semester	Paper	Title	Marks	Credits	
I	I	I	Biology of Non-chordates	100	03	
			Practical – I	50	02	
	II	II	Biology of Chordates	100	03	
			Practical – II	50	02	
II	III	III	Cell Biology, Genetics and Evaluation	100	03	
			Practical – III	50	02	
	IV	IV	Embryology, Physiology and Ecology	100	03	
			Practical – IV	50	02	
III	V	V	Animal Biotechnology	100	03	
			Practical – V	50	02	
		VI	Animal Husbandry	100	03	
			Practical – VI	50	02	
	* Any one paper from A, B and C	VII A*	Elective	100	03	
			Practical – VII A	50	02	
		VII B*	Elective	100	03	
			Practical – VII B	50	02	
	** Any one cluster from I, II and III	VII C*	Elective	100	03	
			Practical – VII C	50	02	
		VIII (I)**	Cluster Elective – I ::		100	03
					100	03
					100	03
					50	02
					50	02
					50	02
VI	VIII (II)**	Cluster Elective – II ::		100	03	
				100	03	
				100	03	
				50	02	
				50	02	
				50	02	
	VIII (III)**	Cluster Elective – III ::		100	03	
				100	03	
				100	03	
				50	02	
				50	02	
				50	02	

* Third year syllabi will be sent shortly

** Student Activities like Seminars, Assignments, Fieldwork, Study Projects, Models etc. are Part of Curriculum for all units in all papers.

GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

DEPARTMENT OF ZOOLOGY

AP STATE COUNCIL OF HIGHER EDUCATION

Course Structure of AQUACULTURE TECHNOLOGY Under CBCS

Year	Semester	Paper	Title	Marks	Credits	
I	I	I	Basic Principles of Aquaculture	100	03	
			Practical – I	50	02	
	II	II	Biology Fin Fish & Shell Fish	100	03	
			Practical – II	50	02	
II	III	III	Fish Nutrition & Feed Technology	100	03	
			Practical – III	50	02	
	IV	IV	Fresh Water and Brackish Water Aquaculture	100	03	
			Practical – IV	50	02	
III	V	V	Fish Health Management	100	03	
			Practical – V	50	02	
		VI	Fisheries Extension, Economics & Marketing	100	03	
			Practical – VI	50	02	
	VI	VII A*	Ornamental Fishery	100	03	
			Practical – VII A	50	02	
		VII B*	Fishery Engineering	100	03	
			Practical – VII B	50	02	
		VIII (I)**	Cluster Elective – I :: FISHERY PROCESSING TECHNOLOGY			
			1. Fish Processing Technology – I – A	100	03	
			Practical – VIII (1 – 1)	50	02	
			2. Title : Fishery Microbiology and Fishery By – Products I – B	100	03	
	Practical – VII (1 – 2)	50	02			
	3. Quality Control in Processing Plants – I – C	100	03			
Practical – VIII (1 – 3)	50	02				
VIII (II)**	Cluster Elective – II :: COASTAL AQUACULTURE					
	1. Crustacean Culture – II – A	100	03			
	Practical – VIII (2 – 1)	50	02			
	2. Molluscan & Seaweed Culture – II – B	100	03			
	Practical – VII (2 – 2)	50	02			
	3. Marine Finfish Culture – II – C	100	03			
Practical – VIII (2 – 3) / Project	50	02				

* Recommended Combination : Zoology, Chemistry & Aquaculture Technology

GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

B.Sc. Zoology Syllabus for I Semester

ZOOLOGY - PAPER - I

ANIMAL DIVERSITY - NONCHORDATES

Periods : 60

Max. Marks : 100

UNIT - I

1.1 Brief History, Significance of Diversity of Nonchordates

1.2 Protozoa :

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

1.3 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 Skeleton in Sponges
- 1.3.5 Canal system in sponges

UNIT - II

2.1 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 reefs

2.2 Platyhelminthes :

- 2.2.1 General Characters
- 2.2.2 Classification of Platyhelminthes up to classes with examples
- 2.2.3 *Fasciola hepatica* - External Characters, Reproductive System, Life History and Pathogenicity.

UNIT - III

3.1 Nematelminthes :

- 3.1.1 General Characters
- 3.1.2 Classification of Nematelminthes up to classes with examples

3.2 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 - Scope, significance, earthworm species, processing, vermicompost, economic importance of vermicompost

UNIT - IV

4.1 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 and Circulatory system.
- 4.1.4 *Peripatus* - Structure and affinities

4.2 Mollusca :

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

UNIT - V

5.1 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

5.2 Hemichordatas :

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

5.3 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



AP STATE COUNCIL OF HIGHER EDUCATION
GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY Model Paper for I Semester

ZOOLOGY - PAPER - I

ANIMAL DIVERSITY - NONCHORDATES

Time : 3 Hrs.

Max. Marks : 60

SECTION - I

I. Answer any TWO of the following. Draw labelled diagrams wherever necessary. 2 x 5 = 10 M

ఈ క్రింది వానిలో ఏదైనా రెండు ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

1. Protozoa General Characters - ప్రోటోజోవా సాధారణ లక్షణాలు
2. Colenterata General Characters - సీలెంటరేటా సాధారణ లక్షణాలు
3. Nematelminthes - నిమాటిహెల్మింథిస్ సాధారణ లక్షణాలు
4. Pelecypoda - పెలిసిపోడా సాధారణ లక్షణాలు
5. Hemichordata - హెమికార్డేటా సాధారణ లక్షణాలు

SECTION - II

II. Answer ALL the following. Draw labelled diagrams wherever necessary. 5 x 10 = 50 M

ఈ క్రింది అన్ని ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

6. (a). Explain the external characters of Elphidium.

ఎల్ఫీడియం బాహ్య నిర్మాణమును వర్ణించుము.

(OR)

- (b). Describe the structure of Canal system in Sponges.

స్పంజికలలో కుల్కా వ్యవస్థలను వివరించుము.

7. (a). Explain the Polymorphism in Coelenterates.

సీలెంటరేటాలో బహురూపకతను వివరించుము.

(OR)

- (b). Describe the life history of Fasciola hepatica.

ఫాసియోలా హెపాటికా జీవిత చక్రమును వర్ణింపుము.

8. (a). Explain the Reproductive system of Leech.

జలగ ప్రత్యుత్పత్తి వ్యవస్థను వివరింపుము.

(OR)

(b). Write an essay on the economic importance of Vermi compost.

వర్మి కంపోస్టు యొక్క వాణిజ్యపరమైన ప్రాముఖ్యతను వివరింపుము.

9. (a). Describe the structure and Affinities of Peripatus.

పేరిపెటస్ నిర్మాణం సంబంధ బాంధవ్యాలు వివరింపుము.

(OR)

(b). Explain the Torsion in Gastropoda.

గాస్ట్రోపాడాలో మెలికను వివరింపుము.

10. (a). Describe the water vascular system in star fish.

సముద్ర నక్షత్రపు జలప్రసరణ వ్యవస్థను వివరింపుము.

(OR)

(b). Describe the structure and affinities of Balanoglosses.

బెలనోగ్లాసస్ నిర్మాణం మరియు సంబంధ బాంధవ్యాలు వివరింపుము.



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Unit	Essay	Short
I	2	1
II	2	1
III	2	1
IV	2	1
V	2	1

GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

B.Sc. Zoology Practical Syllabus for I Semester

ZOOLOGY - PAPER - I

ANIMAL DIVERSITY - NONCHORDATES

Periods : 24

Max. Marks : 50

Observation of the following slides / spotters / models :

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

Demonstration of Dissection / Dissected / Virtual Dissection :

1. Leech / Prawn / Scorpion / Crab - Digestive System.
2. Prawn - Appendages
3. Prawn / Scorpion / Crab - Nervous system.
4. Pila / Unio - Digestive System
5. Mounting of Statocyst
6. Mounting of Radula

Laboratory Record Work shall be submitted at the time of Practical Examination.

Compulsory one species to be adopted for demonstration only by the faculty.

Computer aided techniques should be adopted as per UGC guidelines.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY Model Paper for I Semester

ZOOLOGY - PAPER - I

ANIMAL DIVERSITY - NONCHORDATES

Time : 3 Hrs.

Max. Marks : 50

-
- | | | |
|-----------|---|----------------------|
| 1. | Draw a neat labelled diagram of Nervous system of Prawn. | 1 x 10 = 10 M |
| 2. | Draw a neat labelled diagram of Radula. | 1 x 5 = 5 M |
| 3. | Identify the following Spotters and Write notes. | 5 x 5 = 25 M |
| | (A). | |
| | (B). | |
| | (C). | |
| | (D). | |
| | (E). | |
| 5. | Practical Record. | 1 x 10 = 10 M |



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

B.Sc. 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 Affinities of Cephalochordata
- 1.2.4 Salient features of Urochordata
- 1.2.5 Structure and life history of *Herdmania*
- 1.2.6 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, Respiratory system, Heart.
- 2.2.4 Migration in Fishes
- 2.2.5 Types of Scales
- 2.2.6 Dipnoi
 - * *Scoliodon* - Brain

UNIT - III

3.1 Amphibia :

- 3.1.1 General Characters of Amphibian
- 3.1.2 Classification of Amphibia upto orders with examples
- 3.1.3 *Rana hexadactyla* - External features, Digestive system, Respiratory system, Heart.
 - * *Rana* : Brain

3.2 Reptilia :

- 3.2.1 General Characters of Reptilia
- 3.2.2 Classification of Reptilia upto orders with examples
- 3.2.3 Calotes - External features, Digestive system, Respiratory system, Heart
- 3.2.4 Identification of Poisonous snakes
 - * Calotes - Brain

UNIT - IV

4.1 Aves :

- 4.1.1 General Characters of Aves
- 4.1.2 Classification of Aves upto subclasses with examples
- 4.1.3 *Columba livia* - External features, Respiratory system, Heart
- 4.1.4 Migration in Birds
- 4.1.5 Flight adaptation in birds.
 - * Brain of Pigeon

UNIT - V

5.1 Mammalia :

- 5.1.1 General Characters of Mammalia
- 5.1.2 Classification of Mammalia upto sub-classes with examples.

