(4) B

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1051 **D**

Unique Paper Code : 2232011102

Name of the Paper : DSC-2 Biology of Cell: Structure and function

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

Semester : I

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 **FOUR** questions in all.
3. **Question No. 1** is compulsory

1. (a) Define: (1×3=3)

   (i) Lipid rafts

   (ii) Lamins

P.T.O.

(iii) Microfilaments

(b) Write exact location and function of the following (any three): (1×3=3)

(i) Mannose-6-phosphate

(ii) Cytochrome p450

(iii) SDH

(iv) Hydrolases

(c) State the contributions of (any three): (1×3=3)

(i) Hugh Davson and James Danielli

(ii) Camillo Golgi

(iii) David Sabatini and Gunter Globel

(iv) Christian de Duve

(d) Fill in the blanks: (1×4=4)

(i) Ion channels that open in response to binding of neurotransmitters or other signalling molecules are called _____.

(ii) _____ organelle is also referred to as dictyosome.

(iii) Chromosome is maximally condensed at _____ stage.

(iv) _____ ions are used to generate one molecule ATP in mitochondria.

(e) Expand the following: (1x2)

(i) SRP

(ii) MPF

2. (a) Describe the operation of Na^+- K^- pump with the help of suitable diagram. (6)

(b) Explain the various modifications that proteins undergo in the lumen of ER. (7)

(c) Why are Lysosomes called "Suicidal bags"? (2)

3. (a) How are cells organized into tissues? Explain the various types of "Cell-to-Cell interactions". (8)

(b) Discuss how peroxisomes are involved in detoxification process. (4)

P.T.O.

(c) Explain Endosymbiotic theory. (3)

4. (a) Give an account of the components of Electron Transport Chain and its role in cellular respiration. (7)

(b) Explain the structure of nuclear pore complex with well labelled diagram. (4)

(c) Why Nucleolus are called RNA factory, explain how various ribosomes are organized with well labelled diagram? (4)

5 (a) Explain cell cycle and discuss its molecular regulation through check points. (12)

(b) Elucidate the role of cAMP as second messenger. (3)

6. (a) Explain treadmilling in microfilaments. How are microfilaments arranged in microvilli? (8)

(b) What are the various models of plasma membrane? (7)

(6)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1072 D

Unique Paper Code : 2232011103

Name of the Paper : DSC-3, Concepts of Ecology

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

Semester : 1 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 **four** questions in all.
3. **Question no. 1** is compulsory.

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

(i) Guilds

P.T.O.

(ii) Ecosystem

(iii) Ecological efficiency

(iv) Keystone species

(b) Distinguish between the following: (6)

(i) Grazing and detritus food chain

(ii) Amensalism and Commensalism

(iii) Autogenic and Allogenic succession

(c) Fill in the blanks: (2)

(a) _____ is a type of biological interaction where one species causes harm to another organism without any harm or benefits to itself.

(b) _____ life tables are the most accurate types of life tables.

(d) Name the scientists associated with the following terms: (3)

(i) Competitive exclusion principle

(ii) Ecology

(iii) Life Table

2. (a) Describe density dependent regulation of a population. (7)

(b) Briefly describe Shelford's Law of Tolerance with the help of suitable examples. (4)

(c) Elaborate the differences between autecology and synecology (4)

3. (a) Describe various possible outcomes of inter-specific competition with graphical representation and equations. (9)

(b) Differentiate between r-selected and k-selected species. (6)

4. (a) Define ecological succession? Give the differences between pioneer and climax community. (6)

(b) Explain the phenomenon of primary succession in a community with an example. (9)

5. (a) What are Biogeochemical cycles? Explain the role of micro-organisms in Nitrogen cycle. Along with a neat labelled diagram of Nitrogen cycle (10)

(b) Define Food chain. Explain the differences between Linear and Y-shaped food chain, with examples. (5)

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

(a) Light as a limiting factor

(b) Ecological Pyramids

(c) Types of species interactions

(d) Survivorship curves

(e) Ecotone and edge effect

(f) Vertical stratification in forests

Dec-2022

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1011 **D**

Unique Paper Code : 2232521101

Name of the Paper : Diversity of Animals (DSE-3)

Name of the Course : **B.Sc. (P) Life Science UGCF**

Semester : I

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.
3. **Question No. 1** is compulsory.
4. Illustrate your answers with diagram wherever necessary.

