Mode of Examination: Online

Name of the Course : B.Sc. (H) Zoology Examination, 2020-CBCS

Semester : I
Name of the Paper : Insect Vector and Diseases
Unique Paper Code : 32235908_OC
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 the answer sheet.

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

1. Name a pathogen that you have studied whose vector is a *Triatome* bug. Explain the method of transmission, symptoms, prevention and control of the disease caused by this pathogen.
2. Name the vector responsible for spreading dengue in humans. With the help of suitable diagrams describe the life cycle of this vector and add a note on its control and management.
3. Give the scientific name, order and general characteristics of sucking lice. Discuss its role as a vector in the transmission of diseases. Suggest suitable preventive measures for this vector.
4. What is the basic unit of insect eye? Draw a neat labelled diagram to explain the structure and working of this basic unit. Explain the mechanism which enables the butterflies to see in bright light. How is their eye different from insects which see in dim light? Draw neat labelled diagrams to support your answer.
5. Enumerate the characteristic features of an insect which is an ectoparasite on rats. Name the insect and discuss the diseases transmitted by it along with the symptoms. Add a note on its control.
6. Give the name of the order and enumerate the general characteristics of any one mechanical vector responsible for causing myiasis. Discuss in detail the life cycle, medical importance and control measures of this vector.

Name of the Course : **B.Sc. (H) Zoology Examination, 2020-CBCS**

Semester : I

Name of the Paper : Non-chordates I - Protista to Pseudocoelomates

Unique Paper Code : 32231101 _ **OC**

Duration : 3 hours

Maximum Marks : 75 Marks

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 in all.
- All questions carry equal marks (18.75 each).
- Draw well labelled diagrams wherever required.

1. Explain the various modes of reproduction in Slipper Animalcule. Among these, which mode is the most suitable for its survival and why? (18.75)

2. Discuss the water canal system in *Spongilla* and *Euplectella.* Which of them have a more advanced canal system and why? (18.75)

3. In *Physalia* colony, 'Individuals show division of labour but not genetic polymorphism', elaborate the statement. Why 'Metagenesis' is not a true alternation of generations in Cnidaria? (18.75)

4. Explain that how Pseudometamerism is different from true Metamerism? Justify if *Taenia* is an individual or a colony of different organisms. (18.75)

5. If a child is suffering from intense colic pain, abdominal discomfort, intestinal blockage, diarrhea, weight loss and growth impairment then explain, from which disease, he/she is suffering? Discuss the complete life cycle of the parasite. (18.75)

6. Define the terms Protista, Parazoa and Metazoan with examples. In the studied phylums, which phylum (any 2) would you like to keep in the group Protostomia and why? Justify your answer. (18.75)

SET - A

Mode of Examination : **Online**

Unique Paper Code : 32231102-OC

Name of the Course : B.Sc. (Hons.) Zoology Examination-2020

Name of the Paper : **PERSPECTIVES IN ECOLOGY**

Semester : Ist

Duration : 3 Hours

Maximum Marks : 75

This paper contains SIX questions

Answer four questions in all

All questions carry equal marks (18.75)

1. Define Food chain. Explain the differences between Linear and Y-shaped food chain, with examples. Write a short note on Vertical stratification in forests. (2.75+10+6)

2. Explain the Leibeig's Law of Minimum and Shelford's Law of Tolerance. Differentiate between autecology and synecology.(6+6+6)

3. Define community. Briefly describe the various characteristics of the community. Add a short note on Ecotone and Edge effect. (2.75+8+8)

4. What are the main objectives of Conservation of Biodiversity ? Discuss the strategies for Conservation of Biodiversity. Add a note on salient features of India's Biodiversity. (6.75+6+6)

5. Explain with suitable diagrams and equations the exponential and logistic growth forms of population. Differentiate between r-selected and k-selected species. (12+6.75)

6. Briefly describe competitive exclusion principle? Describe various possible outcomes of inter-specific competition with graphical representation and equations. (6.75+12)

ONLINE EXAMINATION

This question paper contains 1 page

Unique Paper Code : 32231303

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

Name of the Paper : Fundamentals of Biochemistry **(LOCF)**

Semester : III

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No., Course, Name of paper, Semester and Date of Examination on first page of answer sheet.
2. Draw the structures, wherever necessary.
3. Attempt **FOUR** questions. Each question carries **equal** marks.

