

## SET-B

<b>Unique Paper Code</b>	:	<b>32231102</b>
<b>Name of the Paper</b>	:	<b>Principles of Ecology</b>
<b>Name of the Course</b>	:	<b>B.Sc. (Hon) Zoology</b>
<b>Semester</b>	:	<b>LOCF Semester-I</b>
<b>Duration</b>	:	<b>3 hours</b>
<b>Maximum Marks</b>	:	<b>75</b>

### Instruction for candidates:

Attempt any **four questions** only. Each question carries **equal marks**

Q.1. What do you understand by biodiversity? Briefly describe various factors responsible for the loss of biodiversity. Discuss various steps to restore and conserve biodiversity.

18.75

Q.2. Give the graphical representation and equations for the growth of two interdependent species where species 1 is prey and species 2 is predator. Explain with example how the growth of species 1 and 2 are interrelated with each other? What are the various strategies employed by predator to change the densities of prey species?

18.75

Q.3. What are the possible outcomes when, species 1 is competing with species 2 for resources in nature? Give suitable graphical representation, mathematical models and examples to justify the outcomes.

18.75

Q.4. What is nitrogen cycle? How can microorganisms contribute to the nitrogen cycle? What impact do people have on the nitrogen cycle?

18.75

Q.5. Describe the process by which one vegetation community is replaced by other community. What are the factors responsible for this change?

18.75

Q.6. What do you understand by energy flow? How many different types of energy flow models are there? Which of the models is the most realistic, and why?

18.75



Mode of Examination: Open Book Examination

Unique Paper Code	:	32231101_LOCF
Name of the Paper	:	Non-chordates I: Protista to Pseudocoelomates
Name of the Course	:	B.Sc. (H), Zoology
Semester	:	I, CBCS
Duration	:	3hrs
Maximum Marks	:	75

**Instructions for Students**

Write your Roll No., Name of the paper, Course, Semester and Date of examination on the first page of answer sheet.

Attempt **ANY FOUR** questions. All questions carry equal marks.

**Draw well labelled diagrams wherever necessary.**

Q1. . Animals are categorized into different levels of organization (cell, tissue and organ) based on specialization of cell. Explain your answers with suitable examples that few animals or phylum defy this categorization. (18.75)

Q2. Euglena can be studied as animal or plant. Give your arguments to defend the statement. Explain different modes of locomotion and ingestion in Protista. (18.75)

Q3. With the help of a protozoan example elaborate on its reactive behavior. Explain with the help of diagrams the process of reproduction that brings genetic variability in the offspring of Paramecium. (18.75)

Q4. Explain the mechanism of formation of different types of coral reefs. What happened if the coral reef equipped water body is contaminated with plastic pollutants? Add a brief note on the economic importance of the coral reefs. (18.75)

Q5. The metamerism in *Taenia solium* is not considered a true metamerism. Justify? Explain how apolysis is truly advantageous for tapeworm? (18.75)

Q6. Give parasitic adaptations of helminthes. Discuss various diseases success of which is attributed to these adaptations. (18.75)

Unique Paper Code : 32231301  
Name of the Paper : Diversity of Chordates  
Name of the Course : B.Sc. (H) Zoology Examination, 2021-LOCF  
Semester : III – Theory Examination  
Duration : 3 hours  
Maximum Marks : 75 Marks

**Instructions for Candidates**

Write your Roll No., Name of the paper, Course, Semester, and Date of examination on the first page of answer sheet.

Attempt **ANY FOUR** questions. **All questions carry equal marks.**

Illustrate your answers with appropriate diagrams wherever necessary.

