[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2920 **H**

Unique Paper Code : 32231201

Name of the Paper : Non-Chordata II : Coelomates

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

Semester : II (LOCF)

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. This paper contains seven questions. Question No. **1** is compulsory.
3. Answer **five** questions in all.
4. **All** parts of a question should be answered together.

1. (a) Define the following terms : (1×4)

   (i) Epitoky

   (ii) Cephalization

   (iii) Evisceration

   (iv) Autotomy

P.T.O.

(b) Differentiate between the following : (2×4)

(i) Holothuroidea and Echinoidea

(ii) Worker bee and drone bee

(iii) Taenidia and Ctenidia

(iv) Schizocoelous and enterocoelous mode of coelom formation

(c) Give the name of the animal having the following structure and mention its function. (1×4)

(i) Parapodia

(ii) Osphradium

(iii) Pedicellariae

(iv) Malpighian tubules

(d) Give generic name of the following and classify upto class : (1.5×4)

(i) Brittle star

(ii) Pearl oyster

(iii) King crab

(iv) Paddle worm

(e) Match the following : (1×5)

(i) Oligochaeta	(a) Halteres
(ii) Echinoidea	(b) Chelicerae
(iii) Scaphopoda	(c) Clitellum
(iv) Diptera	(d) Tusk shell
(v) Arachnida	(e) Aristotle's lantern

2. (a) Give an account of social organisation in Termites. (7)

(b) Describe the pearl formation in bivalves. (5)

3. Describe the structure of compound eye of Arthropods and explain the image formation in dim and bright light intensities with suitable diagrams. (12)

4. Describe the general characteristics of Phylum Mollusca in brief. Explain the mechanism of torsion and detorsion in gastropods. (12)

5. Give a detailed account of structure and functioning of excretory organs of Annelids. (12)

6. (a) Explain the water vascular system of Starfishes with well labelled diagram. (7)

(b) Describe the different types of metamorphosis in insects. (5)

7. Write short notes on any **three** of the following : (4×3)

(a) Respiration in insects

(b) Reproduction in Earthworm

(c) Metamerism

(d) Evolutionary significance of *Peripatus*

2

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4088 **H**

Unique Paper Code : 2232011201

Name of the Paper : Non-Chordata : Coelomates

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

Semester : II

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Answer any **FOUR** questions in all.
3. Question No. **1** is compulsory.
4. Draw well-labelled diagrams wherever necessary.

1. (i) Define the following (any **four**) : (4)

   (a) Cephalization

   (b) Omatidium

P.T.O.

(c) Taenidia

(d) Osphradium

(e) Madriporite

(ii) Differentiate between the following (**any two**) : (4)

(a) Enteronephric and Exonephric

(b) Holothuroidea and Echinoidea

(c) Setae and Chaetae

(iii) Give the location and function of the following (any **four**) : (4)

(a) Parapodia

(b) Coxal gland

(c) Polian vesicle

(d) Pedicellariae

(e) Radula

(iv) Give generic of the following and classify upto classes (any **three**) : (3)

(a) Sea mouse

(b) Star fish

(c) Pearl oyster

(d) King crab

2. (a) Give an account on the social life of Termite and add note on their economic importance.

(b) Describe the evolution of Coelom. (9+6)

3. (a) Give the structure of Compound eyes and explain its functioning with diagram.

(b) Write an account on metamorphosis in insects and discuss its hormonal control. (9+6)

4. (a) Discuss the locomotion of Asteroidea.

(b) Describe the pearl formation in Mollusca. (9+6)

5. (a) Describe the Torsion and detorsion in gastropods.

(b) Comment upon affinities of Phylum Onychophora with Annelida and Arthropoda. (9+6)

6. Write the short notes on the following : (15)

(a) Types of metamerism

(b) Respiration in insects

(c) General characteristics of Echinodermata

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2956 **H**

Unique Paper Code : 32231401

Name of the Paper : Comparative Anatomy of Vertebrates

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

Semester : IV - LOCF

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Answer any **five** questions in all, including question **1** which is compulsory.
3. Draw well-labelled diagrams wherever necessary.

1. (a) Define the following terms : (5)

(i) Iter

(ii) Opisthonephros

(iii) Plastron

P.T.O.