Q1. Amongst the biomolecules, which one possesses highest level of conformational complexity and why? In details, explain various levels of organization and the factors determining the conformational complexity of these biomolecules.

Q2. How change in concentration of substrate, pH, and temperature affect the rate of reactions in biological systems? Illustrate with appropriate graphical representations and equations.

Q3. What are different forms in which carbohydrates are store in plants and animals, and why? How their structural organizations facilitate proper storage? What are different methods of representing the molecular structures of various carbohydrates?

Q4. With the help of molecular structures enlist the types and significance of various lipids constituting the plasma membrane.

Q5. You have been asked to synthesize a complementary strand for 5'-A-T-G-C-3'. What are the raw materials you would be requiring to synthesize it? Explain about the molecular arrangement of this strand. Give a tabulated account of various confirmations attained by nucleic acids in biological system.

Q6. Why it is advised not to have fried food for better health? Discuss the significance of various biomolecules in biological system.

Unique Paper Code : 32231302 **_OC**
Name of the Paper : Physiology – Controlling and Coordinating Systems
Name of the Course : B.Sc. (H) Zoology Examination, 2020-CBCS
Semester : III
Duration : 03 hours
Maximum Marks : 75 Marks

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. Each question carries equal marks. Draw relevant diagrams wherever required.

Q.1 Draw well-labeled histological diagrams of spongy and compact bone. Explain in what ways is their structural makeup well-suited to their respective functions? Add a note on the endocrine regulation of calcium levels in the body (18.75)

Q.2 Illustrate diagrammatically the architecture of a muscle fiber Describe the sequence of steps taking place during its contraction, with the help of well-labeled diagrams (18.75)

Q.3 A person exhibits the symptoms of Polyphagia, Polydipsia, and Polyuria. What disease could he be suffering from? What could it be due to? Draw a well-labeled histological diagram of the organ referred to in this pathological condition and its physiology. (18.75)

Q4. A person has a disease that inhibits the production of cholinesterase, what kind of symptoms would that person show? Explain the sequence of events that take place at the neuromuscular junction and the role played by acetylcholine during the process. (18.75)

Q.5 Illustrate diagrammatically the structural differences between the various types of cell junctions in relation to their function. Also emphasize on the characteristic feature/s of cardiac muscle fibres which enables the heart to contract as a whole (18.75)

Q.6 . Draw the well-labeled histological diagram of ovary. Describe the phases of ovarian cycle and relate them to events of oogenesis. Explain the role of hormones in the regulation of

the ovarian and uterine cycles in human females (18.75)

SET 1

Unique Paper Code	**:**	**32231301 _OC**
Name of the Paper	**:**	**Diversity of Chordates**
Name of the Course	**:**	**B.Sc. (H) Zoology Examination, 2020-CBCS**
Semester	**:**	**III, CBCS**
Duration	**:**	**3 Hours**
Maximum Marks	**:**	**75 Marks**

Attempt ANY FOUR questions. All questions carry equal marks.

Questions:

1. How birds navigate during migration? Explain flight adaptations in birds. (18.75)

2. Give an account on general affinities of Prototheria. How the limb structure in mammals provides an evidence of divergent evolution? (18.75)

3. Write an essay on classification of Reptilia up to order. Discuss how bones of skulls operate in the biting mechanism in snakes? (18.75)

4. Discuss the need and methods of Parental care in Amphibians. (18.75)

5. Differentiate between Chondrichthyes and Osteichthyes. Discuss the need and types of migration in fishes. (18.75)

6. Differentiate between Tornaria and Tadpole larva. Why a progressive, active and alert larva metamorphoses into a retrograde and sedentary adult in *Herdmania*? (18.75)

SET A

Unique Paper Code	**:**	**32235904**
Name of the Paper	**:**	**GE – III Environment and Public Health**
Name of the Course	**:**	**B.Sc.(H) Zoology Examination,2020-LOCF**
Semester	**:**	**III**
Duration	**:**	**3 Hours**
Maximum Marks	**:**	**75 Marks**

Attempt ANY FOUR questions. All questions carry equal marks.

