[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 761 **B**

Unique Paper Code : 32231202

Name of the Paper : Cell Biology

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

Semester : II (CBCS-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.
3. Question No. **1** is compulsory.
4. Give neat labeled diagrams wherever necessary.

1. (a) Define the following : (6)

   (i) Prion

   (ii) Mycoplasma

   (iii) Glycocalyx

P.T.O.

(iv) Cajal bodies

(v) Kinetochore

(vi) Restriction point

(b) Differentiate between the following : (10)

(i) Virus and Viroids

(ii) Heterochromatin and Euchromatin

(iii) Prokaryotic cell and Eukaryotic cell

(iv) Exocytosis and Endocytosis

(v) COP I and COP II

(vi) Apoptosis and necrosis

(c) Expand the following : (5)

(i) MTOC

(ii) FADD

(iii) Cdk

(iv) SRP

(v) NOR

(d) Give the contribution of the following scientists: (3)

(i) Sabatini and Blobel

(ii) Rudolf Virchow

(iii) Earl W. Sutherland

(e) Give the function of the following : (3)

(i) p53

(ii) Kinetochore

(iii) Colchicine

2. (a) Describe the various polymorphic forms of Lysosomes and add a note on the role of Lysosome in organ regression. (6)

(b) What is Oxidative phosphorylation? Explain the mechanism of generation of ATP in mitochondria. (6)

3. (a) Describe the fluid mosaic model of plasma membrane. Explain the various transport mechanisms across the membrane. (8)

(b) Write about various functions of SER. (4)

P.T.O.

4. (a) Give an account of the assembly and functions of microtubules. (5)

(b) What is cell signaling? Explain the mechanism of signal transduction through G-protein coupled receptors. (7)

5. Describe important molecular events of different stages of cell-cycle and discuss the role of cyclins, Cdks and checkpoints in regulation of cell cycle. (12)

6. (a) Explain the secretory pathway of endomembrane system in cell. (8)

(b) Justify that Mitochondria is a semiautonomous organelle. (4)

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

(i) Nucleo-cytoplasmic exchange

(ii) Clathrin coated pits

(iii) Chromatin Packaging

(iv) Peroxisome

(v) Cell junctions

(9d)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1194 **B**

Unique Paper Code : 32235907

Name of the Paper : GE: Human Physiology

Name of the Course : B.Sc./B.Com /B.A Theory Examination, July-2022

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. Attempt five questions in all.
3. Question No. 1 which is compulsory.

1. (a) Define each of the following terms :

(i) Resting membrane potential

(ii) Stroke Volume

(iii) Ultrafiltration

(iv) Triad

(v) Synapse (5)

P.T.O.

(b) Differentiate between each of the following pairs :

(i) Depolarization and Repolarization

(ii) Parathormone and Calcitonin

(iii) End-diastolic volume and End-systolic volume

(iv) Chyme and Chyle

(v) Primary follicle and Graafian follicle

(10)

(c) Expand the following :

(i) CCK

(ii) ADH

(iii) GABA

(iv) IGA (4)

(d) Fill in the blanks :

(i) Oogonia are arrested at the _____ phase of Meiosis I inhuman female reproductive cycle.

(ii) _____ binds with troponin to expose myosin binding sites for cross bridge [illegible]

(iii) The anatomical area in lungs that does not undergo respiratory exchange is known as _____.

(iv) The neurotransmitter released at the neuromuscular junction is _____.

(4)

(e) Give the location and function of each of the following structures :

(i) Schwann cells

(ii) Crypts of Lieberkuhn

(iii) Bundle of His

(iv) Sertoli cells (4)

2. (a) Describe the digestion and absorption of carbohydrates in the digestive tract. (8)

(b) Give a brief account of different types of secretory cells present in stomach. (4)

3. (a) Discuss the generation and conduction of action potential through myelinated and unmyelinated nerve fibre. (9)

(b) Discuss the role of calcium ions in muscle contraction. (3)

P.T.O.