5.2 Comparison of Prototherians, Metatherians and Eutherians :

5.3 Dentition in mammals :

*** Additional Inputs.**



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY Model Paper for II Semester

ZOOLOGY - PAPER - II

ANIMAL DIVERSITY - CHORDATES

Time : 3 Hrs.

Max. Marks : 60

SECTION - I

I. Answer any TWO of the following. Draw labelled diagrams wherever necessary. 2 x 5 = 10 M

ఈ క్రింది వారిలో ఏదైనా రెండు ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

1. Origin of Chordata - కార్డేటా ఆవిర్భావమును గురించి రాయండి.
2. General Characters of Cyclostomata - సైక్లోస్టోమేటా యొక్క సాధారణ లక్షణాలు రాయండి.
3. General Characters of Amphibia - ఆంఫీబియా యొక్క సాధారణ లక్షణాలు రాయండి.
4. Flight adaptations in birds - పక్షుల వాయుగమన అనుకూలనాలు తెలపండి.
5. General characters of Mammalia - క్షీరదాల సాధారణ లక్షణాలు రాయండి

SECTION - II

II. Answer ALL the following. Draw labelled diagrams wherever necessary. 5 x 10 = 50 M

ఈ క్రింది అన్ని ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

6. (a). Describe the structure and life history of Herdmania.

హెర్డ్మేనియా నిర్మాణం మరియు జీవిత చక్రమును వివరించండి.

(OR)

- (b). Explain the significance of Retrogressive Metamorphosis in Herdmania.

హెర్డ్మేనియాలో తిరోగామి రూపవిక్రమమును వివరింపుము.

7. (a). Explain the comparison of the Petromyzon and Myxine.

పెట్రోమైజాన్ మరియు మిక్సిన్ల మధ్య వ్యత్యాసాన్ని తెలపండి.

(OR)

- (b). Explain the Migration in Fishes.

చేపలలో వలస విధానాన్ని వర్ణించండి.

8. (a). Describe respiratory system of Rana hexadactyla.
రానా హెక్సాడాక్టైలా యొక్క శ్వాస వ్యవస్థను వర్ణింపుము.

(OR)

(b). Describe the structure of heart of Calotes.
కెలోటీస్ యొక్క హృదయ వ్యవస్థను వర్ణించండి.

9. (a). Describe the Respiratory system in Columba livia.
పావురం యొక్క శ్వాసవ్యవస్థను వర్ణింపుము.

(OR)

(b). Explain the Migration of birds.
పక్షుల యొక్క వలస విధానమును వివరించండి.

10. (a). Explain the classification of Mammalia upto sub-classes with examples.
క్షీరదాల యొక్క వర్గీకరణను క్రమాల వారీగా ఉదాహరణలతో వర్ణించండి.

(OR)

(b). Describe the Dentition in Mammals.
క్షీరదాల దంత విన్యాసాన్ని వర్ణించండి.



BLUE PRINT

Unit	Essay	Short
I	2	1
II	2	1
III	2	1
IV	2	1
V	2	1

GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

B.Sc. Zoology Practical Syllabus for II Semester

ZOOLOGY - PAPER - II

ANIMAL DIVERSITY - CHORDATES

Periods : 24

Max. Marks : 50

Observation of the following slides / spotters / models :

- Protochordata** : *Herdmania, Amphioxus, Amphioxus* T.S. through pharynx
- Cyclostomata** : *Petromyzon, Myxine*
- Pisces** : *Pristis, Torpedo, Channapleuronectes, Hippocampus, Exocoetus, Ehenais, Labeo, Catla, Clarius, Auguilla, Protopterus*, Placoid scale, Cycloid scale, Ctenoid scale
- Amphibia** : *Ichthyophis, Amblystoma, Siren, Hyla, Rachophous*, Axolotal larva.
- Reptilia** : *Draco, Chamaeleon, Uromastix, Vipera russeli, Naja, Bungarus, Enhydrina, Testudo, Trionyx, Crocodilus*.
- Aves** : *Passer, Psittacula, Bubo, Alcedo, Columba, Corvus, Pavo*, Study of different types of feathers : Quill, Contour, Filoplume down.
- Mammalia** : *Ornithorhynchus, Tachyglossus, Pteropus, Funambulus, Manis, Loris*, Hedgehog.
- Osteology** : Appendicular skeletons of Varanus, Pigeon, Rabbit - Skull, fore limbs, 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 / Calotes / Fowl / Rat
3. Digestive system of fish.

Laboratory Record Work shall be submitted at the time of Practical Examination.

Compulsory one species to be adopted for demonstration only by the faculty.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY Practical Model Paper for II Semester

ZOOLOGY - PAPER - II

ANIMAL DIVERSITY - CHORDATES

Time : 3 Hrs.

Max. Marks : 50

-
- 1. Draw a neat labelled diagram of IX, X Cranial nerves of Shark. 1 x 10 = 10 M**
 - 2. Identify the following Spotters and Write notes on. 6 x 5 = 30 M**
 - (A).
 - (B).
 - (C).
 - (D).
 - (E).
 - (F).
 - 3. Practical Record. 1 x 10 = 10 M**



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

B.Sc. Zoology Syllabus for III Semester

ZOOLOGY - PAPER - III

CYTOLOGY, GENETICS AND EVOLUTION

Periods : 60

Max. Marks : 100

UNIT - I

1. Cytology - I

- 1.1 Definition, history, prokaryotic and eukaryotic cells, virus, viroids, mycoplasma.
- 1.2 Electron microscopic structure eukaryotic cell.
- 1.3 Plasma membrane - Different models 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

UNIT - III

3. Genetics - I :

- 3.1 Mendel's work on transmission on traits
- 3.2 Principles of inheritance
- 3.3 Incomplete dominance and codominance

UNIT - IV

4. Genetics - II :

- 4.1. Sex determination
- 4.2 Sex linked inheritance
- 4.3 Linkage and crossing over
- 4.4 Extra chromosomal inheritance

UNIT - V

5. Evolution :

- 5.1. Origin of life
- 5.2. Lamarckism, Darwinism, Neo - Darwinism, Hardy - Weinberg Equilibrium
- 5.3. Variations, isolating mechanisms, natural selection
- 5.4. Types of natural selection (directional, stabilizing, disruptive)
- 5.5. Artificial selection and forces of evolution
- 5.6. Speciation (Allopatric and Sympatric)
- 5.7. Macro evolutionary principles (Example : Darwin's finches)

Additional Inputs

- * Chromatin - Structure and significance, Chromosomes, Structure, types and functions.
- * Lethal alleles, Epistasis, Pleiotropy
- * Human karyotyping

BLUE PRINT

Unit	Essay	Short
I	1	1
II	2	1
III	2	-
IV	2	-
V	1	2



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY Model Paper for III Semester

ZOOLOGY - PAPER - III

CYTOLOGY, GENETICS AND EVOLUTION

Time : 3 Hrs.

Max. Marks : 60

I. Answer any FIVE from following. Draw labelled diagrams wherever necessary. 5 x 10 = 50 M

ఈ క్రింది వానిలో ఏదైనా ఐదు ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

1. Write an essay on Electron microscopic structure of an Eukaryotic cell.

యూకారియోటిక్ కణం యొక్క సూక్ష్మ నిర్మాణం పై ఒక వ్యాసం వ్రాయుము.

2. Write notes on structure and functions of Endoplasmic Reticulum.

అంతర్జీవ ద్రవ్యజాలకం యొక్క నిర్మాణం మరియు విధులు వివరించుము.

3. Write notes on structure and functions of Mitochondria.

మైటోకాండ్రీయా నిర్మాణం మరియు విధులు గురించి వ్రాయుము.

4. Describe Mendel's work on transmission on traits.

మెండల్ అనువంశికతను గురించి వివరించుము.

5. Explain incomplete dominance with suitable examples.

అసంపూర్ణ బహిర్గతత్వ సూత్రమును ఉదాహరణలతో వివరించుము.

6. Write notes on sex determination.

లింగ నిర్ధారణ గురించి వ్రాయుము.

7. Write notes on sex linked inheritance.

లింగ సంబంధ అనువంశికత పై వ్యాసం వ్రాయుము.

8. Describe origin of life.

జీవం పుట్టుక పై వ్యాసం వ్రాయుము.

II. Answer any TWO of the following. Draw labelled diagrams wherever necessary. 2 x 5 = 10 M

ఈ క్రింది వానిలో ఏదైనా రెండు ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

9. Prokaryotic cell - కేంద్రక పూర్వకకణం

10. Lysosomes - లైసోసోములు

11. Speciation - జాతులేర్పడుట

12. Lamarckism - లామార్కజం



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

B.Sc. 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 Mendelin 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.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

B.Sc. Zoology Practical Paper for III Semester

ZOOLOGY - PAPER - III

CYTOLOGY, GENETICS AND EVOLUTION

Time : 3 Hrs.

Max. Marks : 50

Draw a neat labelled diagram of wherever necessary. .

- | | |
|-----------------------------|----------------------|
| 1. Experiment | 1 x 15 = 15 M |
| 2. Study of | 2 x 5 = 10 M |
| (A). | |
| (B). | |
| 3. Study of | 3 x 5 = 15 M |
| (A). | |
| (B). | |
| (C). | |
| 4. Field Book. | 1 x 5 = 5 M |
| 5. Practical Record. | 1 x 5 = 5 M |



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

B.Sc. Zoology Syllabus for IV Semester

ZOOLOGY - PAPER - IV

EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY

Periods : 60

Max. Marks : 100

UNIT - I

1.1 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 Development of Frog upto formation of primary germ layers.