(iv) Synsacrum

(v) Holobranch

(b) Differentiate between the following terms : (10)

(i) Monocondylic anddicondylic skull

(ii) External and internal glomeruli

(iii) Spinal and cranial nerves

(iv) Nail and claw

(v) Parotid and paratoid gland

(c) State whether the following statement is true or false. (4)

(i) Syrinx is the voice box of mammals.

(ii) The neurocrania of chondrichthyans are well ossified.

(iii) Cycloid scales are epidermal derivatives.

(iv) In adult birds only the right aortic arch is functional.

(d) Give the exact location and function of the following. (8)

(i) Meibomian gland

(ii) Fovea centralis

(iii) Foramen Panizza

(iv) Foramen magnum

2. With the help of labelled diagrams, illustrate the evolution of aortic arches in vertebrates. (12)

3. (a) Describe the evolution of male urinogenital ducts in vertebrates. (6)

(b) Comment upon the ruminant stomach. (6)

4. (a) Classify and give functions of various types of receptors found in vertebrates. (7)

(b) Describe the types of centrum in vertebrates. (5)

5. (a) Explain the structure and functioning of the gills in cartilaginous and bony fishes. (8)

(b) Briefly discuss the accessory respiratory organs in fishes. (4)

6. Give a comparative account of brain in vertebrates with labelled diagrams. (12)

7. Write short notes on *any* **three** of the following. (12)

(i) Jaw suspensorium in vertebrates

(ii) Dentition in mammals

(iii) Types of feathers

(iv) Autonomic nervous system

(v) Scales in fishes

4

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 3010 **H**

Unique Paper Code : 32231402

Name of the Paper : Animal Physiology : Life Sustaining Systems

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

Semester : IV, LOCF

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **FIVE** QUESTIONS in all.
3. Question no. **1** is COMPULSORY.
4. Draw diagrams wherever necessary.

1. (a) Define the following terms : (5)

   (i) Hematocrit

   (ii) Respiratory acidosis

   (iii) Haustral churning

   (iv) Renal threshold

   (v) Ectopic focus

(b) Distinguish between the following : (10)

(i) Bohr and Haldane effect

(ii) PCT and DCT

(iii) Pulmonary ventilation and pulmonary respiration

(iv) Hemopoiesis and hemostasis

(v) Peristalsis and segmentation

(c) Expand the following abbreviations : (2)

(i) PCV

(ii) EDV

(iii) SARS

(iv) CCK

(d) Fill in the blanks : (4)

(i) Kupffer cells are found in _____ and play a role in _____.

(ii) The renal corpuscle consists of the _____ and _____.

(e) State the *location* and *function* of the following (**Any FOUR**) : (4)

(i) Brunner's glands

(ii) Septal cells

(iii) Apneustic area

(iv) JGA

(v) Crypts of Lieberkühn

(f) Give reason/s : (2)

(i) Tetany does not occur in the cardiac cells.

(ii) Digested lipids are mainly absorbed in the lacteals.

2. (a) Discuss the counter current mechanism and its role in producing concentrated urine.

(b) Explain the mechanism of GFR regulation in nephrons. (6,6)

3. (a) Discuss the basic characteristics of alveoli for gas exchange: Explain the role of various muscles involved in pulmonary ventilation.

(b) Briefly explain the factors affecting Oxygen-hemoglobin dissociation curve. (6,6)

4. (a) Draw and explain portal triad. Briefly discuss the functions of liver.

(b) How is HCI formed in the stomach? (8,4)

5. (a) Define cardiac output. Describe the various factors that affect the regulation of cardiac output.

(b) Draw a neat labelled diagram of cardiac cycle showing all the events associated with one heartbeat. (6,6)

6. (a) Describe the three phases of digestion.

(b) Explain the factors involved in regulation of blood pressure. (6,6)

7. Write short notes on **Any Three** of the following : (3×4=12)

(a) Pulmonary volume and capacities

(b) Glomerular filtration

(c) ECG

(d) Carbon monoxide poisoning

(e) Formed elements of blood

5

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 3121 **H**

Unique Paper Code : 32231403

Name of the Paper : Biochemistry of Metabolic Processes

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

Semester : IV

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **FIVE** QUESTIONS in all, question no. **1** is COMPULSORY.