4. (a) Discuss the physiological process of urine formation in human kidney. (8)

(b) Discuss the role of pancreas in glucose homeostasis. (4)

5. (a) Discuss the various phases of cardiac cycle. (9)

(b) Describe the structure of human heart with a suitable diagram. (3)

6. (a) Describe the changes that occur during the various phases in a menstrual cycle. (7)

(b) Give explain briefly the process of spermatogenesis. (5)

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

(a) Transport of oxygen in blood

(b) Neural control of digestion

(c) Electrocardiogram

(d) Structure of Adrenal gland (4,4,4)

May 2022

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 743 **B**

Unique Paper Code : 32231201

Name of the Paper : Non Chordata II – Coelomates

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

Semester : II

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. Including Question No. **1** which is compulsory.

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

   (i) Deuterostomes

   (ii) Ecdysis

   (iii) Detorsion

   (iv) Metamerism

P.T.O.

(b) Differentiate between the following pairs : (2×4=8)

(i) Polychaeta and Oligochaeta

(ii) Atoky and Epitoky

(iii) Enterocoely and Schizocoely

(iv) Ctenidia and Taenidia

(c) Name the exact location and function of the following : (1×4=4)

(i) Radula

(ii) Tiedemann's body

(iii) Gnathobase

(iv) Respiratory tree

(d) Classify the following upto class and write their scientific name. (2×3=6)

(i) Cake urchin

(ii) Cuttlefish

(iii) Horseshoe crab

(e) Match the following : (1×5=5)

(i) Spider	(a) Aristotle's lantern
(ii) Octopus	(b) Chelicera
(iii) Leech	(c) Mandible
(iv) Sea urchin	(d) Radula
(v) Cockroach	(e) Jaw

2. (a) Give a brief account of larval forms of Echinodermata with diagrams. (7)

(b) Explain the mechanism of torsion in Gastropoda. (5)

3. (a) Give the structure of compound eye and explain its functioning with diagrams. (7)

(b) Briefly discuss the defence mechanisms existing among echinoderms. (5)

4. (a) Give a brief account of respiratory organs in Arthropods and discuss the mechanisms of respiration in insects. (7)

P.T.O.

(b) Discuss the Pulmonary respiration in Mollusca. (5)

5. Give a detailed description of excretion in Annelida with diagrams. (12)

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

(i) Affinities of Onychophora.

(ii) Hormonal control of metamorphosis in insects.

(iii) Pearl formation.

(iv) Copulation and cocoon formation in leech.

[This question paper contains 6 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1382 **A**

Unique Paper Code : 32231402

Name of the Paper : Animal Physiology : Life Sustaining systems

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

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 **FIVE** questions in all.
3. Question No. **1** is compulsory.
4. Draw diagrams where ever required.

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

   (i) Antiporter

   (ii) Plasminolysis

   (iii) Haustral churning

P.T.O.

(iv) Herring-Breuer reflex

(v) Ectopic focus

(b) Differentiate between the following : (10)

(i) Isovolumetric ventricular systole and diastole

(ii) Peristalsis and Segmentation

(iii) Bohr and Haldane effect

(iv) Hemopoiesis and Hemostasis

(v) Tubular secretion and tubular absorption

(c) Expand the following (any FOUR) : (2)

(i) TPO

(ii) IRV

(iii) MMC

(iv) ECG

(v) MALT

(d) Give **ONE** word for the following : (4)

(i) The cells secreting lysozyme in the small intestine.

(ii) The clotting factor responsible for platelet aggregation.

(iii) Ions that move from the peritubular capillaries into the tubular lumen.

(iv) The physiological condition when arterial PCO_2 is less than 40 mmHg.

(e) Give the location and function of any **FOUR** of the following : (4)

(i) Kupfer cells

(ii) K cells

(iii) Chordae tendineae

(iv) Septal cells

(v) Podocytes

(f) Give reasons for any **TWO** of the following : (2)

(i) Facultative reabsorption of water occurs only in DCT.