P.T.O.

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

(i) Schizocoelom

(ii) Biradial symmetry

(iii) Primary host

(iv) Apolysis

(v) Retrogressive Metamorphosis

(b) Give the scientific name for the following: (2)

(i) Venus' flower basket

(ii) Pork tape worm

(iii) House lizard

(iv) Lancelet

(c) Differentiate between the following (2×4=8)

(i) Mature and gravid proglottid

(ii) Torsion and detorsion

(iii) Anadromous and catadromous

(iv) Longitudinal and latitudinal migration

2. (a) Discuss the types of canal system in Porifera. Add a note on the significance of canal system. (10)

(b) Explain the ciliary mode of locomotion in Protozoa. (5)

3. (a) Discuss the parasitic adaptations of *Taenia solium*. (8)

(b) Explain the structure of water vascular system in echinoderms. Add a note on its function. (7)

4. (a) Explain the biting mechanism of venomous snakes. (6)

(b) Give an account of flight adaptation in birds. (9)

P.T.O.

5. (a) Describe osmoregulation of teleost fishes in marine and freshwater? Explain the mechanism of osmoregulation in sharks. (6+2=8)

(b) Explain the parental care in amphibians with examples. (7)

6. Write short note on ANY THREE of the following: (3×5=15)

(i) Polymorphism in Hydrozoa

(ii) Metamerism in Annelids

(iii)Origin of Mammals

(iv) Salient features of chordates

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1282 **D**

Unique Paper Code : 2234001001

Name of the Paper : GE-1: Human Physiology

Name of the Course : **B.Sc/B.Com/B.A Theory Examination, March-2023**

Semester : I, 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 **Four** questions in all.
3. **Question No.1** is compulsory.
4. Draw well labelled diagrams wherever required

P.T.O.

1. (a) Define each of the following terms: (4)

(i) Peristalsis

(ii) SA Node

(iii) Intercostal muscles

(iv) Synapse

(b) Differentiate between each of the following pairs: (6)

(i) Skeletal muscle and Smooth muscle

(ii) Ingestion and Digestion

(iii) Sertoli cells and Leydig cells

(c) Fill in the blanks: (2)

(i) In the absence of _____ hormone,the kidney produce more dilute urine

(ii) _____ is the endocrine part of pancreas.

(d) Give the location and function of each of the following structures: (3)

(i) Kuffer's cells

(ii) Apocrine Sweat glands

(iii) Chordae tendinae

2. (a) How does the digestion and absorption of carbohydrates takes place in digestive tract? (7)

(b) Discuss in details the structure and function of the epithelial and connective tissue (8)

3. (a) Discuss in details the structure and function of the respiratory tract and the lungs. (10)

(b) How does the transport of oxygen takes place in the blood.? (5)

4. (a) Describe the functional anatomy of Kidney. (6)

(b)Explain the structure of testis and discuss the process of spermatogenesis. (9)

5. (a) Describe the sliding filament theory of muscle contraction. (8)

(b) Explain the structure of heart. (7)

P.T.O.

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

(a) Composition of blood

(b) External and internal respiration

(c) Nervous tissue

(d) Functions of liver (5,5,5)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1032 **D**

Unique Paper Code : 2232011101

Name of the Paper : Non Chordata-Protista to Pseudocoelomates (DSC-1)

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

Semester : I

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.

P.T.O.

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

(a) Eutely

(b) Polyembryony

(c) Cyclosis

(d) Metaboly

(e) Apolysis

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

(a) Trophocytes and Thesocytes

(b) Definitive host and Intermediate host

(c) Gonozooid and Gastrozooid

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

(a) Malarial parasite is a digenetic organism.