1.3 Formation and functions of Foetal membrane in chick embryo.

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 - Pulmonary ventilation, 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.

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 Carbondioxide.
- 4.1.3 Nutrient cycles - Nitrogen, carbon and phosphorous
- 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

5.2 Zoogeography :

5.2.1 Zoogeographical regions

5.2.2 Study of physical and faunal peculiarities of oriental, Australian and Ethiopian regions.

Additional Inputs :

- * Development, types and functions of Placenta in mammals.
- * Endocrine glands - structure, secretions and the functions (of hormones) of pituitary, thyroid, parathyroid, adrenal glands and pancreas.
- * Hormal control of reproduction in a mammal.
- * Population studies

BLUE PRINT

Unit	Essay	Short
I	1	2
II	2	-
III	1	1
IV	2	1
V	2	-



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY Model Paper for IV Semester

ZOOLOGY - PAPER - IV

EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY

Time : 3 Hrs.

Max. Marks : 60

I Answer any FIVE from following. Draw labelled diagrams wherever necessary. 5 x 10 = 50 M

ఈ క్రింది వానిలో ఏదైనా ఐదు ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

1. Write a notes on formation and functions of Foetal membranes in Chick embryo.
కోడి పిండాభివృద్ధిలో ఏర్పడే పిండ బాహ్యత్వచాలు ఏర్పడే విధానం మరియు వాటి విధులను వ్రాయుము.
2. Write essay on transport of gases.
వాయువుల రవాణా పై వ్యాసం వ్రాయుము.
3. Describe structure and functions of Nephron.
నెఫ్రాన్ నిర్మాణం మరియు విధులను వ్రాయుము.
4. Explain muscle contraction.
కండర సంకోచమును వివరించుము.
5. Describe light as an Ecological factor.
కాంతి 'ఒక జీవావరణ కారకం' వివరించుము.
6. Explain Nitrogen cycle.
నత్రజని వలయం గురించి వ్రాయుము.
7. Write about Ecological succession.
జీవావరణ అనుక్రమము గురించి వ్రాయుము.
8. Describe fauna of Australian Realm.
ఆస్ట్రేలియన్ ప్రాంతము యొక్క ఫానా గురించి వ్రాయుము.

II Answer any TWO of the following. Draw labelled diagrams wherever necessary. 2 x 5 = 10 M

ఈ క్రింది వానిలో ఏదైనా రెండు ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

9. Types of Eggs - అండములలో రకములు
10. Oogenesis - అండోత్పాదము
11. Nerve Cell - నాడీకణం
12. Food chain - ఆహారపు గొలుసు



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

B.Sc. 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 and ovary a mammal.
2. Study of different stages of cleavages (2, 4, 8 cell stages)
3. Study of chick embryoyos 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 a given sample.
2. Estimation of dissolved oxygen of a given sample.
3. Estimation of total alkalinity of a given sample.
4. Estimation of salinity of a given sample.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

B.Sc. Zoology Practical Model Paper for IV Semester

ZOOLOGY - PAPER - IV

EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY

Time : 3 Hrs.

Max. Marks : 50

Draw a neat labelled diagram of wherever necessary. .

- | | |
|---|----------------------|
| 1. Experiment | 1 x 15 = 15 M |
| 2. Experiment | 1 x 10 = 10 M |
| 3. Identify the following Spotters and Write notes on. | 3 x 5 = 15 M |
| (A). | |
| (B). | |
| (C). | |
| 4. Practical Record. | 1 x 10 = 10 M |



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

B.Sc. Zoology Syllabus for V Semester

ZOOLOGY - PAPER - V

ANIMAL BIOTECHNOLOGY

Periods : 60

Max. Marks : 100

UNIT - I

1.1 Introduction

- 1.1.1 Concept of Biotechnology and Scope of Biotechnology
- 1.1.2 Biotechnology in India

1.2 Molecular techniques in gene manipulation - I

- 1.2.1 Cloning vectors - Plasmids, Cosmids, Phagemids, Lambda bacteriophage, M13, BAC, YAC, MAC and expression vectors (characteristics).
- 1.2.2 Restriction enzymes - Momenclature, Study of type II

UNIT - II

2.1 Molecular techniques in gene manipulation - II

- 2.1.1 Construction of genomic and cDNA libraries
- 2.1.2 Southern and Western blotting
- 2.1.3 Polymerase chain reaction
- 2.1.4 DNA finger printing and DNA micro array

UNIT - III

3.1 Genetically modified organisms

- 3.1.1 Production of cloned and transgenic animals.
- 3.1.2 Application of transgenic animals - Production of pharmaceuticals, production of donar organs etc.

UNIT - IV

4.1 Culture techniques and applications

- 4.1.1 Animal cell culture
- 4.1.2 Culture media
- 4.1.3 Primary culture
- 4.1.4 Cell lines and cloning

UNIT - V

5.1 Recombinant DNA technology and applications

- 5.1.1 Recombinant DNA in medicines
- 5.1.2 Recombinant insulin and human growth hormone
- 5.1.3 Gene therapy
- 5.1.4 Stem cells and their use in Medicine

Additional Inputs :

1. Transformation techniques - Calcium chloride method and electroporation
2. DNA sequencing - Sanger method.

BLUE PRINT

Unit	Essay	Short
I	2	1
II	2	1
III	2	1
IV	2	1
V	2	1



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY Model Paper for V Semester

ZOOLOGY - PAPER - V

ANIMAL BIOTECHNOLOGY

Time : 3 Hrs.

Max. Marks : 60

SECTION - I

I. Answer any TWO of the following. Draw labelled diagrams wherever necessary. 2 x 5 = 10 M

ఈ క్రింది వాటిలో ఏదైనా రెండు ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

1. DNA Polymerase - DNA పాలిమరేజ్
2. Liposome - లైపోసోమ్
3. Monoclonal Antibodies (MAb) - మోనోక్లోనల్ ప్రతిరక్షకాలు
4. Super ovulation - సూపర్ ఓవులేషన్
5. Air lift fermentation - ఎయిర్ లిఫ్ట్ ఫెర్మెంటేషన్

SECTION - II

II. Answer ALL the following. Draw labelled diagrams wherever necessary. 5 x 10 = 50 M

ఈ క్రింది అన్ని ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

6. (a). Give an account on mode of action nomenclature and applications of type - II Restriction enzymes in genetic engineering.

జన్యు సాంకేతిక పరిజ్ఞానంలో టైప్-2 రిస్ట్రిక్షన్ ఎంజైమ్స్ పనితీరు నామకరణమును మరియు వాటి అనువర్తనాలను గురించి వ్రాయుము.

(OR)

- (b). Write an essay on Plasmid vectors.

ప్లాస్మిడ్ వెక్టర్ గురించి వ్యాసం వ్రాయుము.

7. (a). Write about the basics of PCR and its applications.

PCR ప్రాథమిక అంశాలు మరియు వాటి అనువర్తనాలు గురించి వ్రాయండి.

(OR)

- (b). What is DNA Sequencing ? Explain the Sangar's method of DNA Sequencing.

DNA సీక్వెన్సింగ్ అనగానేమి ? సాంగర్స్ DNA సీక్వెన్సింగ్ గురించి వ్రాయండి.

8. (a). What are the different types of Cell culture media and explain organ culture.
సెల్ కల్చర్ మీడియంలోని వివిధ రకాలను గూర్చి వ్రాసి మరియు ఆర్గాన్ కల్చర్‌ను వివరించండి.

(OR)

- (b). Explain different types of stem cells and their applications.
వివిధ రకాల మూలకణాలు గురించి మరియు వాటి అనువర్తనాలను గురించి వ్రాయండి.

9. (a). Write and explain what is Artificial insemination and embryo transfer.
కృత్రిమ శుక్ర నివేశనం మరియు పిండ బదిలీ గురించి వివరించండి.

(OR)

- (b). Given an account on the strategies of Gene Transfer.
జన్యు బదిలీ గురించిన వ్యూహాలను గురించి వివరించండి.

10. (a). What is Fermentation and write different types of fermentation.
పులియబెట్టుట అనగానేమి ? వివిధ రకాల పులియబెట్టు విధానాలు గురించి వ్రాయండి.

(OR)

- (b). Explain DNA finger printing and its applications.
DNA ఫింగర్ ప్రింటింగ్‌ను వివరించి వాటి అనువర్తనాలను తెలియచేయండి.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

B.Sc. Zoology Practical Syllabus for V Semester

ZOOLOGY - PAPER - V

ANIMAL BIOTECHNOLOGY

Periods : 30

Max. Marks : 50

1. Genomic DNA isolation from E.Coli.
2. Plasmid DNA isolation (pUC 18/19) from E.Coli.
3. Study the following techniques through photographs
 - (a). Southern Blotting
 - (b). Western Blotting
 - (c). DNA sequencing (Sanger's method)
 - (d). DNA finger printing
4. PCR (Demonstration) on site or of site demonstration
5. Project Report on animal cell culture.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

B.Sc. Zoology Practical Model Paper for V Semester

ZOOLOGY - PAPER - V

ANIMAL BIOTECHNOLOGY

Time : 3 Hrs.

Max. Marks : 50

Draw labelled diagrams wherever necessary.

- | | |
|---|----------------------|
| 1. Genomic DNA isolation from E.Coli. | 1 x 10 = 10 M |
| 2. Plasmid DNA isolation (pUC 18/19) from E.coli. | 1 x 10 = 10 M |
| 3. Study the following techniques through photographs
(a). | 1 x 5 = 5 M |
| 4. PCR (Demonstration) on site or of site demonstration | 1 x 10 = 10 M |
| 5. Project Report on animal cell culture. | 1 x 10 = 10 M |
| 6. Record. | 1 x 5 = 5 M |



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

III B.Sc. ZOOLOGY SYLLABUS FOR V SEMESTER 2018 - 2019

ZOOLOGY - PAPER - VI ANIMAL HUSBANDRY

Periods : 60

Max. Marks : 100

UNIT - I

- 10 Hours

General Introduction to poultry farming, Principles of poultry housing, poultry houses, Systems of poultry farming. Management of Chicks, growers and layers. Management of Broilers.