(ii) A physiological condition that leads to impaired absorption of Vitamin B_{12}.

(iii) The intrapleural pressure is always sub-atmospheric.

2. (a) How is the blood pressure regulated? Explain.

(b) Describe the intrinsic and extrinsic clotting pathways. (7,5)

3. (a) What are the different phases of digestion? Discuss in detail.

(b) Write a note on absorption in small intestine. (8,4)

4. (a) What are the various mechanisms of Tubular absorption and Tubular secretion in PCT?

(b) Draw the detailed structure of a nephron.

(c) Why glomerular capillary pressure is higher than the pressure in normal blood capillaries? (7,3,2)

5. (a) Explain the interplay of erythrocyte and haemoglobin in carrying O_2 and CO_2.

(b) Describe the muscles responsible for thoracic movements during inhalation and exhalation. (8,4)

6. (a) Describe the structural and functional characteristics of cardiac muscle tissue and the conduction system of the heart.

(b) Discuss the unique features of action potential and contraction of cardiac muscle fibers. (6,6)

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

(b) Explain the reasons preventing the clotting of blood in blood vessels.

(c) Given that the Cardiac Output is 5l/minute, Heart Rate is 75 beats/minute and the End Diastolic Volume is 140 ml/minute, calculate the stroke volume of the patient. (7,3,2)

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

(i) Life cycle of RBC

(ii) Countercurrent exchange mechanism

(iii) Coronary circulation

(iv) Pulmonary volumes and capacities.

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1400 A

Unique Paper Code : 32231403

Name of the Paper : Biochemistry of Metabolic Processes

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

Semester : IV, Core

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.
3. Question No. 1 is compulsory.
4. Illustrate your answers with diagrams/structures wherever necessary.

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

   (i) Ubiquinone

   (ii) Fermentation

   (iii) Oxidative deamination

P.T.O.

(iv) Reducing equivalents

(v) Ketosis

(b) Expand the following : (3)

(i) PEPCK

(ii) NADP

(iii) HMG-CoA

(iv) PLP

(v) UDPG

(vi) ALT

(c) Differentiate between the following : (10)

(i) Oxidative phosphorylation and Substrate level phosphorylation

(ii) Ketonuria and Phenylketonuria

(iii) Glycogenolysis and Glycogenesis

(iv) Anabolism and Catabolism

(v) Hexokinase and Glucokinase

(d) Fill in the blanks : (5)

(i) Glucose 6-phosphate is converted to glucose by _____ enzyme in the liver.

(ii) Biotin is required for the functioning of _____ enzyme.

(iii) _____ is another name for pentose phosphate pathway.

(iv) The w-oxidation of fatty acids occurs in _____ .

(v) Nitrogen of Urea molecule comes from _____ and _____ .

(e) Write the reaction catalyzed by the following enzymes (with structures): (4)

(i) Pyruvate carboxylase

(ii) Lactate dehydrogenase

(iii) PFK

(iv) Glycerol phosphate dehydrogenase

2. (a) Give a detailed account of the Citric acid cycle with the help of structures. (9)

(b) Add a short note on the Cori cycle. (3)

3. (a) Describe Ornithine cycle in detail specifically mentioning steps that take place in the cytoplasm and mitochondria. (9)

P.T.O.

(b) How does our body metabolically adapt during prolonged starvation? (3)

4. (a) Describe in detail various steps of pentose phosphate pathway (only diagrammatic representation). (9)

(b) What is the role of debranching enzyme in glycogenolysis. (3)

5. (a) Describe the process of beta-oxidation of C-16 saturated fatty acid. (9)

(b) What extra steps are required for the oxidation of saturated fatty acids with odd number of carbon atoms. (3)

6. (a) Give a detailed account of the structure of ATPase complex. (6)

(b) Explain the chemical mechanism that couples proton flux with phosphorylation? (6)

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

(i) Fate of Carbon skeleton of ketogenic amino acids

(ii) Shuttle systems

(iii) Oxidative decarboxylation of Pyruvate

(iv) Hydrophobic electron carriers

May 2022

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1155 A

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 **five** questions in all including Q. No. 1 which is compulsory.