1. Define the following : (5)

   (i) Cori cycle

   (ii) Fermentation

   (iii) Glycogenolysis

   (iv) Oxidative phosphorylation

   (v) Acidosis

(b) Differentiate between the following : (2×5=10)

(i) Catabolism and anabolism

(ii) Inhibitors and uncouplers

(iii) Transamination and deamination

(iv) Hexokinase and glucokinase

(v) Glucogenic and ketogenic amino acids

(c) Give the function(s) of the following enzymes : (1×4=4)

(i) Transaldolase

(ii) Succinate dehydrogenase

(iii) Methyl malonyl CoA mutase

(iv) Phosphoenolpyruvate carboxykinase

(d) Expand the following : (1×5=5)

(i) UDP Glucose

(ii) PFK

(iii) NADPH

(iv) DHAP

(v) GTP

(e) Draw the structures of the following : (3)

(i) α-Ketoglutarate

(ii) Glutamate

(iii) HMG CoA

2. (a) With the help of structural formulae, describe the fate of glucose under aerobic condition. (8)

(b) Add a note on ketone bodies. (4)

3. (a) "Gluconeogenesis is not the reversal of glycolysis", justify the statement. (6)

(b) Explain the chemiosmotic hypothesis. (6)

4. (a) Give a detailed account of urea cycle. Add a note on its link to TCA cycle. (8)

(b) Enlist the cascade of metabolic events occur during starving condition. (4)

5. Describe the β-oxidation of palmitic acid. Discuss about fates of the end products produced in this process. (12)

6. (a) What is significance of pentose phosphate pathway? (6)

(b) Describe the process through which glucose is stored in the body. (6)

7. Write short notes on **any three** :– (4×3)

(i) Malate aspartate shuttle

(ii) Oxidative phosphorylation

(iii) Intermediary metabolism

(iv) ETC

6

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2938 **H**

Unique Paper Code : 32231601

Name of the Paper : Developmental Biology

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

Semester : VI (LOCF)

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **Five** questions in all. Question No. **1** is compulsory.
3. Attempt **all** the parts of question together.

1. (a) Define the following (**any five**) : (5)

   (i) Invagination

   (ii) Amphimixis

   (iii) Archenteron

   (iv) Morphogen

   (v) Window of implantation

P.T.O.

(b) Distinguish between any **four** of the following : (2×4=8)

(i) Splanchnopleure and Somatopleure

(ii) Coeloblastula and Steroblastula

(iii) Progressive and Retrogressive metamorphosis

(iv) Area Opaca and Area Pellucida

(v) Epimorphosis and Morphailaxis

(c) Match the following : (3)

(i) E. Allen	a. Phocomelia
(ii) Thalidomide	b. DDT as teratogen
(iii) A. Trembley	c. Senescence
(iv) Rachel Carson	d. Superovulation
(v) Clomiphene	e. Amphibian metamorphosis
(vi) Genetic instability	f. Hydra Regeneration

(d) Expand the following abbreviations : (3)

(i) IVF

(ii) GGF

(iii) DLHP

(e) Fill in the blanks : (4)

(i) Second meiotic arrest in human oocyte takes place at _____ stage.

(ii) Absence of _____ makes the sperm immotile.

(iii) Chemoattractants identified in the egg jelly of sea urchin are _____ and _____.

(f) Name the germ layer from which each of the following is derived : (4)

(i) Trachea

(ii) Ovary

(iii) Bone

(iv) Adenohypophysis

2. (a) Differentiate between Holometabolous and Hemimetabolous development. Discuss the role of hormones in insect metamorphosis. (6)

(b) What are the various causes of ageing, describe any two in detail. (6)

3. (a) Discuss the process by which the spermatid transforms into spermatozoa. (6)

(b) What do you understand by embryonic induction. Write the experimental proof of the regional specificity of induction. (6)

P.T.O.

