KUVEMPU UNIVERSITY

Prof. Nagarana Chairman BOS (UG) Department of P.G. Studies & Research in Applied Zoology, Shankaraghatta-577451

PROCEEDINGS OF THE BOS (UG) IN ZOOLOGY

Proceedings of the BOS (U.G) Zoology held on 25-01-2019 at 02.00 PM. The BoS Chairman welcomed all the members to the meeting.

Agenda:

1) Revision of IIIrd and IVth Semester syllabus of B.Sc., Zoology.

The syllabus of IIIrd and IVth Semester B.Sc., Zoology was discussed in length and resolved to be implemented from the academic year 2019-20. It was resolved to revise the syllabus of the Vth and VIth semesters, to be placed in the next BoS Meeting.

2) Minor corrections if any in Ist and IInd Semester syllabus. Minor Corrections were made in the Ist and IInd Semester syllabus.

Finally, the Chairman (BoS) thanked the members and concluded the BoS meeting.

Signature of the Members:

1. Dr. Ganapathi K Nayak

: Member Member

2. Dr. Meenakumari D.

: Member

3. Dr. K. L. Naik

: Member

: Chairman



4. Prof. Nagaraja

Member Absent:

- 1. Dr. Geetha Samak
- 2. Dr. Somashekar D. S

Chairman (BOS)

P.G. Dept of Applied Zoology Kuvempu University

Snarikargnatta-577-451

II B.Sc. DEGREE SEMESTER SYLLABUS

Theory: Paper III: Ecology, Ethology and Biodiversity (60 Hrs)

This paper deals with ecological components and systems, social organization of animals and diversity of animals. You will understand the principles, various processes and factors pertaining to ecosystem. In addition, you will understand the diversity of animals, their distribution and status with reference to India, and the behaviour of animals, their social organization, etc.

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1		Concepts of Ecology & Environment: Definition-Environment, Ecology & Ecosystem;	8	
		Environmental concepts - Atmosphere, Hydrosphere, Lithosphere & Biosphere,		
		Environmental factors - Abiotic factors (Climate & Edaphic) & Biotic factors. Ecosystem :		
Concept, components, properties and functions;				
	Ecosystem Processes - Energy flow in ecosystem and laws of thermodynamics, primary			
		productivity, Biomass and productivity measurement, food chain, food web & ecological		
	1	pyramids.		
2	2	Animal relationships: Mutualism; commensalisms; parasitism; ammensalism; predation and	4	
		competition with relevant examples		
3		Community ecology: community structure; ecological determinants; ecological	3	
		stratification; ecotone and edge effect; ecological niches; concepts eciological succession;		
		climax community		
4		Limiting Factors- b sic concepts- Leibig's law of minimum, Shelford's law of tolerance,	2	
		combined concept of limiting factors, Light and temperature as limiting factors.		
5	,	Habitat Ecology: Marine habitat with zonation of sea; fresh water habitat: Lentic and Lotic	4	
	-	systems; Terrestrial habitat - a brief account of forest and desert biomes; ecological adaptation		
L		of water and desert animals.		
6	,	Population ecology: Properties of population- density, natality, mortality, age,	4	
		distribution, biotic - Potential- Allee's principle and Gause's principle,		
		environmental resistance and carrying capacity, population growth forms, J and S		
		shaped curves, emigration, immigration and migration, population fluctuation.		
7	7	Environmental toxicology: Definition, scope and importance, Toxicants, Toxicity, LC50,	4	
		LD50, classification of toxic agents. Biomagnification, Green house effects and global		
		warming, sewage and sewage treatment.		
8	3	Ecosystem monitoring - GIS (Geographic information system), role of remote sensing in	3	
		ecology, (Global positioning system) GPS and its application and Ecosystem Modeling (Brief		
		account only).		
9)	ETHOLOGY -Types of animal behavior with examples: Innate behavior - reflexes, instinct,	4	
		motivation; Learning behavior - habituation, imprinting, conditioned reflexes, insight learning;		
L		Aggression and territoriality. Pheromones and behavior.		
41	0	Social organization in animals: Honeybee (with communication),- Termites, Macaques and	3	
		Elephant.		
1	1	Animal migration :	5	
		A) Migration in fishes - types, Anadromous and catadromous migration with salmon and		
1		Eel as examples.		
		B) Migration in birds - Types/pattern, Methods of study, advantages, mechanics,		
		preparation, orientation and navigation.		
1	2	Courtship behavior: General principle, courtships of Three spined stickle back fish, Betta	2	
-		splendens, Frog, Peacock.	La	
1	13	Parental care and Nesting behavior	2	
		Parental care: In fishes - Hippocampus & Arius		
		In amphibians - Ichthyophis & Rhacophorus		
		In birds - Jacana & Penguin.		
		Nesting behavior - in Waver bird, bower bird & tailor bird		