Questions:

1. Give a detailed account of sources of water pollution and suggest measures to control water pollution. (18.75)

2. Describe the causes and effect of global warming. (18.75)

3. Describe the causes, symptoms, diagnosis and treatment of Malaria and discuss its control measures. (18.75)

4. Explain in detail the different sources of environmental hazards and also explain Bioaccumulation and Biomagnification. (18.75)

5. Describe the procedure for solid waste management and also discuss the handling and disposal of Nuclear waste. (18.75)

6. Explain in detail about Chernobyl disaster and Three mile island accident. (18.75)

Unique Paper Code: 32237901

Name of the Course: B. Sc. H Zoology Examination, 2020 CBCS

Name of the Paper: Animal Behaviour and Chronobiology (DSE)

Semester: V

Duration: 3H

Maximum Marks: 75

Instructions for the candidates

Students shall answer the questions on A4 Size papers and mark page number on the top of each page. On the first page, the student shall write the following details.

Examination Roll Number:

B. Sc. H Zoology Examination, 2020 CBCS

Semester V

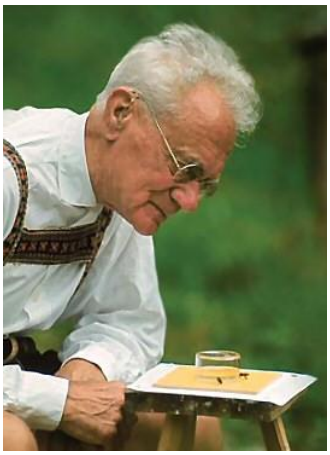
Unique paper Code (UPC): 32237901

Title of paper: Animal Behaviour and Chronobiology

Name of the College:

Answer any FOUR questions in all. All questions carry equal marks (18.75 marks each). Draw well labelled diagrams wherever necessary.

Q.1. Observe the Picture given below and describe his contributions in the modern ethology. Describe in detail the different dance languages of the honey bee. How does a foraging bee use SUN as compass for orientation?



Q.2. Define orientation and discuss its various types with suitable examples.

Q.3.What is the fundamental characteristics of eusocial animals? Discuss any two eusocial animals by describing how they maintain their societies.

Q.4.What is courtship ritual and what are its significances? With relevant examples differentiate intra-sexual selection from the inter-sexual selection.

Q.5.Define chronobiology. Discuss the factors responsible for regulating the biological clock and the adaptive significance of biological clocks.

Q.6.What do you understand by the term Photic and the Non-photic Zeitgebers? Describe the process of entrainment and its significance by giving two examples.

Mode of Examination: OBE

Unique Paper Code	: **32237904**
Name of the Paper	: Biology of Insecta
Name of the Course	: B.Sc. (H) Zoology
Semester	: V
Duration	: 3 h
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.

1. Insects have maintained a position of ecological pre-eminence for over 400 million years. Elaborate the reasons for their unusual survival on the Earth. Add a note on the basis of Insect classification.
2. Describe the morphology of the head and sclerites of a typical insect with well labelled diagrams. Give details about the various types of sensory appendages found on the insect head.
3. With the help of a suitable diagram and explanation, describe how does insect integument forms a sensory interface with the environment and protects the insect from various harms and damages.

   OR

   Illustrate the typical reproductive system of a female and a male insect. Describe the process of oogenesis and its hormonal control.
4. What are the four characteristics that qualify insects as eusocial organisms? Discuss the social organisation and behaviour in any one social insect studied by you.
5. Discuss the different cues used by phytophagous insects to select their host plant. What kinds of responses are generated by these cues among insects?
6. Insects are considered important disease vectors of human beings. Discuss the medical importance of any of the three insect species studied by you.