1. (a) Explain the following terms :

(i) Sigmoid notch

(ii) Carnassial teeth

(iii) Crop milk

(iv) Polyphydont

P.T.O.

(v) Ampullae of Lorenzini (5)

(b) Give the exact location and functions of the following :

(i) Semilunar valves

(ii) Pecten

(iii) Diastema

(iv) Deltoid Ridge

(v) Pessulus

(vi) Aqueduct of Sylvius (6)

(c) Distinguish between the following :

(i) Plantigrade and digitigrade

(ii) Neurocranium and Splanchnocranium

(iii) Crista and Macula

(iv) Bipartite and Bicomuate uteri

(v) Pterylae and Apterylae

(vi) External and Internal Glomeruli (12)

(d) State whether the following statements are true or false and justify your answer :

(i) A rabbit has binocular vision.

(ii) The Reptilian skull is monocondylic.

(iii) IX cranial nerve is called Vagus.

(iv) Ductus caroticus is the dorsal aorta between aortic arches IV and V. (4)

2. Trace the evolution of heart in various groups of vertebrates with suitable diagrams. Differentiate between single and double circuit hearts. 12

3. (a) Give a comparative account of succession of kidney in vertebrates building upon a hypothetical basic pattern.

(b) Write short note on Syrinx in birds. (8,4)

4. (a) Classify vertebrae on the basis of centrum.

(b) Describe epidermal glands in vertebrates. (4,8)

5. (a) What is jaw suspensorium. Explain various types of jaw suspension in vertebrates. (9)

P.T.O.

(b) Differentiate between Lamelliform and Filliform gills. (3)

6. (a) Explain dentition taking following aspects into consideration –

(i) degree of permanence

(ii) mode of attachment

(iii) morphological variants

(iv) patterns of cusps

(b) Write short note on Ruminant stomach. (9,3)

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

(i) Swim bladder

(ii) Classification of receptors

(iii) Scales of fishes

(iv) Avian lungs (4,4,4)

(9)

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1966 **A**

Unique Paper Code : 32235901

Name of the Paper : GE: Animal Cell Biotechnology

Name of the Course : **B.Sc. / B. Com. / B.A. Theory Examination May/June 2022**

Semester : (GE), 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 **five** questions in all, including Question No. **1** which is compulsory.
3. Illustrate your answers with appropriate diagrams wherever necessary.

1. (a) Define the following terms: 5
   (i) Cryopreservation
   (ii) Chimeric DNA
   (iii)Hybridoma
   (iv)Transgenesis
   (v) Palindromic sequences

   (b) Differentiate between: 2x5=10
   (i) Type I and Type II restriction endonucleases
   (ii) Southern and Western Blotting
   (iii)Transgenic animal and Cloned animal
   (iv)Upstream and Downstream processing
   (v) Submerged and Solid-state fermentation

P.T.O.

(c) Expand the following: 5
(i) MCS
(ii) YAC
(iii) PAGE
(iv)ddNTP
(v) RT

(d) State the contribution of the following scientists: 2
(i) Kary Mullis
(ii) Karoly Ereky

(e) Fill in the blanks: 5
(i) Enzymes that recognize the same sequence but cleave at different points are known as .....
(ii) Incubation with Calcium ions make the cells .....to take up DNA.
(iii)Media composed of animal body fluids, such as plasma, lymph, and serum is known as .....
(iv)DNA fragments that are present in multiple copies in the genome are .....
(v) An ..... vector contains sequences upstream of the cloned gene that control transcription and translation of the cloned gene.

2. a) What are the properties of a good vector? 4+8
b) Give an account of cloning vectors used in biotechnology.