	7,3		
F	14	Biological clock: Its nature, types and significance. Chronobiology in human health and	
	15	BIODIVERSITY: Levels of biodiversity — genetic, species, ecosystem level; number of species in different groups of animals — global, and India, Values of Biodiversity & Biodiversity hotspot-Western Ghats. Threats to Biodiversity, Man-wild life conflict, Biodiversity conservation and management: Conservation strategies: in situ; ex-situ,	10
		National parks, Sanctuaries and Biosphere reserves. Wild the conservation with the Protection Act, 1972, Role of Government and Non-Governmental organizations in wild life	
		International efforts: Convention on Biological Diversity (CBD), International Union for Conservation of Nature and Natural Resources (IUCN), Convention for International Trade of endangered species, RAMSAR, Red data book, & endangered fauna of India.	
	T.	III semester Practicals Ecology, Ethology and Biodiversity: Practical- 3 (15 practicals of 3 Hrs each)	
		9 practical	S
		Ecology: 1. pH of water samples	
		2 pH of soil samples	
		2 Estimation of dissolved CO ₂ of water samples	
		4 Estimation of dissolved O ₂ of water samples (Winkler's method)	
		5. Estimation of dissolved chlorides of water samples	
		6. Visit to a pond for the study of ecosystem: Collection and observation of planktons	
		and consumers 7. Estimation of total hardness in water samples	
		2 practica	le le
		1/4 0 0 0 0 0 0 1	.15
		 Ethology Eel, Ichthyophis, Male Hippocampus, Rhacophorus, termites and honey bee. Nesting patterns of Baya, Weaver bird and Tailor bird 	
		Biodiversity: 3 practice	ıls
		1 Endangered fauna of India- Slendur loris, Pangolin, Python, Great Indian Bustard,	
		Varanus, Gharial, Horn bill, Musk deer and Green Sea Turtle.	
		2. Visit to wildlife sanctuary/safari/Nature camp	
		III semester Practical - 3	
		Scheme of Practical Examination	

Q 1. Identify and comment on the given specimens A, B and C.

Q 4. Find the pH of the soil/water samples F and G.

Q 5. Identify and comment on H. (From Ecosystem)

Q 2. Identify and comment on the specimens D and E (from Ethology)

Q 3. Estimate the quantity of dissolved CO2/O2/Cl2 / Total Hardness in the

Duration: 3 Hours

Q 7. Viva Voce.

Q 8. Class records

(from Biodiversity)

provided sample.

Q 6. Submission of field visit report.

Max. Marks: 40

3X3 = 9 marks

3X2 = 6 marks

6 marks

2 marks

2 marks

5 marks

5 marks

5 marks

Theory: Paper IV: Animal Physiology, Biochemistry and Biostatistics (60 Hrs)

This paper teaches you the physiological processes, mechanisms which control the various physiological processes, various systems organization, endocrine glands and their hormonal secretions. Fundamentals of Biomolecules and their structure and functions. In addition, you will understand the essential statistical methods used in biology.