UNIT - II

- 10 Hours

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

- 10 Hours

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

UNIT - IV

- 20 Hours

Breeds of Dairy Cattle and Buffaloes - Definition of breed ; Classification of Indian Cattle breeds, exotic breeds and Indian buffalo breeds. Systems of inbreeding and cross breeding. Housing of dairy animals - Selection of site for dairy farm ; systems of housing - loose, housing system. Conventional dairy barn. Cleaning and sanitation of dairy farm. Weaning of calf. Castration and dehorning.

UNIT - V

- 10 Hours

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

Additional Inputs :

* Deworming and vaccination programme. Records to be maintained in a dairy farm.

BLUE PRINT

Unit	Essay	Short
I	2	1
II	2	1
III	2	1
IV	2	1
V	2	1



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY Model Paper for V Semester :

THEORY MODEL QUESTION PAPER - PAPER : VI

ANIMAL HUSBANDRY

Time : 3 Hrs.

Max. Marks : 60

SECTION - I

I. Answer any TWO of the following. Draw labelled diagrams wherever necessary. 2 x 5 = 10 M

ఈ క్రింది వానిలో ఏదైనా రెండు ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైతే భాగాలతో కూడిన పటములు గీయుము.

1. Poultry Housing - పౌల్ట్రీ హౌసింగ్
2. Layers - లేయర్స్
3. Hatching Eggs - గుడ్లను పొదుగుట
4. Housing of dairy animals - హౌసింగ్ ఆఫ్ డైరీ ఏనిమల్స్
5. Care and Management of Calf - లేగదూడను పెంచుటలో తీసుకోవలసిన యాజమాన్య పద్ధతులు

SECTION - II

II. Answer ALL the following. Draw labelled diagrams wherever necessary. 5 x 10 = 50 M

ఈ క్రింది అన్ని ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైతే భాగాలతో కూడిన పటములు గీయుము.

6. (a). Describe in detail systems of poultry farming.
పౌల్ట్రీని ఏర్పాటు చేయుటను గురించి సోదాహరణముగా వివరింపుము.
(OR)
- (b). Write a note on management of Broilers.
బ్రాయిలర్స్ యొక్క యాజమాన్య పద్ధతులను గురించి వ్రాయుము.
7. (a). Describe in detail the nutrient requirements for different stages of layers and broilers.
లేయర్స్, బ్రాయిలర్స్ పెరుగుదలలో తీసుకోవలసిన పోషక అవసరాలను గురించి వ్రాయుము.
(OR)
- (b). Write notes on poultry discuss, viral bacterial symptoms control and management.
పౌల్ట్రీలో వైరస్, బ్యాక్టీరియా వ్యాధులను నివారించు విధానమును వివరింపుము.

8. (a). Write detailed note on methods of hatching.

కోడి పిల్లలను పొదుగు పద్ధతులను వివరింపుము.

(OR)

(b). Describe in detail Brooding, rearing of Chicks.

కోడిపిల్లల బ్రూడింగ్ మరియు రేరింగ్‌లను వివరింపుము.

9. (a). Write in detail classification of Indian Cattle breeds.

భారతదేశంలోని లేగదూడల యొక్క వర్గీకరణను గురించి వ్రాయుము.

(OR)

(b). Write a detailed account on cleaning and sanitation of dairy farm.

డైరీఫాం క్లీనింగ్ మరియు శానిటేషన్ గురించి వివరింపుము.

10. (a). Describe the heifer milk animal management.

ఎక్కువ పాలు ఇచ్చు జంతువుల యాజమాన్యమును గురించి వ్రాయుము.

(OR)

(b). Write notes on Bull & Bullocks.

ఎద్దు మరియు ఆంబోతులను గురించి వ్రాయుము.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

III B.Sc. ZOOLOGY PRACTICAL SYLLABUS FOR V SEMESTER 2018 - 2019

ZOOLOGY - PAPER - VI

ANIMAL HUSBANDRY

Periods : 24

Max. Marks : 50

1. Study of various breeds of layers and broilers (photographs).
2. Identification of disease causing organisms in poultry birds (as per theory).
3. Study of the anatomy of a poultry bird by way of dissecting a bird. (Demonstration).
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.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY Practical Paper for V Semester

PRACTICAL MODEL QUESTION PAPER - PAPER : VI

ANIMAL HUSBANDRY

Time : 3 Hrs.

Max. Marks : 50

-
- I. Write the following questions. 3 x 5 = 15 M**
1. Write identification characters of layers.
 2. Write identification characters of broilers.
 3. Write identification disease causing organisms in poultry birds.
- II. Write the following questions. 1 x 10 = 10 M**
4. Describe the neat diagram anatomy of a poultry bird by way of dissecting a bird.
 5. Write identification characters of breeds of cattle.
- III. Write one of the following questions. 1 x 15 = 15 M**
6. Write the carried out in a dairy farm submission of a report.
 7. Write the poultry farm layers submission of a report.
- IV. Practical Record. 1 x 10 = 10 M**



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY SYLLABUS FOR VI SEMESTER

ZOOLOGY 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 influence 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 Type of vaccines.

Additional Inputs :

1. Autopsy, Biospy, Lymphoid Organs in Animals

BLUE PRINT

<i>Unit</i>	<i>Essay</i>	<i>Short</i>
Unit - I	2	1
Unit - II	2	1
Unit - III	2	1
Unit - IV	2	1
Unit - V	2	1



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY Model Paper for VI Semester : THEORY MODEL QUESTION PAPER - : VIII (B) * IMMUNOLOGY

Time : 3 Hrs.

Max. Marks : 60

SECTION - I

I. Answer any TWO of the following. Draw labelled diagrams wherever necessary. 2 x 5 = 10 M

ఈ క్రింది వారిలో ఏదైనా రెండు ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

1. Innate Immunity - సహజ అసంక్రామ్యత
2. Antigens - ప్రతిజనకము
3. Structure of Antibody - ప్రతిరక్షకముల నిర్మాణము
4. Humoral Immunity - హ్యూమరల్ అసంక్రామ్యత
5. Types of Vaccines - వేక్సిన్లలో రకాలు

SECTION - II

II. Answer ALL the following. Draw labelled diagrams wherever necessary. 5 x 10 = 50 M

ఈ క్రింది అన్ని ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

6. (a). Explain the Cells of Immune System.

వ్యాధి నిరోధక వ్యవస్థ కణాలను గురించి తెలుపుము.

(OR)

- (b). Describe the Adaptive Immunity.

ఆర్థిత అసంక్రామ్యతను గురించి వివరింపుము.

7. (a). Write an essay on the factors influencing immunogenicity.

అసంక్రామ్యతను ప్రభావితం చేసే కారకాలను గురించి ఒక వ్యాసం వ్రాయుము.

(OR)

- (b). Explain the 'B' and 'T' Cell Functions.

'B' మరియు 'T' కణాల విధులను వ్రాయుము.

8. (a). Explain the classes and functions of Antibodies.
ప్రతిరక్షకాల వర్గీకరణ మరియు విధులను తెలుపుము.

(OR)

(b). Describe the Antigen and Antibody interactions.
ప్రతిజనకం మరియు ప్రతిరక్షకాల సంబంధాలను గురించి వివరింపుము.

9. (a). Describe structure and functions of major Histocompatibility complexes.
మేజర్ హిస్టో కంపాటిబిలిటీ నిర్మాణం విధులను వివరింపుము.

(OR)

(b). Explain the cell mediated immunity.
కణమధ్య అసంక్రామ్యతను వివరింపుము.

10. (a). Describe the various types of Hyper sensitivities.
వివిధ రకాల అధిసున్నితత్వాలను వివరింపుము.

(OR)

(b). Explain the concepts of Autoimmunity.
ఆటో ఇమ్యూనిటీ భావనను వివరింపుము.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY Practical Syllabus for VI Semester :

PAPER - : VIII (B) *

IMMUNOLOGY

Periods : 30 Hrs.

Max. Marks : 50

1. Demonstration of Lymphoid Organs (as per UGC Guidelines).
2. Histological study of spleen, thymus and lymphnodes (through prepared slides)
3. Blood group determination
4. Demonstration of
 - (a). ELISA
 - (b). Immunoelectrophoresis



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY Model Paper for VI Semester :

ZOOLOGY PAPER : VIII (B) *

IMMUNOLOGY

Time : 3 Hrs.

Max. Marks : 50

Draw labelled diagrams wherever necessary.

1. Answer the following. **2 x 5 = 10 M**
 - (a).
 - (b).
2. Answer the following. **3 x 5 = 15 M**
 - (a).
 - (b).
 - (c).
3. Experiment - Blood groups - A, B, AB and O. **1 x 10 = 10 M**
4. Experiment **1 x 10 = 10 M**
5. Record. **1 x 5 = 5 M**



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

III B.Sc. ZOOLOGY : VI SEMESTER : ELECTIVE - VII (B)

CELLULAR METABOLISM AND MOLECULAR BIOLOGY

THEORY SYLLABUS

Periods : 60

Max. Marks : 100

UNIT - I

1. Biomolecules :

- 1.1 Carbohydrates - Classification of Carbohydrates, Structure of Glucose.
- 1.2 Proteins - Classification of Proteins, General Properties of Amino Acids.
- 1.3 Lipids - Classification of Lipids.
- 1.4 Nucleic Acids - DNA - Structure and function RNA - Structure, Types & functions.