## SET 1

Q.1 How would you distinguish between a living fossil and a transitional fossil? Describe each of these with the help of classical examples that you have studied. **(18.75)**

Q.2 Give a detailed account of Wegener's hypothesis for distribution of animals on earth. How does it correlate with the geological time scale? Add a note on the various means of distribution of animals. **(18.75)**

Q.3 Salmon and eels exhibit spawning migration during their breeding season but their life history is quite distinct from one another. Assisted with a diagrammatic flowchart highlight how their life differs from each other. **(18.75)**

Q.4 Duck-billed platypus and Spiny ant-eaters lay eggs like reptiles and birds but are still called mammals. Enumerate the features that makes them closely related to reptiles, birds and mammals yet retaining their own unique characters. **(18.75)**

Q.5 Parental care in amphibians is not gender specific. Cite examples in support of your answer from all the orders that you have studied. **(18.75)**

Q.6 Describe various modes of flight in birds and also give an account of aerial adaptations that make them glorified reptiles. **(18.75)**

Unique Paper Code: 32231302

Name of the Paper: Physiology: Controlling and Coordinating Systems

Name of the Course: B.Sc. (H) Zoology Examination, 2021-LOCF

Semester: III

Duration: 03 hours

Maximum Marks: 75

Instructions for Candidates:

Write your Course, Semester, Roll No., Paper Name, UPC, and Page No. on all the answer sheets used by you.

Attempt four questions in all. All questions carry equal marks. Draw relevant diagrams wherever required.

Q.1. Illustrate with the help of well-labelled diagrams, the different types of contact points between cells that organize them into functional units. State the key components of the connective tissue, and its various types. How does the cartilage differ from bone, and add a note on the different types of cartilages and their location in the body?

(18.75 marks)

Q.2. What do you understand by the term 'gland'? With the help of well-labelled diagrams, describe the structural and functional differences between the various types of glands. Name two glands and its cells whose secretions exert opposite effects, and name a gland and its cells which secrete two different hormones whose actions are antagonistic to each other.

(18.75 marks)

Q.3. Define a twitch contraction, and a myogram. What are the different components of a myogram. What is wave summation? Discuss the effect of rate of stimulation on tetanus with suitable myograms. Why do we consider 'recovery oxygen uptake' a better term than 'oxygen debt' for the elevated use of oxygen after exercise?

(18.75 marks)

Q.4. Describe the histology of the ovary with the help of a well-labelled diagram. Name different hormones that affect the physiology of female reproduction with their role in uterine and ovarian cycle. Graphically explain the changes in concentration of anterior pituitary and ovarian hormones with the positive feedback effect of high levels of estrogens.

(18.75 marks)

Q.5. Name the anatomical and functional region between two successive neurons. What are the different types of neurotransmitters and their receptors? What do you understand by the trigger zone, EPSP and IPSP? Describe with the help of a suitable example.

(18.75 marks)

Q.6. A 60 year old woman suffered from severe fracture in her right shoulder after a minor fall while getting up from bed at midnight. What could be the possible reason/s for the fracture resulting from a minor fall? What would be the recommendations for people of this age to prevent encountering such problems?

(18.75 marks)

## Mode of Examination: Open Book Examination

Unique Paper Code	: 32237901
Name of the Paper	: Animal Behaviour and Chronobiology
Name of the Course	: B. Sc. (H) Zoology
Semester	: V, CBCS
Duration	: 3 h
Maximum Marks	: 75 marks

### **Instruction for Students**

Write your Roll No., Name of the paper, Course, Semester, and Date of examination on the first page of answer sheet.

Attempt **ANY FOUR** questions. All questions carry equal marks (18.75). Draw well labelled diagrams wherever required.

Q1. Describe intrasexual selection. Explain various tactics adopted by males in response to intrasexual selection. **18.75**

Q2. Describe Altruism with suitable examples. Explain evolutionary significance of altruistic behaviour in animals. **18.75**

Q3. Discuss proximate and ultimate cause with a suitable example. Differentiate between fixed action pattern and imprinting. **18.75**

Q4. Define Chronotherapy. Discuss the diseases caused due to alteration of circadian cycle. **18.75**

Q5. Describe courtship behaviour in animals. Discuss in detail the courtship behavior in three spined stickleback fish. Draw a neat diagram. **18.75**

Q6. Circadian and circannual rhythms are found in almost all organisms. Explain why they are important to the survival of the organism. **18.75**



### Mode of Examination: Open Book Examination

<b>Unique Paper Code</b>	<b>: 32231502</b>
<b>Name of the Paper</b>	<b>: Principles of Genetics</b>
<b>Name of the Course</b>	<b>: B.Sc. (H) Zoology (CBCS-LOCF)</b>
<b>Semester</b>	<b>: V</b>
<b>Duration</b>	<b>: 3 Hours</b>
<b>Maximum Marks</b>	<b>: 75</b>

#### **Instructions for Students**

1. Write your Roll No., Name and Code of the paper, Course, Semester, and Date of examination on the first page of the answer sheet.
2. Attempt **ANY FOUR** questions.
3. All questions carry equal marks.