		will understand the essential statistical methods used in biology.	2 7
1	T	Osmoregulation in animals: Types, osmoregulation in shark, marine & fresh water	2
1		1 to Longoroo rat and came	
2		at 1 in af disaction; chemical digestion and absorption of carbonydrates,	4
-	4	11: 14 harmonal control of digestion palanece diet, huminional disorders	
1		to control of the conduction o	
3		* * * * * * * * * * * * * * * * * * *	3
3		of recognization — exchange of gases unisport of on gen	
		1: Dobe affect: transport of 1 12 -Chiofide Shift, respiratory questions	
-	-	of amountation & hearts Biond - Composition and tanoutons	4
4		at the state of blood clotting annihilating, heartheat, conducting	
-		mechanism of blood clotting, disorders of blood clotting, anticoagainst system and pace maker, control of cardiac activity, electrocardiogram, angiogram,	
-		Excretion: Nitrogen Excretion in animals, Ammonotelism, Ureotelism, Uricotelism,	3
2	5	Guanotelism; Vertebrate Kidney - Function and regulation of vertebrate kidney; osmotic	
-		and Ionic Regulation. Nervous System: Nerve Cells; Types, Structure of Multipolar neuro'ns; Nerve Impulse; Nervous System: Nerve Cells; Types, Structure of Multipolar neuro'ns; Nerve Impulse;	7
1		Membrane Potential; Action Potential, Conduction of nerve impulse; Synaptic Transmission,	
1		Year Manuadagoparative disorder : AlZhenners discases.	
1		Human endocrine glands - pituitary, thyroid, parathyroid, pancreas, adrenal, testes, ovaries and	1
		placenta; hypothalamus and its stimulatory and inhibitory effects; effects of hypo and	
		1 of regions hormones in human	
		Muscle physiology: types of muscles, ultra structure of Vertebrate Skeletal Muscles,	4
-1	7	Muscle physiology: types of muscles, and buscles, and	10
		Mechanism and control of Muscle Contraction. Properties of muscles: Twitch, Tetanus, tone summation, all-or-none principle and muscle	
		fatigue. Thermoregulation in animals: Effects of temperature, Acclimation and Acclimatisation; Libermoregulation and daily	3
	8	Thermoregulation in animals: Effects of temperature, Hibernation, Aestivation, and daily Temperature Regulation in Poikilotherms and Homeotherms; Hibernation, Aestivation, and daily	
	, -1	torpor, Behavioural and Physiological Adjustments: Heat Production, Heat Loss, Heat Exchangers,	
		torpor, Benavioural and Physiological Acquisitions. Their and the second	
		Regulatory Mechanisms. Sense organs: Classification of sense organs; structure and physiology of ear; eye of mammal;	3
	9	The state of the s	10
-	10	BIOCHEMISTRY: Carbonydrates: Studente and Bloogled Important Construction of the Biocharides, Ploysaccharides and Glycoconjugates. Glycolysis, Kreb's Cycle, ETS, Gluconeogenesis.	
	6		
	4	Glycogenesis. Lipids: classification and biological importance of saturated and unsaturated fatty acids, Tri-acylglycerols,	
4		Lipids: classification and blological importance of statement and statem	- 11
		Phospholipids, Glycolipids, Steroids. Proteins: Amino acids: Types and Biological importance of amino acids. Proteins: structure	
		(Pri., Sec., ter., and quat.,) and Biological importance with examples, fibrous and globular	
		proteins. Enzymes: Definition, Classification (IUB system); Mechanism of enzyme action; Enzymes: Definition, Classification (IUB system); Mechanism of enzyme action;	- 4
	1	the state of enzyme action. Enzyme kinches, I actors differences	
		rate of enzyme-catalyzed reactions; Derivation of Michaelis-Menten equation, Concept of	
		Km and Vmax, enzyme inhibitors; A brief account of coenzymes cofactors; clinical	
	18	Km and vmax, enzyme minomora, A orier toodate of	
	1	importance of enzymes Vitamins: Definition, Classification and Bilogical importance and deficiency Symptoms.	2
	1	1 · II · I offenbrito: Comming the line of	11
		BIOSTATISTICS: Introduction, Variable and authorite, Sampling medices. Quantitative sample, Random sample, Non random samples.	
		sample. Quantitative sample, Kandom sample, Non random sample.	
		Arrangement of data; Frequency distribution.	

Graphical presentation of data: Line diagram; Bar diagram; Pie d

Measures of dispersion: Variance; Standard deviation; Standard error of mean. Testing of hypothesis: Null hypothesis, Level of significance, Probability, Normal distribution, Error of inference, Student's t-test, Chi (x2)-square test. Ethics in science: (brief account), publications and patents, plagiarism.

IV semester : Practicals- Paper 4: Physiology, Biochemistry and Biostatistics 15 practicals of 3 Hours each.