UNIT - II

2. Enzymes and Cellular Metabolism

- 2.1 Introduction to biocatalysis, Enzymes and their classification
- 2.2 Glycogen Metabolism - Review of Electron Transport Chain

UNIT - III

3. Cellular Metabolism and Cell Physiology

- 3.1 Lipid Metabolism - Biosynthesis and β - oxidation of fatty acid.
- 3.2 Protein Metabolism - Transamination, Deamination
- 3.3 Transport functions of plasma membrane - Active transport - Passive transport

UNIT - IV

4. DNA Genetic Material

- 4.1 Fine structure of gene and types
- 4.2 Griffith's Experiment
- 4.3 Hershey-chase Experiment

UNIT - V

5. Gene Expression

- 5.1 Gene expression in Prokaryotes (lacoperon)
- 5.2 Gene expression in Eukaryotes
- 5.3 Transcription and Translation.

Additional Inputs :

Cistron, Recon, Muton, Phagocytosis, Zwitter ion

BLUE PRINT

Unit	Essay	Short
I	2	1
II	2	1
III	2	1
IV	2	1
V	2	1



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY Model Paper for IV Semester : Theory Model Question Paper

CLUSTER ELECTIVE PAPER : VIII - B - 3

CELLULAR METABOLISM & MOLECULAR BIOLOGY

Time : 3 Hrs.

Max. Marks : 60

SECTION - I

I. Answer any TWO of the following. Draw labelled diagrams wherever necessary. 2 x 5 = 10 M

ఈ క్రింది వానిలో ఏదైనా రెండు ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

1. Structure of Glucose - గ్లూకోజ్ నిర్మాణము
2. Glyconeogenesis - గ్లైకోనియోజెనిసిస్
3. Lipids Metabolism - లిపిడ్ జీవక్రియ
4. Structure of Gene - జన్యు నిర్మాణం
5. Translation - ట్రాన్స్లేషన్

SECTION - II

II. Answer ALL the following. Draw labelled diagrams wherever necessary. 5 x 10 = 50 M

ఈ క్రింది అన్ని ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

6. (a). Describe the structure and functions of DNA

DNA నిర్మాణం మరియు విధులు వివరింపుము.

(OR)

- (b). Describe the structure and functions of RNA & Types.

RNA నిర్మాణం మరియు విధులు రకాలను వివరింపుము.

7. (a). Explain the enzymes and their classification.

ఎంజైమ్స్ మరియు వర్గీకరణను వివరింపుము.

(OR)

- (b). Write an essay on the Carbohydrate metabolism.

కార్బోహైడ్రేట్ జీవక్రియలపై వ్యాసం వ్రాయుము.

8. (a). Write an essay on the - oxidation of plamatic acid.
ప్లామటిక్ ఆమ్ల - ఆక్సీకరణ గురించి వ్యాసం వ్రాయుము.

(OR)

- (b). Describe the functions of plasma membrane.
ప్లాస్మాత్మకపు విధులను గురించి వివరింపుము.

9. (a). Describe Griffith experiment.
గ్రీఫ్త్ ప్రయోగం వివరింపుము.

(OR)

- (b). Explain the Harshe - Chase experiment.
హార్ష్ - చేజ్ ప్రయోగం వివరింపుము.

10. (a). Describe the Lac Operan concept.
లాక్ ఒపెరాన్ భావనను వివరింపుము.

(OR)

- (b). Write an essay on the Gene expression in Eukaryotes.
నిజ కేంద్రక జీవులలో జన్యు వ్యక్తీకరణ గురించి వ్యాసం వ్రాయుము.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

III B.Sc. ZOOLOGY : VI SEMESTER

ELECTIVE - VII (B)

PRACTICAL SYLLABUS

CELLULAR METABOLISM AND MOLECULAR BIOLOGY

Periods : 24

Max. Marks : 50

1. Qualitative tests to identify functional groups of carbohydrates in given solutions (Glucose, Fructose, Sucrose, Lactose).
2. Estimation of Proteins in given samples by lowry method.
3. Study of activity of salivary amylase under optimum conditions.
4. Preparation of permanent slide to show the presence of Barr body in human female blood cells chick cells.
5. Mounting of Salivary gland Chromosomes of chironomous.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

III B.Sc. ZOOLOGY : VI SEMESTER

ELECTIVE - VII (B)

PRACTICAL MODEL PAPER

CELLULAR METABOLISM AND MOLECULAR BIOLOGY

Time : 3 Hrs.

Max. Marks : 50

1. Identify the presence of carbohydrates in the given sample and write the procedure. 25 M
2. Mounting of salivary gland chromosomes of chromomous and write the procedure. 20 M
3. Practical Record Book. 05 M



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

III B.Sc. ZOOLOGY SYLLABUS FOR VIII SEMESTER

CLUSTER ELECTIVE PAPER : VIII (B-1)

PRINCIPLES OF AQUACULTURE

Periods : 60

Max. Marks : 100

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 Fresh water, brackish water, marine.
- 2.1.2 Concept of monoculture, polyculture, composite culture, monosex culture and integrated fish farming.

2.2 Culture Systems :

- 2.2.1 Pond, raceways, cages, pens, rafts and water recirculating aquaculture systems.

2.3 Culture Practices :

- 2.3.1 Traditional extensive, modified extensive, semi intensive and intensive cultures of fish and shrimp.

UNIT - III

3.1 Design and construction of aquafarms :

- 3.1.1 Criteria for the selection of site for fresh water 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 culture.

3.3 Nutrition and feeds :

- 3.3.1 Nutritional requirements of a cultivable fish and shell fish.
- 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/ desilting : 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 :

4.2.1 *Macrobrachium rosenbergii*

UNIT - V

5.1 Culture of Shrimp :

5.1.1 *Penaeus monodon* or *Litopenaeus vannamei*

5.2 Culture of pearl Oysters :

5.3 Culture of Seaweeds :

5.3.1 Species cultured, culture techniques, important by-products, prospects.

5.4 Culture of ornamental fishes :

5.4.1 Setting up and maintenance of aquarium and breeding.

BLUE PRINT

Unit	Essay	Short
I	2	1
II	2	1
III	2	1
IV	2	1
V	2	1



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY Model Paper for VI Semester

CLUSTER ELECTIVE PAPER : VIII (B - 1)

Theory Model Question Paper

PRINCIPLES OF AQUACULTURE

Time : 3 Hrs.

Max. Marks : 60

SECTION - I

I. Answer any TWO of the following. Draw labelled diagrams wherever necessary. 2 x 5 = 10 M

ఈ క్రింది వారిలో ఏదైనా రెండు ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

1. Labeo rohitha - లేబయో రోహిత
2. Ponds - చెరువులు
3. Shrimps - ప్రింప్స్
4. Major Carps - పెద్ద కార్ప్స్ చేపలు
5. Importance of Pearl Industry - ముత్యముల పరిశ్రమ ప్రాముఖ్యత

SECTION - II

II. Answer ALL the following. Draw labelled diagrams wherever necessary. 5 x 10 = 50 M

ఈ క్రింది అన్ని ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

6. (a). Describe the present status of Aquaculture in Global and National scenario.
జాతీయంగా మరియు ప్రపంచ వ్యాప్తంగా ప్రస్తుత ఆక్వాకల్చర్ గురించి వివరించండి.

(OR)

- (b). Write an essay on the major cultivable species for Aquaculture.

పెంపకానికి అనువైన పెద్ద కార్ప్స్లను గురించి వివరించుము.

7. (a). Write about the criteria for the selection of species for culture.

పెంపకపు జీవుల ఎంపికను గురించి వ్రాయుము.

(OR)

- (b). Write about the fresh water Aquaculture.

మంచినీటి ఆక్వాకల్చర్ను గురించి వ్రాయుము.

8. (a). Describe the Nutritional Requirements of Cultivable fish and Shell fish ?
చేప మరియు కర్పర చేపల యొక్క పోషక విలువల అవసరతను గురించి వ్రాయండి

(OR)

(b). Write an essay on culture system.

కల్చర్ వ్యవస్థలపై ఒక వ్యాసము వ్రాయుము.

9. (a). Write an essay on Culture of Indian Major Carps.

భారతదేశంలో పెంచబడుతున్న పెద్ద కార్ప్ చేపల పెంపకమును గురించి వ్రాయండి.

(OR)

(b). Write an essay on Culture of Giant fresh water prawn.

మంచినీటి పెద్ద రొయ్య పెంపకమును గురించి వ్రాయండి.

10. (a). Write an essay on Oysters.

ఆల్టిప్టల పెంపకం గురించి ఒక వ్యాసము వ్రాయుము.

(OR)

(b). Write an essay on Aquarium fishes.

అక్వేరియం చేపలను గురించి వ్యాసము వ్రాయుము.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY PRACTICAL SYLLABUS : SEMESTER - VI

CLUSTER ELECTIVE PAPER : VIII (B-1)

PRINCIPLES OF AQUACULTURE

PRACTICAL SYLLABUS

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 phosphorous and organic carbon.
3. Identification and study of common zooplankton, aquatic insects and aquatic weeds - Each 5



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY PRACTICAL SYLLABUS : SEMESTER - VI

CLUSTER ELECTIVE PAPER : VIII (B-1)

PRINCIPLES OF AQUACULTURE

PRACTICAL SYLLABUS MODEL PAPER

Time : 3 Hrs.

Max. Marks : 50

-
- I. Write the following questions. 4 x 5 = 20 M**
1. Write identification characters of Catla Catla.
 2. Write identification characters of Macrobrachium rosenbergi.
 3. Write the identification characters of any two aquarium fishes.
 4. Write biometric data of Labeo rohita.
- II. Write the following questions. 2 x 5 = 10 M**
5. Write the characters of abdominal dropsy and Argulosis.
 6. Describe the Autopsy of fish.
 7. Write about the drugs for treating common diseases.
- III. Write ONE of the following questions. 1 x 10 = 10 M**
8. Estimate the dissolved oxygen in the given sample of water.
 9. Estimate the available organic compounds in the given sample of soil.
- IV. Practical Record. 10 M**



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

III B.Sc. ZOOLOGY SYLLABUS FOR VIII SEMESTER

CLUSTER ELECTIVE PAPER : VIII (B-2)

AQUACULTURE MANAGEMENT

Periods : 60

Max. Marks : 100

UNIT - I

1.1 Breeding and Hatchery Management :

- 1.1.1 Bundh breeding and induced breeding of carp by hypophysation and use of synthetic hormones.
- 1.1.2 Types of fish hatcheries, hatchery management of Indian major carps.
- 1.1.3 Breeding and hatchery management of *Penaeus Monodon*, *Litopenaeus Vannamei*,
Breeding and hatchery management of giant fresh water prawn.