4. (a) Explain the implantation of embryo in human. (6)

(b) Define teratogenesis, Discuss pharmaceutical drugs and alcohol as teratogens. (6)

5. (a) What are the different extra embryonic membranes in birds. Add a note on their evolutionary significance. (4)

(b) Describe various morphogenetic movements with reference to gastrulation in chick. (8)

6. (a) Explain the process of neural tube formation with suitable diagrams. Name a neural tube defect which occur due to improper closing of anterior neuropore. (6)

(b) 'The amount and deposition of yolk affects the cleavage pattern' Justify the statement. (6)

7. Write short notes on any **three** of the following : (3×4=12)

(a) Amniocentesis

(b) Types of placenta on the basis of histology

(c) Techniques to study fate maps

(d) Cortical Reaction

(e) Embryonic stem cell

7

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2992 **H**

Unique Paper Code : 32231602

Name of the Paper : Evolutionary Biology

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

Semester : VI

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Draw well-labeled diagrams wherever necessary.
3. Attempt **five** questions in all. Question No. **1** is compulsory.

1. (a) Define the following : (5)

   (i) Gene pool

   (ii) Genetic load

   (iii) Deme

   (iv) Orthologous genes

   (v) Haldane's rule

P.T.O.

(b) Differentiate between the following : (10)

(i) Cladogram and Phylogram

(ii) Anagenesis and Cladogenesis

(iii) Species and Subspecies

(iv) Bottle neck effect and Founder effect

(v) Homologous and Analogous organs

(c) Give the major contribution of the following in the field of Evolutionary biology : (5)

(i) Georges Cuvier

(ii) Gould and Eldredge

(iii) Lynn Margulis

(iv) HBD Kettlewell

(v) Donald Johanson

(d) Match the following : (3)

Column A	Column B
(i) Stromatolites	A. Migration
(ii) Circle of races	B. Land tetrapods
(iii) Trace fossils	C. Inclusive fitness
(iv) Devonian period	D. Filamentous Cyanobacteria
(v) Gene flow	E. Coprolites
(vi) Kin selection	F. Ressenkries

(e) Justify the following statements : (4)

(i) Fragmentation of habitats result in speciation on one hand and extinction on the other.

(ii) Both Lamarck's and Darwin's theory can be explained by the example of giraffe's neck.

2. (a) What are the assumptions of Hardy Weinberg equilibrium? Add a note on the implications and significance of the principle as applied to natural populations. (6)

(b) Describe the various pre-zygotic isolating mechanism with suitable examples. (6)

3. (a) How do fossils provide direct evidence for evolution? Briefly describe the various dating methods for fossils. (6)

(b) Organic variations provide raw material for evolution. Support the statement with the help of examples. (6)

4. (a) Explain how simple chemical compounds in the early environment gave rise to basic bio molecules. (6)

(b) Which observations led to the conceptualization of neutral theory of molecular evolution? Discuss the salient features of the proposed theory. (6)

5. (a) Describe and exemplify the types of speciation initiated by extrinsic and intrinsic isolation. (8)

(b) Discuss briefly the type of mass extinction resulting from asteroid impact. (4)

6. (a) Enumerate the trends in the evolutionary progression of horse phylogeny with reference to important fossil records. (8)

(b) How do you infer phylogenetic tree topology? (4)

7. Write short notes on **any three** of the following : (12)

(a) Darwin's theory and its demerits

(b) RNA world

(c) Adaptive radiation

(d) Types of Natural Selection

(e) Unique hominin characteristics

8

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4126 **H**

Unique Paper Code : 2232011202

Name of the Paper : Fundamentals of Biomolecules

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

Semester : II

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **four** question including. Question No. **1** which is compulsory.
3. Draw well-labelled diagrams wherever necessary.

1. (a) Define the following (**Any five**) : (1×5)

   (i) Isozymes

   (ii) Trans fats

P.T.O.