Physiology:

, ,		2 practicals
1.	Total RBC count	
2	Total WBC count	1 practical
	Differential count of WBC	1 practical
	Estimation of Hb	1 practical
5.	Estimation of bleeding and clotting time	1 practical
	Preparation of Haemin crystals	1 practical
	Estimation of protein by colorimetric test	1 practical
	Sense organs: Structure of Ear and Eye of Mammals	1 practical

Biochemistry:

1 practical 9. Qualitative detection of following;

> Glucose-Benedict's test Starch - Iodine test Proteins - Biuret test

1 practical 10. Qualitative detection of Nitrogenous wastes;

> Ammonia - Nessler's reagent test Urea - Specific Urease test Uric acid - Follin's uric acid reagent test Creatinine - Jaffe's test

Biostatistics:

1 practical 11. Construction of graphs using the given data-Histogram, Bar diagram, Pie diagram and Line diagram.

1 practical 12. Measuring central tendency using the given data.

Mean, Mode and Median

13. Tests of Hypothesis: Student's t test and Chi(x²) square test.

1 practical

Practical - 4: Scheme of the practical examination

Max. Marks: 40 Duration: 3 Hours

Q 1. Conduct the major physiology experiment and report. 8 marks (RBC, WBC count, Differential count and Protein estimation by lot). Requirement-1, Procedure-3, Observation and report -4 marks

Q 2. Conduct the minor physiology experiment and report. (Haemoglobin, clotting and bleeding time, Haemin crystals by lot) Requirement-1, procedure-2, Observation and report-1 marks

4 marks

Q 3. Conduct qualitative detection test for 3 marks (proteins starch glucose) Q 4. Conduct qualitative detection test for......
(Ammonia, Urea, Uric acid and Creatinine) 3 marks Q 5. Identify and comment on A 4 marks (Ear and Eye of Mammals) Labelled diagram - 2, comments- 2 marks Q 6. Biostatistics: a). Construct a graph using the given data 4 marks (Line/Bar/Pie/Histogram) b) Tests of Hypothesis/Measure of central tendency. 4 marks Q 7. Via voce. 5 marks Q 8. Class records. 5 marks.

B.Sc. DEGREE SEMESTER SYLLABUS (Effective from 2018-19 onwards)

	Theory			Practical			
Year	Sem	Paper	Title	Teaching Hrs	Paper	Title	Teaching Hrs
I	î	1	Diversity and Functional Anatomy of Non- Chordates	60 hrs	1	Diversity and Functional Anatomy of Non- Chordates	15 x3 = 45hrs
	2	2	Diversity and Functional Anatomy of Chordates	60 hrs	2	Diversity and Functional Anatomy of Chordates	15 x3 = 45hrs
11	3	3	Ecology, Ethology and Biodiversity	60 hrs	3	Ecology, Ethology and Biodiversity	15 x3 = 45hrs
	4	4	Animal Physiology, Biochemistry and Biostatistics	60 hrs	4	Animal Physiology, Biochemistry and Biostatistics	15 x3 = 45hrs
III	5	5	Cell Biology, Microbiology and Immunology	45 hrs	5	Cell Biology, Microbiology and Immunology	15 x3 = 45hrs
		6	AppliedZoology, Histology and Biotechniques	45 hrs	6	AppliedZoology, Histology and Biotechniques	15 x3 = 45hrs
	6 .	7	Genetics, Molecular Biology and Evolution	45 hrs	7	Genetics, Molecular Biology and Evolution	15 x3 = 45hrs
		8	Developmental Biology and Animal Biotechnology	45 hrs	8	Developmental Biology and Animal Biotechnology	15 x3 = 45hrs

Teaching hours: I & II year 4 hours theory and 3 hrs Practical / week. III year 3+3=6 hrs theory and 3+3=6 hours Practical / week.

I SEMESTER

Theory: Paper 1: Diversity and Functional Anatomy of Non-Chordates

(60HRS.)

This paper deals with the diversity of Non-chordates. This paper will help students to understand the diversity of various species among non-chordates including organization of animal body architecture principles of classification, general characteristics of different phyla along with specific type study.

