

Amended Fresh New Syllabus

No. 6-38/2005(FLS)-HPU(Acad.)
Himachal Pradesh University
"Academic Branch"

Date: Shimla-5, the 20th December, 2005.

To

1. All the Principals of the college affiliated to/maintained by H.P. University (RUNNING B.SC COURSES IN COLLEGES)
2. The Dean, faculty of Life Science, H.P. University, Shimla-5.
3. The Chairman, Deptt of Bio-Sciences, (Convenor BOS UG) H.P. University, Shimla-5.
4. The Controller of Examination H.P. University, Shimla-5. With 2 spare copies.
5. The DR/AR (Exam) H.P. University, Shimla-5 With 2 spare copies.
6. The DR/AR (Evaluation/Re-Evaluation) H.P. University, Shimla-5
7. The AR (Conduct) H.P. University, Shimla-5 With 2 spare copies.
8. The AR (Secy) H.P. University, Shimla-5. With 5 spare copies.
9. The Librarian, Main University Library ICDEOL Library, H.P. University, Shimla-5. With 2 spare copies.
10. The Section Officers (B.Sc-I, II and III) Examination Branch. With 2 spare copies to each of them.
11. The Incharge, Inquiry Section, H.P. University, Shimla-5. With 2 spare copies.

Sir/Madam

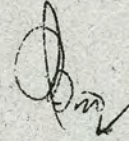
It has been pointed out by some of the Principals that section 'C' and 'D' of B.Sc IIInd year Zoology, paper V (Chordata-II) were printed in continuation of syllabus of B.Sc III year, paper VII (Bio-Chemistry) after section 'B'. The matter has been examined in consultation with the Chairman Deptt of Bio-Science.

Sh. J. Singh S/O. (Secy)
RS

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Who is also Chairman, of Board of Studies (UG) in Zoology and accordingly corrected/certified copy of syllabus/^{is}being enclosed for further necessary action and record. This has the approval of the Hon'ble Vice-Chancellor.

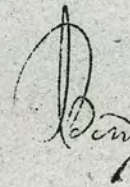
Yours faithfully, gco



P&DO/Incharge (Acad.)
H.P. University, Shimla-5.
Dated 20.12.2005.

Encls. As above.

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P&DO/Incharge (Acad.)
H.P. University, Shimla-5.

B.Sc. Zoology -1-

B.Sc Part I (Zoology)

Paper-I
(Invertebrates-I)

Time-3 hours

Max. marks-50.

Note:- Total nine questions to be set. Five questions to be attempted. All questions carry equal marks.

1st question is compulsory having 10 parts of objective/short answer type questions of 1 mark each, covering whole syllabus.

Eight questions to be set, four each from section-A and B. Each question preferably having 2-3 parts. Students will attempt two questions from each section.

(Section-A)

- 1 Introduction to Non- Chordata—General Characters and comparison with chordates.
- 2 Protozoa – Study of Amoeba, Euglena, Plasmodium and Paramecium w.r.t. locomotion, nutrition and reproduction.
Parasitic protozoans of man w.r.t diagnostic characters, mode of infection and diseases caused. [Entamoeba, Giardia, Trypanosoma and Leishmania].
--Classification of phylum upto classes.
--Origin of Metazoa.

Porifera – Study of Sycon w.r.t. structure, reproduction and development.
--Classification of phylum upto classes.
--Canal system and skeleton in Porifera.

(Section – B)

- 4 Cnidaria—Study of Obelia and Aurelia w.r.t. structure and reproduction.
--Classification of phylum upto classes.
--Polymorphism and coral reefs.
- 5 Ctenophora-Salient features of Ctenophora and comparison with Cnidarians.

B.Sc Part I

Paper-II

(Invertebrates-II)

Time-3 hours

Max. marks-50.

Note:- Total nine questions to be set. Five questions to be attempted. All questions carry equal marks.

1st question is compulsory having 10 parts of objective/short answer type questions of 1 mark each, covering whole syllabus.