SET I

Unique Paper Code: 32235902_OC

Name of the Course: B. Sc. (Hons.) Generic Elective

Name of the Paper: Animal Diversity (GE)

Semester: I

Duration: 3 Hrs

Maximum Marks: 75

Instructions for the candidates

Write your Roll No. on the top immediately on receipt of this Question paper on your answer sheet. Students shall answer the questions on A4 Size papers and mark page number on the top of each page. On the first page, the student shall write the following details.

Date and time of examination (DD/MM/YYYY):

Examination Roll Number:

B. Sc. H Zoology Examination, 2020 CBCS

Semester I

Unique paper Code (UPC):32235902_OC

Title of paper:Animal Diversity (GE)

Name of the College:

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

1. Give a detailed account of the life history of *Taenia solium*. Add a note on the parasitic adaptions of helminthes. **(18.75)**

2. Discuss the mechanism of osmoregulation evolved in fishes in relation to their habitat. (**18.75)**

3. With the help of diagrams discuss various types of locomotor organelles of Protista. Explain how they bring about locomotion. (**18.75)**

4. Discuss the rise and diversification of the mammals with appropriate examples. (**18.75)**

5. Give distinctive features of class Reptilia. Discuss various adaptations evolved in them to lead a terrestrial life. (**18.75)**

6. Describe the general characters of Cnidaria and discuss the polymorphism in Hydrozoa. (**18.75)**

Name of Course: **B.Sc (Hons) Zoology Examination, 2020-CBCS**
Semester: **III**
Name of the Paper: **GE-III Environmental and Public Health**
Unique Paper Code: **32235904_OC**
SET: **B**

Time: 3 Hrs Max Marks: 75

Instructions for the candidates: Attempt any four questions. All questions carry equal marks.

1. (a) Discuss the possible impact of radioactive waste on abiotic and biotic component of environment. Discuss various strategies utilized by various nations to avoid the occurrence of same. (18.75)

2. Explain the role of environment in manifestation of respiratory ailments with the help of an example. (18.75)

3. Differentiate between Bad and Good Ozone. Give an account of global efforts undertaken to protect Ozone layer. (18.75)

4. (a) Discuss the various approaches for waste management that can be applied at individual level. Discuss the role of public health workers in waste management. (18.75)

5. (a) "Safe drinking water is a prerequisite for survival", discuss the statement in light of various water borne infectious diseases. Give the load of infectious diseases on health services in developing nations. (18.75)

6. (a) What do you understand by Bio magnification? Give the impact of industrial discharge on aquatic life/ecosystem. (18.75)

Unique Paper Code: 32237905

Name of the Paper: DSE-Computational Biology

Name of the Course: B.Sc. Hons. Zoology CBCS

Semester: V

Duration: 3 hours

Maximum Marks: 75 marks

Instructions for candidates: Attempt <u>any four</u> questions. All questions carry equal marks.

Q.1 A group of researchers have identified a coloured pigment from a soil bacterium. This pigment is found to be effective against a particular disease. So, based on the usefulness of this pigment, the researchers deduced the active molecule from this pigment. Now, they are interested in making an FDA approved drug from this active molecule. In this respect, design a step-wise procedure by which they can design the drug from that molecule and get it approved by FDA. Elaborate your answer using suitable diagrams or flowcharts. (18.75)

Q.2 "Bioinformatics based studies provide solutions for various problems but suffer from various limitations too". Justify the statement with suitable examples. (18.75)

Q.3 What do you understand by the statement, "Biological databases can be classified according to the source and type of data"? Explain with suitable examples. (18.75)

Q.4 Assume that a protein 'X' was found to be critical for the survival of SARS-CoV-2 virus. Hence it was suggested to be a potent target protein for binding of a drug molecule. Now, assume that you are working with SARS-CoV-2 proteins in a laboratory using Biosafety cabinet P4 and you want to design a potent drug against protein 'X'. Describe different wet lab methods or techniques which can be used to deduce the amino acid sequence of protein 'X', followed by various methods which can be used to unravel the structure of this protein using the sequence information only. (18.75)

Q.5 A student is asked to perform sequence alignment between closely related Human and Chimpanzee beta globin proteins. Out of PAM30, PAM120 and PAM250, which scoring matrix should he/ she choose for this? Also explain how it would differ if he/ she uses