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		Hrs
1	Introduction	7.
	Animal Architecture: i) Body symmetry- types spherical symmetry, radial symmetry,	
	biradial symmetry and bilateral symmetry. ii) Organization- the hierarchical organization of	
	protoplasmic level, cellular level, tissue level and organ level of organization. iii)Germ layers-	
	diploblastic and triploblastic condition. iv) Coelom- origin and types- acoelom, pseudocoelom,	
	eucoelom (enterocoelom and schizocoelom). v) Metamerism- types – pseudometamerism, true	
m	metamerism, vi) Cephalization.	
	Principles of animal classification: An outline classification of Animal kingdom.	
9	- binomial nomenclature; international rules of Zoological nomenclature (brief account);	
1	New trends in systematics: Numerical taxonomy (Phenetics), Cladistics (Phylogenetic systematics), Molecular systematics.	
2		
1 5	Phylum Protozoa: General characters, classification of the phylum up to classes with	6
4	examples. Type study – structure, life history and pathogenicity of Plasmodium vivax	
1	Locomotion in Protozoa: Locomotory organelles and modes of locomotion, Reproduction in Protozoa	
3		
-	Phylum Porifera: General characters, classification of the phylum up to classes with examples.	5
	General study –Cell types, skeleton, canal system (Asconoid, Syconoid, Leuconoid and Rhagonoid types). Reproduction in sponges.	gradien.
4	Origin of Metazoa: Blocton and Contract theories and IV. 1. 17. 1	
5	Origin of Metazoa: Blastea and Gastrea theories and Hadzi's theory	2
3	Phylum Coelenterata: General characters, classification of the phylum up to classes with	4
4 9	examples. Type study - Obelia- Morphology & Life history.	
	Coral and Coral reefs, types and importance of coral reefs. Polymorphism in coelenterata	
6	Phylum Platyhelmithes: General characters, classification of the phylum up to classes with	4
	examples.	
	Type study- Taenia solium - Structure, reproduction, life cycle and pathogenesis. Parasitic	
7	adaptations in neimintnes.	
1	Phylum Nemathelminthes: General characters, classification up to classes with	3
	examples. Pathogenicity of Ascaris & Wuchereria	
8	Role of Turbatrix aceti (vinegar eels) and Brachionus.	
0	Phylum Annelida: General characters, classification up to classes with examples.	3
- 0	Type study – Hirudinaria granulosa – Morphology, Excretory, digestive and reproductive systems.	
9	Phylum Arthropoda: General characters, classification up to classes with examples.	10
	Type study - Penaeus - appendages, concept of serial homology, digestive system, parvous	
	system and Crustacean larvae: Nauplius, Zoea, cypris and mysis larval stages.	(2)
	web building spiders, Structure and affinities of peripatus, Metamorphosis of insects, Economic	×
10	importance of insects.	
10	Phylum Mollusca: General characters, classification up to classes with examples.	9
1	Type study - Unio- structure, shell structure, Reproduction and life cycle. General study - Shells	
	in Mollusca. Torsion in Gastropoda, Diversity of Cephalopods-Nautilus, Sepia & Octopus	
11	Phylum Echinodermata: General characters, classification up to classes with	-
181	examples. Type study: Star fish- Morphology, digestive and water vascular systems.	5
	Bipinnaria and Auricularia larvae.	
12	Phylum Hemichordata: General characters Type study: Balanoglossus – Morphology and Affinities	2
	of Hemichordata	2

I SEMESTER Practicals

PAPER I: DIVERSITY AND FUNCTIONAL ANATOMY OF NON-CHORDATES

(15 Practicals of 3 hrs. each = 45 hrs).

I		Title	Pt		
+	1		60		
	ı	Introduction to practicals- Microscopy-Laboratory handling of Compound & dissection microscope and stereoscopic microscopes.	1		
	2	Protozoa: Study of permanent slides – Study of Entamoeba, Euglena, Noctiluca, Blantidium, and Elphidium Temporary slide preparation and observation of protozoan	2		
		culture.(Amoeba, Euglena, Paramecium, vorticella, stentor) and soil protozoans			
	3	Porifera: Specimen study: Sycon, , Hyalonema, Spongilla. Permanent slides: spicules and gemmule. Temporary slide preparation and observation of spicules	1		
	3	Coelenterata Specimen study: Physalia, Aurelia, Gorgonia, Fungia, Metridium	1		
		Permanent slides: study of T.S. of Hydra, Obelia colony,			
	4	Platyhelminthes & Nemathelminthes Specimen study - Planaria, Fasciola hepatica, Taenia]		
	solium, Schistosoma				
		Ascaris lumbricoides, Ancylostoma duodenale . T.S of Ascaris			
	5	Annelida Specimen study:Pheritema, Nereis, Sabella, Aphrodite, Hirudinaria granulose.			
	6	Arthropoda Specimen study: Penaeus, Sacculina, Scolopendra, Scorpion, Aranea, Lepisma, Gryllotalpa, Carausius, butterfly, Rhinoceros beetle, Cimex hemipterus (bed bug), wasp. Permanent slides: Mouth parts cockroach& Mosquito	2		
	7	Mollusca Specimen study: Chiton, Dentalium, Cypraea, Conus, Limnaea, Mytilus, Unio, Sepia, Octopus, Permanent slides: Glochidum larva, Shells of Xancus, cyprea, scallop, Nautilus and Cuttle bone.	2		
	8	Echinodermata Specimen study: Astropecten, Ophiothrix, Echinus, cucumaria, Antedon, Slides of Bipinnaria& Echinopluteus larvae, Aristotle lantern, Pedicellaria Hemichordata – Balanoglaossus, Slide of Tornaria larva	2		
	9	Demonstration of animations /model/pictures	2		
		Leech-Digestive &reproductive system			
1		Penaeusnervous system			
1	-4	Cockroach -digestive & reproductive system			
		Mountings- Appendages of prawn, Mouth parts of Cockroach, mosquito, honey bee, Spiracles of cockroach(dead commercially available specimens)			