Eight questions to be set, four each from section-A and B. Each question preferably having 2-3 parts. Students will attempt two questions from each section.

(Section-A)

- 1 Platyhelminthes – Study of Fasciola and Taenia w.r.t. structure, reproduction, life cycle and parasitic adaptations.

2. Nemathelminthes Study of Ascaris w.r.t. structure, reproduction and life cycle.
- Classification of phylum upto classes.
 - Parasitic nematodes of man w.r.t. diagnostic characters, mode of infection and diseases caused. (Ancylostoma, Enterobius and Wuchereria).
 - (Brief account of Plant nematodes).

(Section - B)

3. Annelida - Study of Nereis, Pheretima and Hirudinaria w.r.t. structure and reproduction.
- Classification of phylum upto classes.
 - Coelom and excretory system.
 - Metamerism and its significance.
 - Trochophore larva and its significance.
 - Filter feeding in Polychaetes.
 - Blood vascular system and its evolution.
 - Wormiculture.

B.Sc Part-I

Paper-III

(Invertebrates-III)

Time-3 hours

Max. marks-50.

Note:- Total nine questions to be set. Five questions to be attempted. All questions carry equal marks.

1st question is compulsory having 10 parts of objective/short answer type questions of 1 mark each, covering whole syllabus. Eight questions to be set, four each from section-A and B. Each question preferably having 2-3 parts. Students will attempt two questions from each section.

(Section-A)

1. Arthropoda - Study of prawn, cockroach and scorpion w.r.t. structure and reproduction.
- Classification of phylum upto classes.
 - Comparative account of respiration in Arthropods.
 - Crustacean Larvae. Mouth parts in insects.
 - Social life in insects.
 - Economic importance of insects.
 - Zoological importance of Peripatus and Limulus.

(Section - B)

2. Mollusca - Study of Pila and Unio w.r.t. structure and reproduction.
- Classification of phylum upto classes.
 - Torsion and detorsion in Gastropoda.
 - Foot in Mollusca.
 - Pearl formation.

3. Echinodermata - Study of starfish (Asterias) w.r.t. structure, locomotion, mode of feeding and reproduction.
--Classification of phylum upto classes.
--Water vascular system in starfish.
--Echinoderm larvae and their significance with emphasis on Dipleurula.
--Phylogenetic position of Echinodermata.

B.Sc Part-II
Paper-IV
(Chordata-I)

Time-3 hours

Max. marks-50.

Note:- Total nine questions to be set. Five questions to be attempted. All questions carry equal marks.

1st question is compulsory having 10 parts of objective/short answer type questions of 1 mark each, covering whole syllabus.

Two questions to be set from each section. Each question preferably having 2-3 parts. Students will attempt one question from each section.

(Section-A)

- Origin of Chordates.
- General characters and classification of chordates upto orders.

(Section-B)

- Detailed study of following animals:-
Balanoglossus, Herdmania and Amphioxus.

(Section-C)

- Detailed study of following animals:-
Platyfish, Scoliodon and Frog.

(Section-D)

- Detailed study of following animals:-
Uromastix, Pigeon and Rat.

B.Sc Part-II
Paper-V
(Chordata-II)

Time-3 hours

Max. marks-50.

Note:- Total nine questions to be set. Five questions to be attempted. All questions carry equal marks.

1st question is compulsory having 10 parts of objective/short answer type questions of 1 mark each, covering whole syllabus.

Two questions to be set from each section, each question preferably having 2-3 parts. Students will attempt one question from each section.

(Section-A)

Functional Anatomy of following systems in Chordates:

1. Integumentary system – Structure, functions and development of its derivatives.
2. Skeletal system – Types of skull, Vertebral column, Visceral arches, Jaw suspension in vertebrates.
3. Digestive system –
 - Alimentary canal and its associated glands.
 - Dentition in vertebrates.
 - Structure of stomach in cattle.