UNIT - II

2.1 Water Quality Management :

- 2.1.1 Water Quality and soil characteristics suitable for fish and shrimp culture.
- 2.1.2 Identification of oxygen depletion problems and control mechanisms in culture ponds.
- 2.1.3 Limiting materials, organic manures and inorganic fertilizers commonly used and their implications in fish ponds.

UNIT - III

3.1 Feed Management :

- 3.1.1 Food and their role in shrimp larval nutrition.
- 3.1.2 Supplementary feeds : Principle foods in artificial diets : Types of feeds : feeds, additives and preservatives, role of probiotics.
- 3.1.3 Feed formulation and manufacturing feed storage
- 3.1.4 Feeding strategies : Feeding devices, feeding schedules and ration size.

UNIT - IV

4.1 Disease Management :

- 4.1.1 Principles of disease diagnosis and health management.
- 4.1.2 Specific and non-specific defense systems in fish : fish immunization and vaccination.
- 4.1.3 Etiology, symptoms, prophylaxis and therapy of common fish disease in fish pond.
- 4.1.4 Etiology, symptoms, prophylaxis and therapy of common shrimp diseases in shrimp ponds.

UNIT - V

5.1 Economics and Marketing :

5.1.1 Principles of Aquaculture Economics - Capital costs, variable costs, cost-benefits analysis.

5.1.2 Fisheries Extension :

Fisheries training and education in India ; Role of extension in community development.

5.1.3 Fish Genetics :

Gynogenesis, androgenesis, polyploidy, transgenic fish, cryopreservation of gametes, production of monosex and sterile fishes and their significance in Aquaculture.

BLUE PRINT

Unit	Essay	Short
I	2	1
II	2	1
III	2	1
IV	2	1
V	2	1



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY Model Paper for IV Semester : Theory Model Question Paper

CLUSTER ELECTIVE PAPER : VIII - B - 2

AQUACULTURE MANAGEMENT

Time : 3 Hrs.

Max. Marks : 60

SECTION - I

I. Answer any TWO of the following. Draw labelled diagrams wherever necessary. 2 x 5 = 10 M

ఈ క్రింది వానిలో ఏదైనా రెండు ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైతే ఛిత్రాలతో కూడిన పటములు గీయుము.

1. Types of Fish Hatcheries - చేపల హేచరీల రకాలు
2. Water quality for fish culture - చేపల పెంపకంలో నీటి నాణ్యత
3. Types of Feeds - ఆహారపు రకాలు
4. Fish Immunization - చేపల వ్యాధి నిరోధకత
5. Hybridization of Fish - సంకరజాతి చేపలు

SECTION - II

II. Answer ALL the following. Draw labelled diagrams wherever necessary. 5 x 10 = 50 M

ఈ క్రింది అన్ని ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైతే ఛిత్రాలతో కూడిన పటములు గీయుము.

6. (a). Describe the Bundh Breeding in Carp.

కార్ప్ చేపలలో బంధిత ప్రజననము గురించి వివరింపుము.

(OR)

- (b). Write an essay on the Hatchery Management of gaint fresh water prawn.

అతి పెద్ద మంచి నీటి రొయ్య యొక్క హేచరీ యాజమాన్యం గురించి వ్రాయుము.

7. (a). Write an essay on Oxygen depletion problems in culture ponds.

కల్చర్ పాండ్లలో ఆక్సిజన్ లోపం వలన కలిగే ఇబ్బందులను గురించి వ్రాయుము.

(OR)

- (b). Write notes on the site selection criteria of culture pond.

చేపల చెరువు స్థలం ఎంపిక గురించి వ్రాయండి.

8. (a). Describe the Feed fomulation and manufacturing.
ఆహారపు సమీకరణము మరియు తయారీ విధానం గురించి వ్రాయండి.

(OR)

(b). Write an essay on Supplementary feeds of culture ponds.
పెంపక చెరువులలో అనుబంధ ఆహారం గురించి వ్రాయండి.

9. (a). Write notes on the disease diagnosis and health management.
వ్యాధి నిర్ధారణ మరియు ఆరోగ్య యాజమాన్యం గురించి వ్రాయుము.

(OR)

(b). Describe the common Shrimp disease in fish ponds.
రొయ్యల పెంపకంలో వచ్చు వ్యాధులను గురించి వ్రాయండి.

10. (a). Write notes on the principles of Aquaculture economics.
ఆక్వాకల్చర్ వాణిజ్యపు సూత్రాలను గురించి వ్రాయండి.

(OR)

(b). Describe the fisheries training and education in India.
భారతదేశంలో చేపల పెంపకపు శిక్షణ మరియు విద్యను గురించి వివరింపుము.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

III B.Sc., ZOOLOGY PRACTICAL SYLLABUS : SEMESTER - VI

AQUACULTURE MANAGEMENT - VIII - B2

PRACTICAL - II SYLLABUS

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.

(OR)

3. Estimation of Proximate composition of aquaculture feeds - Proteins, carbohydrates, lipids, moisture ash content.

Post Harvest Technology :

1. Evolution 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.

(OR)

3. Preparation of singlass, 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.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

III B.Sc., ZOOLOGY PRACTICAL SYLLABUS : SEMESTER - VI

AQUACULTURE MANAGEMENT - VIII - B2

PRACTICAL - II MODEL PAPER

Time : 3 Hrs.

Max. Marks : 50

1. Identification of **1 x 10 = 10 M**

2. Formulation and preparation of a balanced fish feed. **1 x 10 = 10 M**

Post Harvest Technology :

3. Evolution of Fishery products. **1 x 5 = 5 M**

4. Preparation of **1 x 10 = 10 M**

5. Preparation of **1 x 10 = 10 M**

6. Practical Record Book. **1 x 5 = 5 M**



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

III B.Sc. ZOOLOGY SYLLABUS FOR VIII SEMESTER

CLUSTER ELECTIVE PAPER : VIII (B-3)

POST HARVEST TECHNOLOGY

Periods : 60

Max. Marks : 100

UNIT - I

1.1 Handling and Principles of fish preservation :

- 1.1.1 Handling of fresh fish, storage and transport of fresh fish, post mortem changes (rigor mortis and spoilage), spoilage in marine fish and freshwater fish.
- 1.1.2 Principles of preservation - Cleaning, lowering of temperature, rising of temperature, denudation, use of salt, use of fish preservatives.

UNIT - II

2.1 Methods of fish preservation :

- 2.1.1 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 :

- 3.1.1 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 fin, fish manure.
- 3.1.2 Fish by-products : Fish glue, ising glass, chitosan, pearl essence, shark fins fish, leather and fish maws.
- 3.1.3 Seaweed products : Preparation of agar, algin and carrageen.

UNIT - IV

4.1 Sanitation and Quality Control :

- 4.1.1 Sanitation in processing plants - environmental hygiene and personal hygiene in processing plants.
- 4.1.2 Quality control of fish and fishery products - Pre processing control, control during processing and control after processing.

UNIT - V

5.1 Quality Assurance, Management and Certification :

- 5.1.1 Seafood quality assurance and systems : Good Manufacturing Practices (GMPs), Good Laboratory Practices (GLPs) : Standard Operating Procedures (SOPs) ; Concept of Hazard Analysis Critical Control Points (HACCP) in seafood safety.
- 5.1.2 National and International Standards - ISO 9000 - 2000 series of Quality Assurance System,

Additional Inputs :

Codex Alimentarius, Rigiormortis, Pickling

BLUE PRINT

Unit	Essay	Short
I	2	1
II	2	1
III	2	1
IV	2	1
V	2	1



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY Model Paper for IV Semester : Theory Model Question Paper

CLUSTER ELECTIVE PAPER : VIII - B - 3

POST HARVEST TECHNOLOGY

Time : 3 Hrs.

Max. Marks : 60

SECTION - I

I. Answer any TWO of the following. Draw labelled diagrams wherever necessary. 2 x 5 = 10 M

ఈ క్రింది వారిలో ఏదైనా రెండు ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

1. Transport of Fresh Fish - మంచినీటి చేపల రవాణా
2. Advanced methods of Fish preservation - చేపలను నిల్వ చేయుటలో ఆధునిక పద్ధతులు
3. Fish meal and fish manure - ఫిష్ మీల్ & ఫిష్ మాన్యూర్
4. Preparation of Agar - అగార్ తయారీ
5. HACCP - HACCP

SECTION - II

II. Answer ALL the following. Draw labelled diagrams wherever necessary. 5 x 10 = 50 M

ఈ క్రింది అన్ని ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

6. (a). Write an essay on storage and transport of fishes.

చేపలను నిల్వచేయు మరియు రవాణా చేయుట గురించి వ్రాయుము.

(OR)

- (b). Write an essay on principles of fish preservation.

చేపలను నిల్వ చేయుటలో పాటించవలసిన సూత్రాలను రాయండి.

7. (a). Write an essay on traditional methods of fish preservation.

చేపలను నిల్వ చేయుటలో పాటించవలసిన వివిధ సాంప్రదాయక పద్ధతులను వ్రాయండి.

(OR)

- (b). Write as essay on advanced methods of fish preservation.

చేపలను నిల్వ చేయుటలో పాటించవలసిన నూతన పద్ధతులను వ్రాయండి.

8. (a). Write an essay on fish products.

చేపల ఉత్పత్తులపై ఒక వ్యాసం వ్రాయండి.