SCHEME OF PRACTICAL EXAMINATION

QII

Duration: 3hrs.

Identify, classify and comment with labeled diagram of C, DE,F&G...3x5=15marks (Identification 1/2 mark; classification 1/2 mark; Labeled diagram 1 mark, Description 1 mark specimens& slides)

Note: Certified assignment/field study report and practical record submission by the student at the time o practical exam is mandatory.

II SEMESILA

Theory: Paper 2: Diversity and Functional Anatomy of Chordates (60 Hours)

This paper deals with the diversity and anatomy of Chordates. This will help students to understand the diversity of various species among chordates. Students will learn general characteristics of different phyla from Protochordates to Manunalia along with specific type characteristics of deals with comparative anatomy of vertebrates, and paleontological and evolutionary aspects.

		Hrs
1	is in of chardates	3
-	Introduction: General characters of Chordates, classification up to classes, origin of chordates	
1	(Combined theory, E.J.W. Barrington (1965)) (Combined theory, E.J.W. Barrington (1965))	4
1	(Combined theory, E.J.W. Barrington (1965)) (Combined theory, E.J.W. Barrington (1965)) Protochordates: General characters of Sub-phylum Urochordata – Morphology of Ascidia, Ascidian Protochordates: General characters of Sub-phylum Urochordata – Morphology of Ascidia, Ascidian	
10	Protochordates: General characters of pharvnx	deg I
	tadpole and retrogressive metamorphosis. tadpole and retrogressive metamorphosis. Control phylum Cephalochordata – Amphioxus – Morphology, Structure of pharynx	
	Distinctive features of Sub-phytum Cephalocolor	2
1	and feeding mechanism in brunchiostems ap	2
	and feeding mechanism in Branchiostoma sp. Subphylum Vertebrata: Division Agnatha – distinctive characters and classification upto classes. Cyclostomata – Petromyzon, Myxine general organization, Ammocoete larva and its significance.	
	C -1 - stomata Peliculty/IIII, IVIVANIA DT	
	Cyclostomata - I chomy 25-1, Cyclostomata - I	8
-	Gnathostomata – General characters of PISCES, Chondrichthyes and Osteichthyes. Classification up to	
5	Gnathostomata - General Circulatory system, Central	Har
	Classes. Type study: Scoliodon-Morphology, Digestive system, Respiratory system, Circulatory system, Central	
	nervous system & Urinogenital system	
	nervous system & Urinogenital system General study- Accessory respiratory structure in teleosts, Salient features of Dipnoi fishes.	A
1	General study- Accessory respiratory	5
A	Class Amphibia: General characters and classification of living Amphibians upto orders, with suitable	AFR S
4	Class Amphibia: General characters and classification of living Amphibians upto cross, where the characters are classification of living Amphibians upto cross, which is considered to a constant of the const	
	examples. Paedomorphosis with special reference to the special referenc	
	Ghats-Nyetibatrachusechasikabatrachus, 512	5
	is at its artist up to order level.	
5	Class Reptilia -General features and Classification of temporal fossae.	
	Spake venom, Poison apparatus of shakes	8
	the section teatures ()	100
6	Class Aves – General characters and classification up to subclasses; distinctive features of Archaeornithes and Neornithes with reference to Paleognathae, Impennae and Neognathae with suitable Archaeornithes and Neornithes wetland and shore birds; adaptation to flight.	ALT
7.00	Archaeomithes and Neomithes with reference to Paleognation, adaptation to flight	
	examples: a brief account of forest, we have	
	Dook and feet modifications in bilds	9
7	Cum Microsofia: - general characters and classification in Distinctive features of	