BLOSUM scoring matrix. Justify your answer explaining how PAM and BLOSUM matrices are related to sequence alignment. (18.75)

Q.6 The length of a common carp, *Catla catla*, is normally distributed. The mean length of 100 fishes was found to be 10.6 inches. Use a suitable statistical test to know if this group of fishes belongs to a population with mean length of 10.3 and standard deviation of 2 (Take $\alpha = 0.05$)? (18.75)

Unique Paper Code : **32237909**

Name of the Paper : **DSE- Immunology**

Name of the Course : **B.Sc.(H)Zoology,2020-CBCS**

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 first page and number the sheets used.
2. Attempt **ANY FOUR** questions. All questions carry equal marks.
3. Draw well labeled diagrams wherever required.

Q1. Vertebrates have two types of immune system- innate and adaptive. Discuss the two systems emphasizing the advantage of having this dual system and how they cooperate with each other. (18.75)

Q2. With the help of diagram explain the detail of monomeric antibody and discuss how IgM is different from IgA in its structure and effector function? (18.75)

Q3. Discuss the steps of activation of classical pathway of complement system and explain briefly the biological consequences of activated complement system. (18.75)

Q4. Illustrate with suitable diagrams the type of the MHC molecules present on a dendritic cell. Explain how antigens are usually processed and presented by these cells and what is the outcome of such presentation? (18.75)

Q5. Explain the role of basophil and mast cell in mediating type I hypersensitive reactions? Discuss the type of hypersensitive reaction that occurs when antibody reacts to the antigenic determinants present on the surface of the cells. (18.75)

Q6. There are various approaches of vaccination to activate immunity against pathogens. Giving suitable examples, discuss each type with their advantages and disadvantages. (18.75)

Unique Paper Code	: 32231502
Name of the Paper	: Principles of Genetics
Name of Course	: B.Sc. (H) Zoology Examination, 2020-CBCS
Semester	: V
Duration	: 3 hours
Maximum Marks	: 75 Marks

Instruction for Students

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

1. Describe various modifications of Mendel's monohybrid cross. Explain how the sex of an individual affects the expression of the trait. **18.75**

2. 'Maternal effect patterns result when nuclear gene products expressed by the maternal genotype of the egg influence early development'. Throw light on the statement and discuss with suitable examples. **18.75**

3. Describe the genetic element responsible for genetic instability and mosaic pattern in maize kernels. Explain the genetic behaviour and the mechanism by which this element controls the colouration pattern with suitable diagram. **18.75**

4. Describe interrupted mating technique used in bacterial chromosomal mapping in *E. coli.*

An experiment was carried out in *E. coli* to map genes using four different Hfr strains. The Hfr strains were found to transfer the gene at the times indicated in parentheses.

Hfr A: bio (4) glu (20) his (27) cys (37) tyr (45)
Hfr B: xyl (6) met (18) tyr (24) cys (32) his (42)
Hfr C: xyl (7) thr (25) lac (40) bio (48) glu (62)
Hfr D: his (4) glu (11) bio (27) lac (35) thr (50)

Construct a genetic map of the *E. coli* chromosome that includes all the genetic markers, the genetic distances in minutes between adjacent gene pairs, and the origin and direction of transfer of each Hfr. **18.75**

5. Describe Muller's experiment to identify role of X-rays in inducing X-linked recessive lethal mutation in *Drosophila*. Enlist various chemical mutagens and explain the mechanism of action of any one of them. **18.75**

6. Design an experiment by which two traits showing independent assortment and linkage can be distinguished.

In *Drosophila b* represents black body colour and *vg* represents vestigial wings. In two different crosses the wild type female heterozygous for both the genes were test crossed. The phenotype of the progeny in two crosses was as follow

	Wild type	Black body wild type wings	Wild body colour vestigial wings	Black body colour, vestigial wings
Cross 1	41%	9%	9%	41%
Cross II	9%	41%	41%	9%

Interpret the results and diagrammatically represent the two cross. **18.75**