**Q1.** In mice, a locus for hair colour has two alleles, **A** and **a**. '**A**' is a dominant allele producing Agouti colouration (bands of black and white) while '**a**' is a recessive allele and produces brown colouration. At another locus, presence of recessive allele '**h**' in homozygous condition leads to albino colouration of the mice.

An **albino female** was mated to a **brown male** and all the **offspring** were **Agouti**. The **male** and **female** Agouti offspring were then mated. What will be the phenotypic ratio of the product of these mating? Explain your finding. Also, provide an example in humans where a similar modification in the Mendelian dihybrid ratio is seen. **18.75**

**Q2.** Differentiate between the lytic and lysogenic cycle of phages. What are the different types of transduction? With the help of examples, explain, how transduction can be used in bacterial gene mapping. **18.75**

**Q3.** Explain the molecular basis of spontaneous mutations. With the help of suitable examples, describe the different types of structural chromosomal aberrations. **18.75**

**Q4.** How is polygenic inheritance different from Extra-chromosomal inheritance? Explain. Describe the inheritance of shell coiling pattern in *Limnaea* (with illustration). If an oocyte from a *Limnaea* female with genotype Dd is injected with antibody against D protein (thus rendering it non-functional), just before fertilization with a sperm carrying D allele, what will be the phenotype of the progeny? Explain. **18.75**

**Q5.** Female *Drosophila* with cinnabar eye (cn) and vestigial wings (vg) were mated to males with roof wings (rf). The F1 were all wild-type. When the F1 females were test crossed with males homozygous for all three traits the following result were obtained.

cinnabar,vestigial	382
roof	401
cinnabar	3
roof, vestigial	4
cinnabar, roof, vestigial	59
wild	67
cinnabar, roof	44
vestigial	40

Based on this data justify the statement “these genes are linked”. What is the order of these genes? Calculate the coefficient of coincidence and interference. What are the different categories of progeny obtained and what are their genotypes? If the F1 female was a coupling heterozygote, then what would be the phenotypes of Single crossover and Double crossover progeny? **18.75**

**Q6.** What are the different types of transposable elements found in prokaryotes? Explain their structure and mechanism of transposition. A male *Drosophila* with P elements (P+) mates with a female *Drosophila* that lacks P elements (P-). What is the expected outcome of this cross and what is the reason behind the outcome? **18.75**

Unique Paper Code : 32231501  
Name of the Paper : Molecular Biology  
Name of the Course : B.Sc. (H) Zoology  
Semester : V  
Duration : 3 hours  
Maximum Marks : 75 Marks

**Instructions for Candidates**

Write your Roll No., Name of the paper, Course, Semester, and Date of examination on the first page of answer sheet.

Attempt **ANY FOUR** questions. **All questions carry equal marks.**

Illustrate your answers with appropriate diagrams wherever necessary.

### Set 1

1. DNA replication is 'semiconservative, bidirectional and semidiscontinuous' –Justify. What will be the consequence if helicase is not present during replication? Explaining the role of replicating enzymes describe the process of replication in eukaryotes.
2. Compare and contrast the process of transcription in prokaryotes with that in eukaryotes.
3. One gene may code for more than one polypeptide in eukaryotes. How is this achieved? Support your answer with suitable examples.
4. RNAi is a fundamental pathway of gene-silencing in eukaryotic cell. Discuss its components and mechanisms.
5. Explain how functioning of lac operon is dependent on availability of glucose and lactose in medium. Will the cell be able to utilize lactose for energy if there is mutation in (1) lac I gene (2)  $\beta$ -galactosidase gene? Discuss .
6. Synthesis of a polypeptide requires the participation of three major classes of RNA. Name them and illustrate their involvement in this process with suitable diagrams (Answer with reference to prokaryotes). How is fidelity of protein synthesis maintained?