(OR)

(b). Write an essay on seaweed products.

సముద్ర కలుపు మొక్కలపై ఒక వ్యాసం వ్రాయండి.

9. (a). Environmental hygiene in processing plants.

ప్రోసెసింగ్ యూనిట్‌లో పాలిశుద్ధ్య నిర్వహణ గురించి వ్రాయుము.

(OR)

(b). Write an essay on quality control of fish & fishery products.

చేపలు మరియు చేపల ఉత్పత్తుల తయారీలో పాటించే నాణ్యత ప్రమాణాలను గురించి వ్రాయండి.

10. (a). Write an essay on seafood quality assurance and systems.

సముద్ర ఆహారపు నాణ్యతలో పాటించవలసిన పద్ధతులను వ్రాయుము.

(OR)

(b). Write an essay on National & International standards of quality assurance system.

నాణ్యత హామీ వ్యవస్థలో జాతీయ మరియు అంతర్జాతీయ అంశాలపై ఒక వ్యాసం వ్రాయండి.



BLUE PRINT

Unit	Essay	Short
I	2	1
II	2	1
III	2	1
IV	2	1
V	2	1

GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

III B.Sc., ZOOLOGY PRACTICAL SYLLABUS : SEMESTER - VI

POST HARVEST TECHNOLOGY VIII - B3

PRACTICAL SYLLABUS MODEL PAPER

Periods : 24

Max. Marks : 50

1. Visit to a fish breeding centre / fish farms and submit a project work.
2. Visit to a feed manufacturing unit and submit a project work.
3. Visit to a shrimp hatchery / shrimp farms and submit a project work.
4. Visit to a shrimp processing unit and submit a project report.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

III B.Sc., ZOOLOGY PRACTICAL : SEMESTER - VI POST HARVEST TECHNOLOGY VIII - B3 PRACTICAL MODEL PAPER

Periods : 3 Hrs.

Max. Marks : 50

I. Any ONE Project Work.

1 x 50 = 50 M

1. Visit to a fish breeding centre / fish farms and submit a project work.

(OR)

2. Visit to a feed manufacturing unit and submit a project work.

(OR)

3. Visit to a shrimp hatchery / shrimp farms and submit a project work.

(OR)

4. Visit to a shrimp processing unit and submit a project report.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

DEPARTMENT OF ZOOLOGY CERTIFICATE COURSE ON VERMICOMPOST THEORY SYLLABUS

Unit - I

General Vermiculture :

- ◆ Introduction to Vermiculture, Definition, Meaning and History.
- ◆ Maintenance of soil structure, the matter and humus cycle.
- ◆ Vermicompost Devices and Equipment

Unit - II

Earthworm Biology :

- ◆ Taxonomy, Anatomy, Physiology and Reproduction of Earthworm.
- ◆ Economic importance of Earthworms.

Unit - III

Vermicompost Technology :

- ◆ Small scale earthworm forming for home gardens.
- ◆ Conventional commercial composting
- ◆ Maintenance of Vermicompost.
- ◆ Verms diseases and enemies.

Unit - IV

Economic Importance of Vermicompost

- ◆ Economic importance of Vermicompost.
- ◆ Harvesting and processing.

BLUE PRINT

<i>Unit</i>	<i>Essay</i>
Unit - I	1
Unit - II	2
Unit - III	4
Unit - IV	2



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

DEPARTMENT OF ZOOLOGY

CERTIFICATE COURSE ON VERMICOMPOST

THEORY MODEL PAPER

I. Write any FIVE answers and draw labeled diagrams where ever necessary. 5 x 10 = 50 M

1. Write notes on maintenance of soil, the matter and humus cycle.
2. Describe indetail about biology of Earthworm.
3. Write notes on Economic importance of Earthworm.
4. Write notes on maintenance of Vermicompost.
5. Give an account on small scale earthworm forming for home gardens.
6. Explain in detail economic importance of Vermicompost.
7. Write notes on Harvesting and processing of vermiculture.
8. Give an account on commercial composing.
9. Explain in detail about reduce, reuse, recycle and restore ?



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

DEPARTMENT OF ZOOLOGY

CERTIFICATE COURSE ON VERMICOMPOST

PRACTICAL SYLLABUS

1. Estimation of soil pH.
2. Identification of different types of Earthworms.
3. Preparation of Home gardens.
4. Field trip and collection of native earthworms.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM
DEPARTMENT OF ZOOLOGY
CERTIFICATE COURSE ON VERMICOMPOST
PRACTICAL MODEL PAPER

- | | |
|--|------|
| 1. Estimation of soil pH | 10 M |
| 2. Earthworm identification and writing notes | 10 M |
| 3. Preparation of home gardens. | 10 M |
| 4. Field trip and collection of native earthworms. | 10 M |
| 5. Practical Record Book | 10 M |



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

AQUACULTURE TECHNOLOGY COURSE SYLLABUS

SEMESTER - I : PAPER - I

BASIC PRINCIPLES OF AQUACULTURE

Periods : 60

Max. Marks : 100

UNIT - I : INTRODUCTION

- 1.1 Concept of Blue Revolution - History and Definition of Aquaculture.
- 1.2 Scope of Aquaculture at global level, India and Andhra Pradesh.
- 1.3 Fresh water aquaculture, brackish water aquaculture and mariculture.
- 1.4 Different Aquaculture Systems - Pond, Cage, Pen, Running Water, Extensive, Intensive and & Semi-Intensive Systems and their significance. Monoculture, Polyculture and Monosex culture systems.

UNIT - II : POND ECOSYSTEM

- 2.1 General Concepts of Ecology, Carrying Capacity and Food Chains
- 2.2 Lotic and Lentic systems, streams and springs.
- 2.3 Nutrient Cycles in Culture ponds - Phosphorus, Carbon and Nitrogen
- 2.4 Importance of Plankton and Benthos in culture ponds, nutrient dynamics and algal blooms.

UNIT - III : TYPES OF FISH PONDS

- 3.1 Classification of ponds based on water resources - Spring, rain water, flood water, well water and water course ponds.
- 3.2 Functional classification of ponds - Head pond, hatchery, nursery, rearing, production, stocking and quarantine ponds.

UNIT - IV : POND PREPARATION

- 4.1 Important factors in the construction of an ideal fish pond - Site selection, topography, nature of the soil, water resources.
- 4.2 Lay out and arrangements of ponds in a fish farm.
- 4.3 Construction of an ideal fish pond - Space allocation

UNIT - V : POND MANAGEMENT FACTORS

- 5.1 Need of fertilizer and manure application in culture ponds ; Role of nutrients ; NPK contents of different fertilizers and manures used in aquaculture ; and precautions in their application.

- 5.2 Physico-chemical conditions of soil and water optimum for culture - temperature, depth, turbidity, light, water and shore currents, pH, DOD, CO₂ and nutrients.
- 5.3 Eradication of predators and weed control - Advantages and disadvantages of weed, weed plants in culture ponds, aquatic weeds, weed fish, toxins used for weed control and control of predators.

Additional Inputs :

- 1). Aquaculture Vs. Agriculture ; Present day needs with special reference to Andhra Pradesh.
- 2). Concepts of Productivity, estimation and improvement of productivity.
- 3). Hatchery design.
- 4). Structure and components of barrage pond.
- 5). Measures to increase oxygen and reduce ammonia & hydrogen sulphide in culture ponds ; correction of pH.

BLUE PRINT

Unit	Essay	Short
I	2	1
II	2	1
III	2	1
IV	2	1
V	2	1



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY - AQUACULTURE TECHNOLOGY COURSE SYLLABUS

SEMESTER - I : PAPER - I

Theory Model Question Paper

BASIC PRINCIPLES OF AQUACULTURE

Time : 3 Hrs.

Max. Marks : 60

SECTION - I

I. Answer any TWO of the following. Draw labelled diagrams wherever necessary. 2 x 5 = 10 M

ఈ క్రింది వారిలో ఏదైనా రెండు ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

1. Concept of Blue Revolution - నీలి విప్లవ భావన
2. General concept of Ecology - ఇకాలజి సాధారణ భావన
3. Classification of Ponds - చెరువుల వర్గీకరణ
4. Water Resources - నీటి వనరులు
5. Eradication of predators - పరభక్షకాల తొలగింపు

SECTION - II

II. Answer ALL the following. Draw labelled diagrams wherever necessary. 5 x 10 = 50 M

ఈ క్రింది అన్ని ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

6. (a). Write an essay on the scope of Aquaculture at global level.

విశ్వ వ్యాప్త ఆక్వాకల్చర్ భావన గురించి ఒక వ్యాసం వ్రాయుము.

(OR)

- (b). Describe the different types of Aquaculture systems.

వివిధ రకాల ఆక్వాకల్చర్ వ్యవస్థలను గురించి వివరింపుము.

7. (a). Explain the lentic and lotic systems.

ప్రవాహ మరియు స్థిర జల ప్రసరణ వ్యవస్థలను వివరింపుము.

(OR)

- (b). Describe the importance of Plankton and Benthos in culture ponds.

చేపల చెరువులలో ప్లాంకటన్ మరియు బెంథోస్ ప్రాముఖ్యతను వివరింపుము.

8. (a). Write an essay on the stocking and production ponds.

నిలువ మరియు ఉత్పాదక చెరువులను గురించి ఒక వ్యాసం వ్రాయుము.

(OR)

(b). Describe the Hatchery design and management.

హేచరీ నిర్మాణం మరియు యాజమాన్యం గురించి వివరింపుము.

9. (a). Give an account of the important factors in the construction of ideal pond.

చేపల చెరువు నిర్మాణంలో ప్రాముఖ్యత వహించే కారకాలను గురించి వ్రాయుము.

(OR)

(b). Describe the lay out of the fish farm.

చేపల చెరువు నిర్మాణమును వివరింపుము (లేఅవుట్)

10. (a). Write an essay on the need of fertilizers in culture pond.