(b) The totipotent cells of sponges are the archeocytes.

(c) Siphonophore cnidarians exhibit polymorphism.

(d) *Taenia solium* has a well-developed digestive system.

(iv) Give generic names of the following and classify up to class **(any three):** (3)

(a) Glass rope sponge

(b) Slipper animalcule

(c) Organ pipe coral

(d) Jelly fish

2. (a) Mention the types of locomotor organelles in Protozoa. Explain briefly how they bring about locomotion.

(b) Describe the various modes of asexual reproduction in Protozoa. (9+6)

3. What are coral reefs? Write all you know about coral formation mentioning clearly various forms of coral reefs met with all over the world. (15)

P.T.O.

4. (a) Give a detailed account of the criteria on the basis of which Non-Chordates have been classified.

   (b) Give general characteristics of phylum Ctenophora.

   (10+5)

5. (a) Describe the life cycle of *Ascaris lumbricoides* with the help of labelled diagrams.

   (b) Give its physiological adaptations towards parasitic mode of life. (10+5)

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

   (a) Polymorphism in Hydrozoa

   (b) Structure and function of types of cells in sponges

   (c) Syconoid canal system

   (d) Sporogony

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1385 **C**

Unique Paper Code : 32231301

Name of the Paper : Diversity of Chordates

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

Semester : III

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 diagram wherever necessary.

1. (a) Give the scientific name and classify each of the following upto order :

   (i) Sea squirt

   (ii) Midwife toad

   (iii) Glass snakes

P.T.O.

(iv) Sea horse (4×1½=6)

(b) Differentiate between :

(i) Physostomous and Physoclistous swim bladder

(ii) Lacertilia and Ophidia

(iii) Ratitae and Carinatae

(iv) Tornaria and Ascidian tadpole larva (4×2=8)

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

(i) Gas gland

(ii) Uropygial gland

(iii) Patagium

(iv) Loreal pit (4×1½=6)

(d) Mark the following statements as TRUE or FALSE :-

(i) Balanoglossus is a ciliary feeder.

(ii) Swim bladder is present in Elasmobranch.

(iii) Excretion in amphibians is ureotelic.

(iv) All the reptiles have diapsid skull.

(v) Presence of pygostyle helps the birds for stability in air.

(vi) Metatherians are oviparous. (6×1/2=3)

(d) Explain :

(i) Paedogenesis

(ii) Cursorial adaptation

(iii) Lateral Line

(iv) Realm (4×1=4)

2. Give a detailed account of migratory behavior of birds. (12)

3. (a) What are the reasons for considering *Sphenodon* as a connecting link between amphibians and reptiles? (8)

(b) Describe the catadromous migration in fishes with suitable example. (4)

P.T.O.

4. Explain the origin and evolution of Tetrapods. (12)

5. Elaborate the mechanism of maintaining the internal balance of salt and water in various groups of fishes that help them adapt to their habitats. (12)

6. (a) Describe the salient features and fauna of Palearctic and Oriental regions. (8)

   (b) Explain the biting mechanism of poisonous snakes. (4)

7. Write short note on **ANY THREE** of the following :

   (i) Continental drift theory

   (ii) Reptilian affinity of Prototherians

   (iii) Echinoderm theory of origin of chordates

   (iv) Retrogressive metamorphosis (3×4=12)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1994 **C**

Unique Paper Code : 32235906

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

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

Semester : III, (GE) 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. Do not write anything on the question paper except your Roll Number.
3. Attempt **FIVE** questions in all. Question Number **ONE** is COMPULSORY.

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

   (i) Micro nutrient

   (ii) Addiction

   (iii) Glycemic index

P.T.O.

(iv) Diabetes

(v) Organic Food

(b) Differentiate between **(any 4)** : (8)

(i) Kwashiorkor and Marasmus

(ii) Type 1 and Type 2 Diabetes

(iii) Ascariasis and Taeniasis

(iv) Macro- and Micronutrients

(v) Diet and Balanced Diet

(c) Expand the following : (4)

(i) MUFA

(ii) GI

(iii) DM

(iv) HBV

(d) Fill in the blanks : (5)

(i) In animals, the main storage carbohydrate is _____ .