3. a) What are monoclonal antibodies? How are they made using hybridoma technology? 8+4
b) Discuss the methodology of production of recombinant Growth hormone by recombinant DNA technology in brief.

4. a) What is DNA fingerprinting technique and its applications? 8+4
b) Discuss the principle of Affinity chromatography.

5. a) What is the scope of Biotechnology? 6+6
b) Differentiate between agarose and polyacrylamide gel electrophoresis.

6. a) Explain any one transformation method used in biotechnology. 6+6
b) Describe the various steps involved in Recombinant DNA technology with the help of a well labelled diagram.

7. Write short notes on any THREE of the following: 3x4=12
(i) Batch fed Fermentation
(ii) DNA microarray
(iii) DNA microinjection method
(iv) PCR
(v) Electroporation

(100)

[This question paper contains 6 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1689 **A**

Unique Paper Code : 42234406

Name of the Paper : Genetics and Evolutionary Biology

Name of the Course : **B.Sc. (Prog.) Life Sciences**

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 Section **A** & **B** on separate sheets.

SECTION A – GENETICS

Answer **three** questions in all.
Question No. **1** is compulsory

1. (a) Distinguish between any **three** the following : (2×3)

P.T.O.

(i) Induced mutations & Spontaneous mutations

(ii) Dominant epistasis and recessive epistasis

(iii) Aneuploidy and polyploidy

(iv) Coupling phase and repulsion phase

(v) Intersex and gynandromorph

(b) Define any four of the following : (1×4)

(i) Lethal alleles

(ii) Heterogametic sex

(iii) Holandric inheritance

(iv) Pleiotropy

(v) Interference

(c) Justify the following statements **(any two)** : (1×2)

(i) Shell coiling pattern in the Limnaea offspring is determined by the genotype of the mother.

(ii) Recombination frequency between two genes cannot exceed 50%.

(iii) The Drosophila with chromosome combination as XXY is female

(d) Name a human syndrome associated with the following : (½×4)

(i) Monosomy

(ii) Trisomy

(iii) Chromosomal Deletion

(iv) Chromosomal translocation

2. (a) What is epistasis? Name different types of epistasis and explain any two. (7)

(b) Determine the sex of the individuals for the given chromosomal arrangements in Drosophila: (5)

(i) 3X 4A

(ii) 2X 3A

(iii) 1X 3A

(iv) 2X 2A

Briefly explain the basis of sex determination.

3. (a) The data obtained from a three factor test-cross is as follows :

Genotype	Number of progenies
XYz/xyz	475
xyZ/xyz	495
XYZ/xyz	14
xyz/xyz	16
xYZ/xyz	98
Xyz/xyz	102
xYz/xyz	144
XyZ/xyz	156

Based on the given data,

(i) Determine the order of gene

(ii) Draw a linkage map and calculate the map distance between the genes

(iii) Calculate the coefficient of coincidence and interference. (9)

(b) How Somatic cell genetics can be used in gene mapping in eukaryotes. (3)

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

(a) Cytoplasmic inheritance

(b) Inversion

(c) Dosage compensation

(d) Chromosomal theory of inheritance

SECTION B – EVOLUTTONARY BIOLOGY

Attempt **three** questions in all, including Question No. **1** which is compulsory.

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

(i) Coprolites

(ii) Directional selection

(iii) Coacervates

(iv) Cline

(v) Ring species

(vi) Organic variation

(b) Differentiate **(any three)** : (2×3)

(i) Mold and cast

(ii) Allopatric and sympatric speciation

P.T.O.

(iii) Homology and analogy

(iv) Microevolution and Macroevolution

(c) State the contributions of the following scientists **(any two)** : (1×2)

(i) Georges Cuvier

(ii) Ernst Mayr

(iii) Miller and Urey

2. What are isolating mechanisms? Describe various isolating mechanisms with suitable examples. (12)

3. Illustrate the role of fossil records in understanding the evolution of horse. (12)

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

(a) Endosymbiotic theory

(b) Mass extinction

(c) Genetic drift

(d) Adaptive radiation

(e) Neo-Darwinism

[This question paper contains 4 printed pages.]