చేపల పెంపకాలలో ఎరువుల అవశ్యకత గురించి ఒక వ్యాసం వ్రాయుము.

(OR)

(b). Describe the different types of fertilizers in culture pond.

చేపల చెరువులలో వినియోగించే వివిధ రకాల ఎరువులను గురించి వివరింపుము.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY PRACTICAL SEMESTER - I

CLUSTER ELECTIVE PAPER : I

PRACTICAL SYLLABUS

BASIC PRINCIPLES OF AQUACULTURE

Periods : 24 Hours

Max. Marks : 50

PRACTICALS :

1. Estimation of Carbonates, Bicarbonates in water samples.
2. Estimation of Chlorides in water samples.
3. Estimation of dissolved oxygen
4. Estimation of ammonia in water.
5. Field Visit to Nursery, Rearing and stocking ponds of aqua farms
6. Field Visit to Hatchery
7. Study of algal blooms and their control.
8. Collection & Identification of Zooplankton and Phytoplankton.
9. Study of aeration devices.
10. Determination of soil nitrogen and phosphorus.
11. Collection and study of aquatic weeds.
12. Field survey of nearby habitat for dietary dependency on and requirement of aqua products.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY PRACTICAL SEMESTER

CLUSTER ELECTIVE PAPER : I

PRACTICAL SYLLABUS MODEL PAPER

BASIC PRINCIPLES OF AQUACULTURE

Time : 3 Hrs.

Max. Marks : 50

-
1. Estimation of Carbonates, Bicarbonates in given water samples. 1 x 10 = 10 M
 2. Identify the following and draw the labelled diagrams and write notes on Zoo-phyto planktons. 5 x 4 = 20 M
 - (A).
 - (B).
 - (C).
 - (D).
 - (E).
 3. Identify the following and draw the labelled diagrams and write notes on Zoo-phyto planktons. 2 x 2½ = 5 M
 - (A).
 - (B).
 4. Field Book. 1 x 5 = 5 M
 5. Practical Record. 1 x 10 = 10 M



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

AQUACULTURE TECHNOLOGY COURSE SYLLABUS

SEMESTER - II : PAPER - II

BIOLOGY OF FIN FISH & SHELL FISH

Periods : 60

Max. Marks : 100

UNIT - I : GENERAL CHARACTERS & CLASSIFICATION OF CULTIVABLE FIN & SHELL FISH

- 1.1 General characters and classification of fishes, crustaceans and molluscs up to the level of class.
- 1.2 Fish, Crustaceans and Molluscs of commercial importance.
- 1.3 Sense organs of fishes, crustaceans and molluscs.
- 1.4 Specialized organs in fishes - electric organ, venom and toxins.

UNIT - II : FOOD, FEEDING AND GROWTH

- 2.1 Natural fish food, feeding habits, feeding intensity, stimuli for feeding, utilization of food, gut content analysis, structural modifications in relation to feeding habits, forage ratio and food selectivity index.
- 2.2 Principles of Age and growth determination ; growth regulation, growth rate measurement - Scale method, otolith method, skeletal parts as age indicators.
- 2.3 Genetic, biotic & ecological factors in determining the longevity of fishes, length - frequency method, age composition, age-length keys, absolute and specific growth, back calculation of length and growth, annual survival rate, asymptomatic length, fitting of growth curve.

UNIT - III : REPRODUCTIVE BIOLOGY

- 3.1 Breeding in fishes, breeding places, breeding habits & places, breeding in natural environment and in artificial ponds, courtship and reproductive cycles.
- 3.2 Induced breeding in fishes.
- 3.3 Breeding in shrimp, oysters, mussels, clams, pearl oyster, pila, freshwater mussel and cephalopods.

UNIT - IV : DEVELOPMENT

- 4.1 Parental care in fishes, ovo-viviparity, oviparity, viviparity, nest building and brooding
- 4.2 Embryonic and larval development of fishes.
- 4.3 Embryonic and larval development of shrimp, crabs and molluscs of commercial importance.

UNIT - V : HORMONES & GROWTH

- 5.1 Endocrine system in fishes
- 5.2 Neurosecretory cells, androgenic gland, ovary, Y-organ, chromatophores, pericardial glands and cuticle.
- 5.3 Molting, molting stages, metamorphosis in crustacean shell fish.

Additional Inputs :

- 1). Buoyancy in fishes - Swim bladder and mechanism of gas secretion.
- 2). Length - weight relationship, condition factor / Ponderal index, relative condition factor.
- 3). Environmental factors affecting reproduction and development of cultivable aquatic fin & shell fish.

BLUE PRINT

Unit	Essay	Short
I	2	1
II	2	1
III	2	1
IV	2	1
V	2	1



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY - AQUACULTURE TECHNOLOGY COURSE SYLLABUS

SEMESTER - II : PAPER - II

Theory Model Question Paper

BIOLOGY OF FIN-FISH AND SHELL FISH

Time : 3 Hrs.

Max. Marks : 60

SECTION - I

I. Answer any TWO of the following. Draw labelled diagrams wherever necessary. 2 x 5 = 10 M

ఈ క్రింది వానిలో ఏదైనా రెండు ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

1. Commercial importance of Mollusca - మలస్కా - ఆర్థిక ప్రాముఖ్యత
2. Natural fish food - చేపల సహజ ఆహారం
3. Breeding Habits - ప్రజనన ఆవాసాలు
4. Viviparity - శిశుత్వాదన
5. Moulting - కుబుస విసర్జన

SECTION - II

II. Answer ALL the following. Draw labelled diagrams wherever necessary. 5 x 10 = 50 M

ఈ క్రింది అన్ని ప్రశ్నలకు సమాధానాలు వ్రాయుము. అవసరమైనచోట భాగాలతో కూడిన పటములు గీయుము.

6. (a). Describe the commercial importance of Custraceans.

కస్త్రేషియన్ ఆర్థిక ప్రాముఖ్యతను వివరింపుము.

(OR)

- (b). Explain the sense organs in fishes.

చేపలలో జ్ఞాన అవయవాలను వివరింపుము.

7. (a). Write an essay on the principles of age and growth determination.

వయసు మరియు పెరుగుదలను నిర్ణయించు ప్రాథమిక అంశాలను గురించి వ్యాసం వ్రాయుము.

(OR)

- (b). Describe the Biotic and genetic factors in determining the longevity of fishes.

చేపలకు దీర్ఘాయువును ఇచ్చుటలో బయోటిక్ - జన్యుకారకాలను గురించి వివరింపుము.

8. (a). Explain the Reproductive cycles in fishes.
చేపలలో ప్రత్యుత్పత్తి వలయాలు గురించి వివరింపుము.

(OR)

(b). Give an account of Breeding in Shrimps.
ప్రింప్ (రొయ్య)లో ప్రజననం గురించి వివరింపుము.

9. (a). Describe the parental care in fishes.
చేపలలో సంతాన పాలనను గురించి వివరింపుము.

(OR)

(b). Explain the Nevearsecretory cells and functions.
నాడీ అంతఃశ్రావకాలు మరియు విధులను వివరింపుము.

10. (a). Describe the endocrinic system in fishes.
చేపలలో అంతఃశ్రావక వ్యవస్థను గురించి వివరింపుము.

(OR)

(b). Explain the commercial importance of Crabs.
పీతల ఆర్థిక ప్రాముఖ్యతను గురించి వివరింపుము.



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY PRACTICAL SEMESTER - II

CLUSTER ELECTIVE PAPER : II

PRACTICAL SYLLABUS

BIOLOGY OF FIN-FISH AND SHELL FISH

Periods : 24 Hrs.

Max. Marks : 50

PRACTICALS :

1. Study of mouth parts in herbivorous and carnivorous fishes.
2. Comparative study of digestive system of herbivorous and carnivorous fishes.
3. Length - weight relationship of fishes.
4. Gut content analysis in fishes and shrimp.
5. Mouth parts and appendages of cultivable prawns, shrimps and other crustaceans.
6. Study of eggs of fishes, shrimps, prawns and other crustaceans.
7. Study of oyster eggs
8. Embryonic and larval development of fish.
9. Study of gonadal maturity and fecundity in fishes and shellfish.
10. Observation of crustacean larvae
11. Observation of molluscan larvae.
12. Study of nest building and brooding of fishes.

GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

AQUACULTURE TECHNOLOGY COURSE SYLLABUS

SEMESTER - II : PAPER - II

PRACTICAL SYLLABUS MODEL PAPER

BIOLOGY OF FIN FISH & SHELL FISH

Time : 3 Hrs.

Max. Marks : 50

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1. **Identify the nature of food habits of given fish by observing contents in the gut.**
Herbivorous / Carnivorous / Omnivorous **1 x 10 = 10 M**
 2. **Mounting in prawn. (Prawn appendages)** **1 x 5 = 5 M**
 3. **Write about study of eggs fishes** **1 x 10 = 10 M**
 - Shimps, prawns
 - Embryonic development of fish and larval forms.
 - Gradual maturity.
 4. **Identify the following and draw the labelled diagrams and write notes on** **3 x 5 = 15 M**
 - (A).
 - (B).
 - (C).
 5. **Practical Record.** **1 x 10 = 10 M**



GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

ZOOLOGY PRACTICAL SEMESTER - II : 2018 - 2019

CLUSTER ELECTIVE PAPER : II

PRACTICAL SYLLABUS MODEL PAPER

BIOLOGY OF FIN-FISH AND SHELL FISH

Time : 3 Hrs.

Max. Marks : 50

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| 1. | Study of mouth parts in Herbevorous and carnivorous fishes. | 2 x 5 = 10 M |
| 2. | Comparative study of digestive systems of Herbivorous and Carnivorous fishes. | 2 x 10 = 20 M |
| 3. | Appendages of Prawns. | 1 x 5 = 5 M |
| 4. | Observation of Larvae | 2 x 2½ = 5 M |
| 5. | Practical Record. | 1 x 10 = 10 M |