(ii) _____ Macronutrient is a rich source of immediate energy.

(iii) High fat diet leads _____ to Lifestyle Condition.

(iv) Macronutrient deficiency leads to _____ Condition in humans.

(v) Vitamin _____ is necessary for growth and functioning of the reproductive system.

(e) True or false, justify the statement : (5)

(i) Fats are building blocks of the cell.

(ii) A food item which has a high glycemic load isn't good for diabetic individuals.

(iii) Low blood pressure is a sign of hypertension.

(iv) There will be a high probability of getting an infection if we don't wash our hands regularly.

(v) Food in the open will not get spoiled compared to refrigerated food.

2. (i) Lifestyle diseases are major issues now-a-days. Discuss how a lifestyle disease is linked with other lifestyle diseases. (6)

(ii) Discuss lifestyle modifications for a 30 years old person suffering from Diabetes. (6)

3. (i) How can an individual protect him-/herself from various diseases by regular hand washing and hygiene? (3)

(ii) Discuss any two viral diseases along with their mode of infection, symptoms, and prevention? (9)

4. Give a detailed account of food spoilage. Elaborate various methods by which food spoilage can be prevented? (5+7)

5. Describe the role of a balanced diet. A person has been on a very low protein diet for 5 years; What condition you can expect out of this deficiency, Describe and discuss the symptoms, prevention and treatment. (3+9)

6. (i) Discuss the role of micronutrients for a pregnant woman. (6)

(ii) Elucidate the diet modifications and improvement for pregnant women? (6)

7. Write short notes on **(ANY THREE)**: (4×3=12)

(i) Organic Food

(ii) Role of Dietary fibers

(iii) Amoebiasis

(iv) Nutritional Anthropometry

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1432 **C**

Unique Paper Code : 32231303

Name of the Paper : Fundamental of Biochemistry

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

Semester : III

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 **FOUR** quesiions in all.
3. Question No. **1** is compulsory.

1. (a) Define the following terms : (7)

   (i) Eicosanoids

   (ii) Epimer

   (iii) Amphipathy

P.T.O.

(iv) Isozymes

(v) Pitch of the DNA

(vi) Plasmalogens

(vii) pKa value

(b) Differentiate between the following pairs of terms : (6×2 =12)

(i) Cysteine and Cystine

(ii) Hemiacetal and Hemiketal

(iii) Nucleoside and Nucleotide

(iv) Cofactor and Coenzyme

(v) Peptide and Glycosidic bond

(vi) Phi and Psi angle

(c) Give the names and structures of the following: (4×2=8)

(i) A disaccharide composed of glucose and fructose

(ii) An amino acid with aromatic R group

(iii) A purine nitrogenous base

(iv) A saturated C-16 fatty acid

2. (a) Describe various forms of DNA with special reference to Watson and Crick Model? (8)

(b) Explain the C_0t-curvesanalysis with the help of graph. (4)

3. (a) Give an account on the structural and functional features of phospholipids. (7)

(b) Describe the physiological importance of saturated and unsaturated fatty acids. (5)

4. (a) Elucidate the Michaelis-Mentenequation for a one enzyme one substrate reaction. (7)

(b) What factors are responsible for affecting the enzyme activity. Discuss. (5)

5. (a) Explain various levels of organization of protein structure and their significance. (9)

(b) What are essential and non-essential amino acids? Cite the examples. (3)

P.T.O.

6. (a) Give a detailed account of 'structure and function of any two homo and hetero polysaccharides. (8)

(b) Describe the structural properties of Monosaccharides. (4)

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

(i) Lineweaver-Burk Plot

(ii) Immunoglobulins

(iii) Cholesterol

(iv) induced fit theory of Enzyme action

(v) t-RNA

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1710 **C**

Unique Paper Code : 42234301

Name of the Paper : Physiology and Biochemistry

Name of the Course : **B.Sc. (Prog.) Life Science, Zoology Examination, LOCF**

Semester : III

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 neat, well labeled diagrams, wherever required.
3. Attempt **Five** questions in all.
4. Question No. 1 is compulsory

1. (a) Define **(any four)** : (4)
   (i) Ketosis
   (ii) Cytochromes
   (iii) Cardiac Impulse
   (iv) Peristalsis
   (v) Ribose

P.T.O.