(iii) RNA world hypothesis

(iv) C-value paradox

(v) Hyperchromic shift

(vi) Cofactor

(b) Expand the following (**Any five**) : (1×5)

(i) PUFA

(ii) GAG

(iii) siRNA

(iv) ADH

(v) LPS

(vi) IUBMB

(c) Differentiate between (**Any five**) : (1×5)

(i) Homotropic and heterotropic enzymes

(ii) Hydrolase and lyase

(iii) Configuration and conformation

(iv) Saturated and unsaturated fatty acids

(v) Glycoproteins and proteoglycans

(vi) Anomers and Epimers

2. Describe the salient structural features of B-DNA. Explain how reducing the water content around this molecule to about 75% would change its structure. Compare the two structures. (15)

3. Describe how Michaelis-Menten model can be modified in presence of different types of reversible inhibitors. Illustrate with suitable graphs. (15)

4. (a) Explain the various levels of structural organization of proteins with suitable illustrations. (10)

(b) Explain the physiological significance of derived lipids. (5)

5. (a) Discuss isomerism in carbohydrates with suitable examples. (12)

(b) Add a note on physiological importance of essential and non-essential amino acids. (3)

P.T.O.

6. Write short notes on **any three** : (5×3)

(a) Cot curves and their significance

(b) Allosteric regulation

(c) Membrane lipids

(d) Ramachandran plot

9

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4164 **H**

Unique Paper Code : 2232011203

Name of the Paper : Human Physiology: Control and Coordination Systems/ Discipline Specific Core- 6

Name of the Course : **B.Sc (Hons) Zoology Exam-2023**

Semester : II – (NEP-UGCF)

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **FOUR** QUESTIONS in all and Question No. **1** is COMPULSORY.

1. (a) Define the following terms (**Any four**) : (4)

   (i) Sertoli cells

   (ii) Hyperpolarization

P.T.O.

(iii) Sarcomere

(iv) Trigger zone

(v) Perimysium

(b) Differentiate between the following : (4)

(i) Myelinated vs Unmyelinated nerve fibre

(ii) Follicular phase vs Luteal phase

(c) Give the location and function of the following : (3)

(i) Islet of Langerhans

(ii) Sarcoplasmic reticulum

(iii) Nissl granules

(d) Expand the following : (2)

(i) PNS

(ii) FSH

(iii) EPSP

(iv) Ach

(e) Fill in the blanks : (2)

(i) _____ cells form the myelin sheath around the neurons of the PNS.

(ii) The mature and dominant follicle in the ovary is known as _____.

2. (a) What is action potential? Explain the generation of action potential in a neuron. (10)

(b) Explain the all or none principle of action potential. (5)

3. (a) What is Spermatogenesis? Explain the process of spermatogenesis. (10)

(b) Draw a well-labelled diagram of the mature mammalian sperm. (5)

4. (a) How does pancreas regulate the normal level of glucose in the blood? (10)

(b) Describe the negative feedback regulation of secretion of a hormone. (5)

5. (a) Discuss the role of ATP and calcium ions in the excitation-contraction coupling in a skeletal muscle fibre with help of diagrams. (10)

(b) Give a brief account of the physiological effect of the hormones secreted by the thyroid gland. (5)

6. Write short notes on any **three** of the following : (3×5=15)

(a) Oogenesis

(b) Sliding Filament mechanism

(c) Hypothalamo-hypophyseal portal system

(d) Implantation

(e) Neuromuscular junction

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4069 **H**

Unique Paper Code : 2232012401

Name of the Paper : DSC - Comparative Anatomy of Vertebrates

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

Semester : IV - NEP

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **any four** questions including **Question No. 1** which is compulsory.
3. Draw well-labelled diagrams wherever necessary.

1. (a) Define the following (any four): (4)

   (i) Meninges

   (ii) Procoelous

P.T.O.

(iii) Archinephros

(iv) Holocrine

(v) *Arbor vitae*

(b) Distinguish between the following (any two): (4)

(i) Single circuit and Double circuit circulation

(ii) Holobranch and Hemibranch

(iii) Contour and Down feathers

(iv) Monocondylic and Dicondylic skull

(c) State exact location and function of the following (any three): (3)

(i) Gill raker

(ii) Jacobson's organ

(iii) Parotoid gland

(iv) Femoral gland

(d) State whether following statements are true or false: (4)

(i) Adult birds only have left aortic arch.

(ii) Intervertebral discs are found in mammals.

(iii) Craniostylic jaw suspension is found in fishes.

(iv) Gizzard is the part of bird stomach.