Your Roll No.....

A

Sr. No. of Question Paper : 1235

Unique Paper Code : 32237903

Name of the Paper : Animal Biotechnology

Name of the Course : **B.Sc. (H) Zoology Examination, 2022-LOCF**

Semester : VI – Theory Examination

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. Write your Roll No., Name of the paper, Course, Semester, and Date of examination on the first page of answer sheet.
3. Attempt **five** questions in all.
4. Question No. 1 is compulsory.

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

(i) Transfection

P.T.O.

(ii) Transgene

(iii) Plasmid

(iv) Polylinker

(v) DNA microarray

(b) Expand the following terms : (5×1=5)

(i) TALEN

(ii) MAC

(iii) VNTR

(iv) RFLP

(v) ASO

(c) Differentiate between the following : (6×2=12)

(i) Real time PCR and Reverse transcription PCR

(ii) Cosmid and phagemid

(iii) Westem and Southern blotting

(iv) Agarose gel and polyacrylamide gel electrophoresis

(v) Isoschizomer and Isocaudomer

(vi) Insertion and Replacement lambda vector.

(d) Explain the contribution of following scientists in the field of Biotechnology : (5×1=5)

(i) Watson and Crick

(ii) Sanger

(iii) Sir Alec JefFerey

(iv) Fredrick Griffith

(v) Arber, Nathans and Smith

2. (a) Explain the Embryonic Stem Cell method of producing transgenic animals. (6)

(b) Discuss the use of Ti plasmid for introduction of genes into plants. (6)

3. (a) Explain the principle of Sanger's chain termination method. (6)

(b) Discuss the applications of PCR. (6)

4. (a) Describe the CRISPR-CAS system as a gene editing tool. (6)

(b) Explain the process of genetic recombination with Cre-lox P recombination system. (6)

5. Explain the process of molecular diagnosis of Cystic Fibrosis. (12)

6. Write short note on the following **(Any two)** : (6×2=12)

(i) Recombinant Growth Hormone

(ii) DNA Microarray

(iii) Insect Resistant Plants

(iv) Type II restriction endonucleases

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1364 A

Unique Paper Code : 32231602

Name of the Paper : Evolutionary Biology

Name of the Course : B.Sc. (H) 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. Attempt Five Questions in all including Question No. 1 which is compulsory.

1. (a) Define the following :

   (i) Stromatolites

   (ii) Inbreeding coefficient

   (iii) Sister taxon

   (iv) Ring species

   (v) Gene flow

   (vi) Molecular clock (1×6=6)

P.T.O.

(b) Differentiate between the following :

(i) Parapatric and Peripatric modes of speciation

(ii) Rooted and Unrooted trees

(iii) Background and mass extinction

(iv) Stabilizing and disruptive selection (2×4=8)

(c) Mention the contributions of following :

(i) Raymond Dart

(ii) Alaxander Oparin

(iii) Theodosius Grygorovych Dobzhansky

(iv) Barbara McClintock

(v) Henry Bernard Davis Kettlewell (1×5=5)

(d) Justify the following statements :

(i) Horse evolution didn't proceed in a straight line.

(ii) Drift changes the gene frequency but inbreeding does not

(iii) Over-reproduction is the driving force of evolution.

(iv) Prokaryotic cells have given rise to aerobic eukaryotic cell (2×4=8)

2. (a) What are the 'isolating barriers' for species? With suitable examples, elaborate the barriers that operate before the formation of zygote. (8)

(b) Outline the merits and demerits of RNA-world hypothesis. (4)

3. (a) Describe various sources of genetic variations at individual and population level? (8)

(b) Explain how migration causes changes in allele frequency among populations. (4)

4. (a) Discuss the paleontological evidences of evolution with suitable examples. Also, briefly comment upon different types of fossils. (8)

(b) Justify the statement, 'Incompleteness of fossil records does not disprove the theory of evolution.' (4)

P.T.O.