10	Distinctive features and distribution of Prototheria, Metatheria & Butheria, Distinctive features and distribution of Prototheria, Metatheria & Butheria, Distinctive features and distribution of Prototheria, Metatheria & Butheria, Distinctive features and distribution of Prototheria, Metatheria & Butheria, Distinctive features and distribution of Prototheria, Metatheria & Butheria, Distinctive features and distribution of Prototheria, Metatheria & Butheria, Distinctive features and distribution of Prototheria, Metatheria & Butheria, Distinctive features and distribution of Prototheria, Metatheria & Butheria, Distinctive features and distribution of Prototheria, Metatheria & Butheria, Distinctive features and distribution of Prototheria, Metatheria & Butheria, Distinctive features and distribution of Prototheria, Caracteria, Protoscidia, Ungulata – Perissodactyla mammalian orders (Rodentia, Carnivora, Chiroptera, Cetacea, Proboscidia, Ungulata – Perissodactyla mammalian orders (Rodentia, Carnivora, Chiroptera, Cetacea, Proboscidia, Ungulata – Perissodactyla mammalian orders (Rodentia, Carnivora, Chiroptera, Cetacea, Proboscidia, Ungulata – Perissodactyla mammalian orders (Rodentia, Carnivora, Chiroptera, Cetacea, Proboscidia, Ungulata – Perissodactyla mammalian orders (Rodentia, Carnivora, Chiroptera, Cetacea, Platvrhini and Catarhini) with examples.	
	Distinctive location orders (Rodentia, Carnivora, Chiroptera, Cetacea, Floodsciola, Ongolica orders (Rodentia, Carnivora, Chiroptera, Cetacea, Floodsciola, Carnivora, Chiroptera, Cetacea, Floodsciola, Carnivora, Chiroptera, Cetacea, Floodsciola, Carnivora, Chiroptera, Cetacea, Chiroptera, Chiroptera, Cetacea, Chiroptera, Chiropt	
	mammalian orders (Rodentia, Carnivora, Chrioptera, Scharler, Schar	1
	and Artiodactyla, and Primates – Platyrhini and Catarnini) with examples. and Artiodactyla, and Primates – Platyrhini and Catarnini) with examples. Dentition in Mammals- Types, Dental formula of dog, cow and man, Type study – Rabbit – Dentition in Mammals- Types, Dental Nervous System, cranial nerves, urinogenital systems.	
1	Dentition in Mammals- Types, Dental formula of dog, cow and man, Type stary Dentition in Mammals- Types, Dental formula of dog, cow and man, Type stary Morphology, digestive, respiratory, Central Nervous System, cranial nerves, urinogenital systems.	
V	Morphology, algestive, respiratory,	
	8 Comparative anatomy of vertebrates: - vertebrate integument and its derivatives 8 Rain, and Kidney of Shark, frog, Lizard, Pigeon and	R
1	8 Comparative anatomy of vertebrates: - vertebrate integration and ris derivative anatomy of vertebrates: - vertebrate integration and ris derivative anatomy of vertebrates: - vertebrate integration and ris derivative anatomy of vertebrates: - vertebrate integration and ris derivative anatomy of vertebrates: - vertebrate integration and ris derivative anatomy of vertebrates: - vertebrate integration and ris derivative anatomy of vertebrates: - vertebrate integration and ris derivative anatomy of vertebrates: - vertebrate integration and ris derivative anatomy of vertebrates: - vertebrate integration and ris derivative anatomy of vertebrates: - vertebrate integration and ris derivative anatomy of vertebrates: - vertebrate integration and ris derivative anatomy of vertebrates: - vertebrate integration and ris derivative anatomy of vertebrates: - vertebrate integration and ris derivative anatomy of vertebrates: - vertebrate integration and ris derivative anatomy of vertebrates and ris	
-	Evolutionary trends in the structure of fleat g Diana,	
	Rabbit.	
	mothods of fossils.	
-	9 Paleontology: An account of fossils, dating of fossils, conservation memous of fossils. Paleontology of Dinosaurs: Tyrannosaurus, Brontosaurs, Pterosaurs, Ichthyosaurs and Archaeopteryx.	
	Throws Tyrannosaurus, I torontosaura, I toront	
	Paleontology of Dinosaurs: Tytalinosaurus,	