2. With the help of appropriate diagrams, discuss in detail the evolution of the heart in vertebrates. (15)

3. (a) Describe the evolutionary change in the pattern of urinogenital ducts in amniotes. (8)

(b) Discuss the various types of uteri found in mammals with the help of suitable diagrams. (7)

4. (a) What are cranial nerves? Tabulate the mammalian cranial nerves and explain their functions. (11)

(b) Draw a well-labelled diagram avian brain. (4)

5. (a) Describe the dentition in mammals. (7)

(b) Classify and give functions of various types of receptors found in vertebrates. (8)

6. (a) Describe the air sacs in birds and how does it improve the efficiency of respiration in birds. (10)

(b) Give evidence to support the claim that integument is a "jack of all trades." (5)

7. Write the short notes on any **three** of the following: (15)

(a) Internal ear

(b) Accessory Respiratory organs

(c) Jaw suspension

(d) Scales in fishes

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4107 **H**

Unique Paper Code : 2232012402

Name of the Paper : DSC-Developmental Biology

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

Semester : IV - NEP

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **any four** questions including **Question No. 1** which is compulsory.
3. Draw well-labelled diagrams wherever necessary.

1. (a) Define the following: (4)

   (i) Gray crescent

   (ii) Compensatory regeneration

P.T.O.

(iii) Epiboly

(iv) Capacitation

(b) Distinguish between the following (any two): (2×2=4)

(i) Amnion and mosaic development

(ii) Involution and invagination

(iii) Totipotency and pluripotency

(c) Match the following: (2)

(i) Louis Brown	(a) Aristotle
(ii) Teratogen	(b) Fate maps
(iii) Walter Vogt	(c) IVF
(iv) Epigenesis	(d) Rachel Carson

(d) Expand the following abbreviations: (3)

(i) FAS

(ii) ICSI

(iii) NIMZ

(e) Name the germ layer from which each of the following is derived: (2)

(i) Epidermis

(ii) Thyroid

(iii) Vertebrae

(iv) Pancreas

2. (a) What are three different types of regeneration and explain epimorphic regeneration in detail with the appropriate diagram. (9)

(b) Explain the effect of various chemicals and drugs on embryonic development (6)

3. (a) What is placenta and its role in embryonic development? Describe different types of placenta based on the villi distribution and histology with suitable examples and diagram. (9)

(b) Discuss the process of IVF and amniocentesis and add a note on its merits and demerits (6)

4. (a) Enumerate different morphogenetic movements involved in gastrulation. Explain the process of gastrulation in frog. (9)

(b) Define fate map. Explain different methods of preparing a fate map. Draw well labelled diagrams of fate map of frog and chick blastula. (6)

5. (a) Describe the mechanism of fertilization in detail. Add a note on the difference between external and internal fertilization with examples. (9)

(b) What is aging? Enumerate various causes/theories of aging. (6)

6. Write short notes on any three of the following: (3×5=15)

(a) Embryonic induction

(b) Hormonal control of metamorphosis in Amphibians

(c) Embryonic stem cell and therapeutic cloning

(d) Types of eggs based on distribution and amount of yolk

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4145 **H**

Unique Paper Code : 2232012403

Name of the Paper : Animal Behaviour – DSC

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

Semester : IV

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **four** questions in all including Question No. **1** which is compulsory.
3. **All** questions carry equal marks. **All** parts of a question should be answered together.

1. (a) Define the following : (1x5=5)

   (i) Inclusive fitness

   (ii) Stimulus filtering

   (iii) Code breakers

P.T.O.

(iv) Infanticide

(v) Sexual Dimorphism

(b) Differentiate between the following : (2x3=6)

(i) Orthokinesis and Klinokinesis

(ii) Habituation and Sensitization

(iii) Klinotaxis and Tropotaxis

(c) Give the important contributions made by the following scientists : (1x4=4)

(i) E.O. Wilson

(ii) Ivan Pavlov

(iii) Robert drivers

(iv) R. A. Fisher

2. (a) What are the characteristics of eusocial organisms? Describe Social organization in honey bees. (10)

(b) Add a note on honeybee communication methods and the related experimental studies conducted to prove communication pattern in honey bees. (5)

3. (a) Describe the principles of classical and operant conditioning in associative learning, providing examples for each, and discuss how these processes contribute to behavior modification and learning in animals? (8)