5. (a) Discuss the different types of natural selection with suitable examples. (6)

(b) What do you understand by 'Hardy-Weinberg equilibrium'? Comment upon its assumptions and applications. (6)

6. What are the unique hominin characteristics in contrast to primates? Trace the primate phylogeny from *Dryopithecus* leading to *Homo sapiens*. (12)

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

(a) K-T extinction

(b) Modern synthetic theory

(c) Biological species concept

(d) Geological time scale (3×4=12)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1603 **A**

Unique Paper Code : 42237904

Name of the Paper : Immunology – (DSE 4)

Name of the Course : **B.Sc. (P) Life Sciences (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. Attempt **Five** questions in all.
3. Question No. **1** is compulsory.

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

   (i) Hapten

   (ii) Extravasation

   (iii) Affinity

   (iv) Epitope

   (v) Autoantigen

P.T.O.

(b) Expand the following : (3)

(i) MAC

(ii) CTL

(iii) HLA

(iv) CDR

(v) CLIP

(vi) HGPRT

(c) Differentiate between the following : (10)

(i) Humoral immunity and Cell mediated immunity

(ii) Memory cells and plasma cells

(iii) Allotypic variation and Idiotypic variation

(iv) Opsonization and ADCC

(v) T_H and T_C cells

(d) Fill in the blank : (3)

(i) Macrophages like cells in Liverare called _____ cells.

(ii) The first evidence of antibody asa serum protein was described by _____ .

(iii) _____ class of antibody has a role in Type I Hypersensitivity.

(e) Write contribution of the following scientist : (2)

(i) Louis Pasteur

(ii) K. Prausnitz and H. Kustner

(iii) Kohler and Milstein

(iv) Karl Landsteiner

(f) Explain why : (4)

(i) Serum IgM cannot activate complement by itself.

(ii) T_C cells are said to be MHC class I restricted.

2. (a) Describe the role of various barriers of innate immunity in humans.

(b) What are primary lymphoid organs? Discuss their structure and functions. (6,6)

3. (a) Discuss various cardinal signs of inflammatory response.

(b) What is Hypersensitivity? Discuss its various types. (4,8)

4. (a) How endogenous antigens are processed and presented. Explain with the help of appropriate diagram(s).

(b) What are monoclonal antibodies. Write a note on their production by hybridoma technology. (6,6)

5. (a) Give a detailed account of the classical pathway of complement activation.

(b) Define MHC. Compare the structure of MHC I and MHC II. (6,6)

6. (a) Give a brief account of different types of vaccine.

(b) Write properties and function of cytokines. (8,4)

7. Write short notes **(any three)** :

(i) Antigen presenting cells

(ii) Autoimmunity

(iii) Clonal Selection theory

(iv) AIDS (4,4,4)

(1200)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1243 **A**

Unique Paper Code : 32237911

Name of the Paper : Wildlife Conservation and Management

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

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.

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

   (i) Sere

   (ii) Quarantine

   (iii) Carrying capacity

   (iv) Ecotourism

   (v) GPS

P.T.O.

(b) Distinguish between the following : (6)

(i) Conservation and Preservation

(ii) Trail and Run

(iii) Controlled Grazing and Patch-burn Grazing

(iv) Wildlife Sanctuary and Biosphere Reserve

(c) Expand the following : (4)

(i) CITES

(ii) CBD

(iii) MOEFCC

(iv) NBWL

(d) Fill in the blanks : (4)

(i) National parks are categorized as _____ under IUCN categories of protected areas.

(ii) _____ is the state animal of Delhi.

(iii) World Wildlife Day is celebrated on _____ every year.

(iv) Tiger Census is conducted by _____ after every _____ years.

(e) Give reasons : (4)

(i) Prescribed fire is more efficient method of setting back succession than mowing.