(Section-B)

Functional Anatomy of following systems in Chordates:

4. Circulatory system –
 - Evolution of heart and aortic arches.
 - Lymphatic system.
5. Respiratory system –
 - Respiratory organs and their evolution.
 - Accessory respiratory organs.
6. Urino-genital system – Evolution and succession of kidney and genital ducts.

(Section-C)

Functional Anatomy of following systems in Chordates:

7. Nervous system -
 - Evolution of Cerebral Hemispheres and Cerebellum.
 - Major parts of brain in different vertebrate classes, functional basis of their development.
 - The different cell types constituting brain parts – neuron, neuroglia, neurosecretory and axons, white and grey matter, ganglia formation.
8. Sense organs – Structure and function of-
 - Olfactory organs.
 - Ear.
 - Eye.
 - Pressure receptors.

(Section-D)

Migration of fishes, Mesozoic reptiles, Origin of birds, Migration of birds, Flight mechanism in birds. Poison apparatus of snakes.

B.Sc Part-II
General Zoology
Paper-VI

Time-3 hours

Max. marks-50.

Note:- Total ten questions to be set. Five questions to be attempted. All questions carry equal marks.

1st question is compulsory having 10 parts of objective/short answer type questions of 1 mark each, covering whole syllabus.

Three questions to be set from each section. Each question preferably having 2-3 parts. Students will attempt at least one question from each section.

(Section-A)
Cell Biology

- 1 Cell theory, diversity of cell size and shape.
- 2 Structure of Pro and Eukaryotic cells.
- 3 Cell adhesion and cell junctions.
- 4 Ultrastructure of a typical animal cell with structure and functions of cell organelles.
- 5 Cellular energy transactions – role of mitochondria.
- 6 Membrane transport of small molecules and ionic basis of membrane excitability.
- 7 Cell differentiation.
- 8 Biology of cancer.

(Section-B)
Developmental Biology

Types of eggs, fertilization, cleavage, development upto gastrulation in Amphioxus, frog and chick, Metamorphosis in frog, Embryonic and Extra-embryonic membranes in birds and mammals, Implantation, placenta in mammals, Parturition and Lactation.

(Section-C)
Evolution

- 1 A brief account of Zoo-geographical regions.
- 2 Fossil types and their formation.
- 3 Types of evolution – parallel, convergent and divergent.
- 4 Sources and nature of variations.
- 5 Natural selection.
- 6 Isolatory mechanisms and their role in evolution.
- 7 Adaptations and adaptive radiations.

B.Sc Part-III
Paper-VII
(Biochemistry)

Time-3 hours

Max. marks-50.

Note:- Total nine questions to be set. Five questions to be attempted. All questions carry equal marks.

1st question is compulsory having 10 parts of objective/short answer type questions of 1 mark each, covering whole syllabus.

Eight questions to be set, four each from section-A and B. Each question preferably having 2-3 parts. Students will attempt two questions from each section.

(Section-A)

- 1 Elementary idea of analytical and separation techniques:- ultracentrifugation, electrophoresis and chromatography.
- 2 Chemical nature of protoplasm, chemistry of carbohydrates, proteins, lipids and nucleic acids.
- 3 Enzymes and coenzymes -- Definition, nature, function, specificity and classification of enzymes. Enzymes action.
- 4 Nature and function of coenzyme A, coenzyme Q, NAD and NADP, FMN and FAD(Flavin nucleotide and cytochromes).

(Section-B)

- 5 High energy compounds -- Phosphogens, phosphate bonding, formation of ATP, energy release oxidation mechanism.
- 6 Intermediary Metabolism
 - (i) Carbohydrates -- Glycogenesis, Glycogenolysis and Gluconeogenesis.
 - Glycolysis [The Embden -- Meyerhof's Pathway].
 - Hexose monophosphate pathway[Shunt].
 - Tricarboxylic acid cycle.
 - Role of dicarboxylic acid shuttle.
 - (ii) Lipids
 - β -oxidation of fatty acids.
 - Fate of glycerol.
 - Ketosis, Ketone bodies.
 - (iii) Proteins
 - Amino acids, peptide linkage.
 - Deamination, transamination.
 - Ornithine cycle.
 - Inter-relationship of metabolic pathways.