(b) Describe courtship behaviour in animals and its significance. Discuss in detail the courtship behaviour of any bird/insect with help of well-labelled diagram. (7)

4. (a) Explain the different modes of communication used by animals by giving suitable examples. Analyze the advantages and drawbacks of each mode in terms of their functional relevance. (10)

(b) Explain the importance of Tinbergen's four questions in modern study of animal behaviour by giving suitable examples. (5)

5. (a) What mechanisms drive sexual selection in the animal kingdom, and how do they influence the evolution of traits related to mating success? Explain with suitable examples. (10)

(b) Explain altruism? With suitable example describe how Hamilton's rule provides the evolutionary significance of altruism. (5)

6. Write short notes on any **three** of the following : (3×5=15)

(a) Parental care

(b) Imprinting

(c) FAP

(d) Courtship behaviour in 3-spine stickleback

13

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4261 **H**

Unique Paper Code : 2233012008

Name of the Paper : DSE-8, Parasitology

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

Semester : IV, (DSE-8)

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.

2. Attempt **any five** questions in all including **question No.1**, which is compulsory.

1. (i) Define any five of the following: (5)

   (a) Definitive Host

   (b) Reservoir Host

   (c) Chromatid bars

   (d) Ectoparasite

P.T.O.

(e) Cysticercosis

(f) Mechanical vector

(g) Parasitism

(ii) Differentiate between the following: (10)

(a) Infection and infestation

(b) Epidemic and Endemic disease

(c) Anthroponosis and Zoonosis

(d) Trophozoite and Cyst

(e) Facultative and obligatory parasite

(iii) Fill up the following blanks: (5)

(a) Smallest tape worm infecting the human is _____

(b) The cercaria larva of _____ has bifid tail for penetration.

(c) Presence of _____ in liver cells cause relapse in Malaria.

(d) _____ is the infective stage of *Entamoeba histolytica*.

(e) Egg stage of *Pediculus humanus is known as* _____

(iv) Draw well labelled diagrams of the following: (5)

(a) Polymormorphic forms of Trypanasoma gambiense.

(b) Internal anatomy of Fascioplisis buski

(v) Match the following: (5)

A	B
(a) Entamoeba histolytica.	(i) ventral sucker
(b) *Plasmodium vivax*	(ii) copulatory spicules
(c) *Trichinella spiralis*	(iii) chromatoid bodies
(d) *Schistosoma haematobium*	(iv) signet ring stage
(e) Ascaris lumbricoides	(v) claspers

2. (a) Describe the life cycle and medical importance of *Pediculus humanus.* (7)

(b) Explain the parasitic adaptation, diagnosis and cure of disease caused by *Taenia solium.* (8)

P.T.O.

3. Describe the life cycle of the malaria parasite with a schematic diagram and add a note on the control strategies of the vector to prevent the disease. (15)

4. Describe the morphology, life cycle, laboratory diagnosis and treatment of *Ascaris lumbricoides.* (15)

5. What is African sleeping sickness? How is it transmitted? Describe its pathogenesis, diagnosis and treatment. Give some important control measures to prevent the disease. (15)

6. (a) Discuss in detail the life cycle, medical importance and control measures of *Schistosoma haematobium.* (9)

   (b) Write the epidemiology of *Ancyclostoma duodenale.* (6)

7. Write short notes on **any three** of the following: (3×5=15)

   (a) Pathogenecity of *Wuchereria bancrofti*

   (b) Amoebiasis

   (c) Parasite as evolutionary response

   (d) Cookicutter shark

   (e) Biology of *Xenopsylla cheopis*

(24

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 3095 **H**

Unique Paper Code : 32237903

Name of the Paper : Animal Biotechnology

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

Semester : VI (DSE)

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Answer **five** questions in all.
3. Q. No. **1** is compulsory.

1. (a) Define the following : (5)

   (i) Genetically modified organism

   (ii) Humulin

   (iii) DNA Polymerase

   (iv) Gene Therapy

   (v) Gene Knockout

P.T.O.