(ii) Five snag trees per hectare is left during silvicultural operations.

(f) Illustrate following with the help of diagrams (no description required) : (4)

(i) Hind pugmark of a male tiger

(ii) Zones of a Biosphere Reserve

2. (a) Describe the various components of Very High Frequency Radio Tracking. Enlist various advantages and disadvantages of this method.

(b) Briefly explain the concept of climax community and its relevance in wildlife management. Add a note on various theories related to climax community. (6,6)

3. (a) Describe the various factors responsible for the depletion of wildlife.

(b) What is sustainable development? Write the major objectives of World Conservation Strategy, 1980. (6,6)

4. (a) Describe the importance of preserving genetic

diversity in an ecosystem.

(b) What all information can be collected from a series of scat samples collected from a forest during a wildlife survey? (6,6)

5. (a) Describe *any one* disease of wildlife emphasizing on its causative agent, reservoir, symptoms and control measures.

(b) Describe the different types of Protected Areas found in India. Add a note on major challenges faced in Protected Areas. (6,6)

6. (a) What is a habitat? Describe the various biological parameters of a habitat that need to be modified for wildlife management.

(b) What is conservation ethic? Describe briefly various theories related to them. (6,6)

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

(a) Ecological Restoration

(b) Census method

(c) Identification of hairs in scat samples

(d) Human-wildlife conflict

(e) Ecological perturbation

[This question paper contains 6 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1329 **A**

Unique Paper Code : 32237911

Name of the Paper : Wildlife Conservation and Management

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

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.
3. Question no. **1** is compulsory.

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

   (i) Trails

   (ii) Ecological restoration

P.T.O.

(iii) Mowing

(iv) Zoonosis

(v) GIS

(b) Distinguish between the following : (6)

(i) Conservation reserves and community reserves

(ii) Pugmark of male and female tiger

(iii) VHFR tracking and GPS tracking

(iv) Keystone species and foundation species

(c) Expand the following : (4)

(i) WCED

(ii) IUCN

(iii) NCS

(iv) CDC

(d) Give reasons : (4)

(i) Conservation Biology is a multidisciplinary science.

(ii) In an abandoned crop field, advancing succession is recommended for cover construction.

(e) Fill in the blanks : (4)

(i) _____ is the chairman of NBWL.

(ii) Logo of World Wildlife Fund for Nature is _____.

(iii) _____ is called as the father of Wildlife Management.

(iv) The layer of hair used for forensic identification between different human individuals is _____.

(f) Illustrate following with the help of diagrams (no description required) : (4)

(i) Line transect method

(ii) A canid pugmark

2. (a) Enlist different Ex situ conservation strategies for wildlife. What are the different techniques followed at animal research centres/Zoos around the world to conserve endangered animals?

   (b) Why quarantine in wild animals is done? Where is it done? What are the sanitary protocols and safety protocols followed during quarantine? (6,6)

3. (a) When was project tiger initiated in India? What are its objectives and outcomes? Give any two examples of tiger reserves in India.

   (b) What are the different census techniques used to enumerate wild animals in a forest? (6,6)

4. (a) What are the different approaches used for the restoration of degraded habitats. Why the ease of restoration depends on the state of the soil.

   (b) Briefly describe various mechanical applications that can be used for setting back succession. Why is Dozer-clearing often followed by root-plowing in setting back succession? (6,6)

5. (a) What are the important components of GIS? Add a note on its applications.

   (b) Describe various ethical perspectives for wildlife management and conservation. (6,6)

6. (a) Briefly describe various physical factors that can be manipulated for wildlife conservation and management?

   (b) What is ecotourism? Describe the various pros and cons of ecotourism. Mention any three ecotourism places in India. Which is the first planned ecotourism destination in India? (6,6)

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

   (a) Climax Community

   (b) Perturbation

   (c) Value of Wildlife

P.T.O.

(d) World Conservation Strategy

(e) Causes of Wildlife depletion