B.Sc Part-III(General)
Paper-VIII
(Mammalian Physiology)

Time-3 hours

Max. marks-50.

Note:- Total nine questions to be set. Five questions to be attempted. All questions carry equal marks.

1st question is compulsory having 10 parts of objective/short answer type questions of 1 mark each, covering whole syllabus.

Eight questions to be set, four each from section-A and B. Each question preferably having 2-3 parts. Students will attempt two questions from each section.

(Section-A)

- 1 Nutrition, digestion and absorption:-
--Nutritional requirements, composition, function and regulation of salivary, gastric, pancreatic, hepatic and intestinal juices.
--Mechanism of absorption.
- 2 Blood:-
--Composition and function of blood and lymph.
--Haemopoiesis.
--Blood group, RH factor.
--Blood coagulation.
--Structure and function of haemoglobin.
- 3 Heart:-Structure, origin and conduction of heart-beat, the pacemaker system, cardiac cycle, blood pressure, capillary pressure, electrocardiogram an elementary idea.
- 4 Respiration:-Mechanism and control of breathing, transport of O_2 and CO_2 .
--Oxygen dissociation curves of haemoglobin and myoglobin.
--Bohr's effect, chloride shift.

(Section-B)

- 5 Excretion:-Nitrogenous wastes[Ammonotelism, ureotelism, uricotelism], urine formation, water balance.
- 6 Muscles:-Types of muscles[striated, non-striated, cardiac], structure of skeletal muscle cell, myofibrillar proteins, mechanical basis of muscle contraction, energy relation[energy sources,heat dissipation and work. Muscle fatigue.
- 7 Nervous system:-Structure of neuron, nature, origin and propagation of nerve impulse,synaptic functions, myoneural junctions.
- 8 Endocrines:-Detailed structure of pituitary glands, nature and functions of pituitary hormones, feed back relationship with other endocrines.
- 9 Reproduction:-Gonadal hormones, oestrous cycle, corpus luteum, parturition, lactation.

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B.Sc Pa. t-III

Paper-IX

(Applied Zoology and Environmental Biology)

Time-3 hours

Max. marks-50.

Note:- Total nine questions to be set. Five questions to be attempted. All questions carry equal marks.

1st question is compulsory having 10 parts of objective/short answer type questions of 1 mark each, covering whole syllabus.

Eight questions to be set, four each from section-A and B. Each question preferably having 2-3 parts. Students will attempt two questions from each section.

(Section-A)

Medical Zoology:-Brief account of Arthropods as direct agents of disease or discomfort.

Arthropods as vectors of human diseases.

--Malaria, Filariasis and Plague.

--Brief account of diseases caused by:-

(i)Pathogenic Protozoa - Entamoeba, Trypanosoma, Leishmania, Giardia, Trichomonas and Plasmodium.

(ii)Pathogenic Helminthes - Fasciolopsis, Schistosoma, Echinococcus, Ancylostoma, Trichinella, Wuchereria, Dracunculus and Oxyuris.

--Epidemic diseases such as typhoid, cholera and small pox, their occurrence and eradication programmes.

--Brief introduction to human defence mechanisms. Antigens and antibodies lymphoid tissue, Allergies and AIDS.

(Section-B)

Genetics - Cloning and genetic engineering.

Environmental Biology - Concept of ecosystem and introduction to laws of limiting factors, Energy flow in ecosystem, Food chain, Environmental pollution and green house effect.

--Definition of Toxicity, classification of Toxicants, toxic agents and their modes of action.

--Brief account of Apiculture, Sericulture, Lac-culture and Pisciculture.

--Important wild life sanctuaries, national parks and reserves.