(b) Differentiate between any **four** of the following : (8)

(i) Adaptors and Linkers

(ii) YAC and MAC

(iii) Plasmid and M13

(iv) Southern and Northern Blotting

(v) Transformation and Transfection

(c) Expand the following : (5)

(i) BAC

(ii) NGS

(iii) SCID

(iv) SCNT

(v) RFLP

(d) Write the contributions of the following scientists. (5)

(i) Ian Wilmut and Keith Campbell

(ii) Alec Jeffreys

(iii) Smith, Nathan and Arber

(iv) Mario Capecchi & Oliver Smithies

(v) Boliver and Rodriquez

(e) Explain any **two** of the following : (2+2)

(i) Taq polymerase

(ii) Transformation efficiency

(iii) Plaque hybridization

2. (a) Describe type II restriction endonucleases and explain their mode of action. (7)

(b) Describe colony hybridization technique for the screening of genomic library. (5)

3. (a) Describe Western Blotting technique in detail with the help of appropriate diagrams. (7)

(b) Define cloning vectors. Describe the essential features of a cloning vector with suitable examples. (5)

4. (a) Explain the method of producing insect resistant transgenic plants by recombinant DNA technology. (7)

(b) How was 'Dolly the sheep' created? Explain. (5)

5. (a) What is ex-vivo gene therapy? Describe in detail. (7)

(b) Explain calcium chloride method of transformation. (5)

6. (a) Explain how recombinant Insulin is produced using recombinant DNA technology. (7)

(b) Describe the use of TALENS as a tool in gene editing. (5)

7. Write short notes on any **three** of the following : (4×3=12)

(a) Molecular diagnosis of Sickle Cell Anaemia

(b) Production of pharmaceuticals in transgenic animals

(c) Microarray

(d) Bacteriophage lambda

(e) Scope of Biotechnology

15

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 3208 **H**

Unique Paper Code : 32237906

Name of the Paper : Parasitology

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

Semester : (DSE) VI, LOCF

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **ANY FIVE** questions in all.
3. Question No. **1** is compulsory.

1. (i) Define the following terms : (5)

   (a) Prophylaxis

   (b) Stylet

P.T.O.

(c) Zoonosis

(d) Strobilation

(e) Parasitoid

(ii) Differentiate between the following (at least two points) : (10)

(a) Monogenetic and digenetic life history

(b) Biological and mechanical vector

(c) Miracidium and metacercaria larva

(d) Epidemic and endemic disease

(e) Corticated and decorticated egg

(iii) Write the causative agent/vector of the following : (5)

(a) Sleeping sickness

(b) Relapsing fever

(c) Leishmaniasis

(d) Elephantiasis

(e) Plague

(iv) Draw well labelled diagram of different morphological forms of *Entamoeba histolytica.* (2)

(v) Match the following : (5)

(i) *Entamoeba histolytica*	(a) Ventral sucker
(ii) *Plasmodium vivax*	(b) Copulatory spicules
(iii) *Trichinella spiralis*	(c) Chromatoid bodies
(iv) *Schistosoma haematobium*	(d) Signet ring stage
(v) *Ascaris lumbricoides*	(e) Claspers

2. (a) With the help of well labelled diagram, describe the asexual phase of life cycle of malarial parasites. (6)

(b) With the help of one example each, discuss the importance and control measures of parasitic ticks and mites. (6)

3. Describe the morphology, life cycle, prevalence, medical importance, diagnosis and control measures of *Leishmania donovani.* (12)

4. (a) What are root knot nematodes? Explain the life cycle of *Meloidogyne spp.* and write the symptoms of plants when infected with this parasite. Add a note on its control measures. (8)

(b) Describe the pathogenicity caused by *Entamoeba histolytica* infection. (4)

5. (a) With the help of a neat and labelled diagram write a detailed note on the life cycle of *Taenia solium.* (8)

(b) State the control measures of the arthropod parasites rat flea and bed bug. (4)

6. (a) With suitable diagrams illustrate the life cycle of *Hymenolepis nana.* Comment on the medical importance of this parasite? (8)

(b) Describe the life cycle of Head louse. (4)

7. Write short notes on any **three** of the following : (4×3=12)

(a) Trichinellosis

(b) Vampire bat

(c) Giardiasis

(d) Parasitism as an evolutionary response