## SET-2

Unique Paper Code : 32235902

Name of the Paper : GE\_II\_Animal Diversity\_LOCF

Name of the Course : B.Sc. (H)

Semester : I, CBCS

Duration : 3 Hours Maximum

Marks : 75

Instruction for Students:

Write your Roll No., Name of the paper, Course, Semester, and Date of examination on the first page of answer sheet.

**Attempt ANY FOUR questions. All questions carry equal marks.** Substantiate your answer with diagrams wherever necessary.

1. What are the differences between Chondrichthyes & Osteichthyes? Discuss the osmoregulatory adaptations developed in freshwater and marine fish.
2. Write the general characters in arthropods. Discuss the social life in honey bees.
3. How are protostomes different from deuterostomes? Describe the water vascular system in starfish.
4. Enumerate the salient features and adaptations of nemathelminthes that have enabled them to lead a parasitic mode of life.
5. Discuss how the first tetrapods, the amphibians adapted to terrestrial mode of life. Discuss parental care in amphibians.
6. Why is Protozoa placed in Protista? Discuss in detail the life cycle of *Plasmodium* with suitable diagrams.

## SET-A

Unique Paper Code : 32235906

Name of the Paper : Generic Elective: Food Nutrition and Health

Name of the Course : B.Sc (H) Zoology,2021-LOCF

Semester : III, (GE) Theory Examination

Duration : 3 hours

Maximum Marks : 75

### Instruction for Candidates

Write your Roll No., Name of the paper, Course, Semester, and Date of examination on the first page of answer sheet.

Attempt **ANY FOUR** questions. All questions carry equal marks.

- Q.1. Explain the concept of a balanced diet. Discuss how people in our country who are at risk of malnutrition can be identified by interpretation of anthropometric data. (18.75)
- Q.2. Discuss the nutrient needs and dietary pattern of the elderly people? Why is it necessary to include dietary fibres in our food? Add a note on organic food. (18.75)
- Q.3. Justify the statement “a single lifestyle disease may lead to other lifestyle diseases”. Describe various lifestyle modifications for a 40 years old person suffering from hypertension. (18.75)
- Q.4. Describe role of family for a drug dependent person in a positive and negative manner. Why it is a big challenge for a drug addict to stop the drug consumption? What are the adverse effects of tobacco smoking in an active smoker? (18.75)
- Q.5. Justify the statement in detail “Regular hand washing can protect us from several diseases”. Name any two diseases caused by protozoan parasites. Write their mode of infection, symptoms, and prevention? (18.75)
- Q.6. Give an account of the causes of food spoilage. What are the various methods used to prevent food spoilage? Add a note on hepatitis. (18.75)

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Unique paper Code: 32237909  
Name of the paper: Immunology- (DSE for Honours)  
Name of the Course: B.Sc. (H) Zoology- **LOCF**  
Semester: Semester V  
Duration: 3 Hours  
Maximum Marks: 75

**Instructions for Candidates**

1. Write your Roll No., Name of the paper, Course, Semester, and Date of examination on the first page of answer sheet.
2. Attempt **ANY FOUR** questions. All questions carry equal marks.
3. Draw well labelled diagrams wherever necessary.

- Q1. Immunoglobulins are glycoproteins, therefore can act as potential immunogens to induce antibody response against themselves. Explain this statement describing different antigenic determinants present on immunoglobulins. 18.75
- Q2. "Recognition of antigen by the innate immune system leads to an effective immune response" - Justify this statement by describing the difference between innate immune response from adaptive immune response and by illustrating different barriers in innate immunity. 18.75
- Q3. Elaborate the different pathways used by the immune system for processing exogenous and endogenous antigens. Give suitable diagrams. 18.75
- Q4. The process of formation of cellular components of blood by pluripotent stem cells begins early in the embryo and continues up to the death of an individual. Discuss the process and explain the differentiation of stem cells. 18.75
- Q5. The binding of antigenic determinant to TCR or BCR is dependent on its properties. Discuss these properties that ensure effective binding in both cases. 18.75
- Q6. Explain the pathogenesis of autoimmune diseases and their treatment. Give brief account of autoimmunity against self-antigens unique to an organ/tissue or against range of antigens in different organs. Substantiate your answer with suitable examples. 18.75