Practical 1 SCHEME OF PRACTICAL EXAMINATION

Duration: 3hrs. Max. marks: 40 OI i)Mounting: Make temporary preparation & comment on A..... 5marks. ii) Identify & comment on B(Microscope parts)..... 5marks. OII. Identify, classify and comment with labeled diagram of C, DE,F & G...3x5=15marks (Identification 1/2 mark; classification 1/2 mark; Labeled diagram 1 mark, Description 1 mark specimens& slides). 5marks Q III. Submission of field study report / assignment 5 marks Q IV. Viva - Voce 5marks Q V. Class records

Note: Certified assignment/field study report and practical record submission by the student at the time of practical exam is mandatory.

Practicals Paper 2: Diversity and Functional Anatomy of Chordates. (15 practicals of 3 hours each = 45 Hours).

	Title	PIS
1	Sub-phylum Urochordata – Herdmanja, Ascidian tadpole. Sub-phylum Cephalochordata – Amphioxus, T.S. of Amphioxus through Pharynx Cyclostomata – Petromyson, Myxine	1
2	Pisces – Scoliodon, Narcine, sting ray, Rhinobatus, Pristis, Hippocampus, Synaptura, Echenis, Mackerel, Anabas, Ophiocephalus, Antennarius, Dipnoi fishes Mounting & temporary slide prepareation of placoid, ctenoid, cycloid scales and Ampullae of Lorenzini.	3
3	Amphibia – Ichthyophis, Bufo, Ambystoma and Axolotl Larva, Necturus, Alytes, Nasikabatrachus sahyadrensis.	1
4	4 Reptelia – Bungarus, Calotes, Chameleon, Draco, Naja naja, viper, Hydrophis, Python, Green snake, Hemidactylus, Alligator, Chelone mydas, Sphenodon, Phrynosoma. Fossil models- Tyrannosaurus, Brontosaurs, Pterosaurs, Ichthyosaurs and Archaeopteryx	
5	Aves –Owl, Penguin, Ostrich, Wood pecker, Duck, Kingfisher, Pigeon, Gypus bengalensis (Bengal vulture), Psittacula (parrot), Mulus migrans (black winged kite), Bubulcus ibis.	2
6	Mammalia: Echidna, Ornithorhynchus, Macropus, Whale, Dolphin, Pteropus, Loris, Porcupine Macaca mulatta, Funambulus palmarum, Rhinoceros, Axis axis.	2
7	Comparative Anatomy of Vertebrates by Models – Heart & Brain of Shark, Frog, Pigeon and Rabbit	1
8	and the second state of th	1
9	Demonstration of systems by animations /model/pictures Rat- digestive, respiratory system and urinogenital system	1

Practical 2 SCHEME OF PRACTICAL EXAMINATION

Duration :3Hrs.	Max. Marks:40
Q I. Mounting: Make temporary preparation & comment on A (scales/ampullae	of lorenzini) 05
Q. II. Demonstrate B(system/bone)	05
QIII. Identify, classify and comment with labeled diagram of C, D, E, F & G (Identification 1/2 mark; classification 1/2 mark; Labeled diagram 1 mark, Description 1 mark. 3 specimens, 1 comparative anatomy and 1 from Pale	
Q IV. Submission of Field study report/Assignment	05marks
Q V. Viva–Voce	05marks
Q VI. Class records	05marks
Note: Certified assignment/field study report and practical record submission practical exam is mandatory.	on by the student at the time of
Theory Question paper pattern I semester B.Sc., degree examination May/Nov 201- Semester scheme Zoology Paper 1: Diversity and Functional Anatomy of Non-Chord Time :3Hrs. Instructions to the candidates:	IVIAA, IVIAINS
Instructions to the candidates: 1. Objective type question should be answered in the first two pages 2. Draw labeled diagrams wherever necessary	of the answer book
 I. Answer any FIVE of the following questions 1. 2. 3. 4. 5. 6. 7. 	5x2=10 marks
II. Explain briefly any FOUR of the following: 8 9 10 11 12 13	4x5=20 marks
III. Answer any TWO of the following 14 15 16	2x10=20marks