(b) Differentiate between the following **(any five)** : (5)

(i) Insulin and Glucagon

(ii) Saturated Fatty acid and Unsaturated Fatty acid

(iii) Myelinated and Non-myelinated axons

(iv) Essential and non-essential amino acids

(v) Ureotelic and uricotelic organisms

(vi) Bone and cartilage

(c) Draw the structures of the following **(any four)** : (8)

(i) Glyceraldehyde 3 phosphate

(ii) Lactate

(iii) Multipolar neuron

(iv) Human Egg Cell

(v) Urea

(d) Write the importance of the following **(any five)** : (5)

(i) UDP-Glucose

(ii) Counter current Mechanism

(iii) Ovulation

(iv) ATP synthase

(v) Gluconeogenesis

(vi) Chemical synapses

(e) Expand the following **(any five)** : (5)

(i) GTP

(ii) RAAS

(iii) UDPGLc

(iv) ACTH

(v) MALT

(vi) FADH2

2. (a) Describe the ultrastructure of skeletal muscle.

   (b) Discuss the hormonal control of spermatogenesis. (6+6)

3. Explain the different phases of Cardiac cycle. Briefly discuss the respiratory volumes and capacities of Human lungs. (8+4)

3. Give a detailed account of the pathway of Tricarboxylic acid cycle. How many ATPs are produced per cycle? (12)

4. Describe the steps of urea cycle. Briefly explain the classification of enzymes. (9+3)

5. Short Notes (**Any three**): (4+4+4)

   (i) Proton motive force

   (ii) Michaelis Menten equation

   (iii) Graded potential

   (iv) Absorption of Lipids

[This question paper contains 4 printed pages.]

Your Roll No.....

C

Sr. No. of Question Paper : 1414

Unique Paper Code : 32231302

Name of the Paper : Physiology: Controlling and Coordinating Systems

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

Semester : III

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. Draw diagrams wherever required.

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

(i) Synapse

(ii) Osteoporosis

P.T.O.

(iii) Tropic hormone

(iv) Epiphyseal plates

(b) Differentiate between the following : (10)

(i) Diabetes mellitus and Diabetes insipidus

(ii) Isotropic and anisotropic band

(iii) Spermatogenesis and spermiogenesis

(iv) Compact and spongy bone

(v) Somatotropin and somatostatin

(c) Expand the following (**any FOUR**) : (4)

(i) ICSH

(ii) PIF

(iii) hGH

(iv) IPSP

(v) ACTH

(vi) NOS

(d) Give the location and function of the following: (5)

(i) Chromaffin cells

(ii) Corpus luteum

(iii) T- tubules

(iv) Leydig cells

(v) Volkmann's canal

(e) Fill in the blanks : (4)

(i) Oxygen-binding protein found only in the muscle fibres is _____

(ii) Ligand-gated ion channels are present in _____

(iii) Simple columnar epithelium is specialised for _____ and _____

2. Compare the conduction of an action potential in a non-myelinated axon with that in a myelinated one. Which type of conduction is more energy-efficient and why? (9+3)

P.T.O.

3. (a) Describe the mode of action of lipid soluble and water-soluble hormones. Give suitable examples for each. (8)

   (b) List the hormones secreted from the posterior pituitary and describe their functions. (4)

4. (a) Discuss the molecular basis of skeletal muscle contraction. (10)

   (b) What are ionotropic receptors? (2)

5. (a) How are sound waves converted into action potentials in the auditory nerve? (9)

   (b) Draw a well labelled diagram of a neuron. (3)

6. (a) Discuss the role of different hormones involved in the male reproductive physiology. (6)

   (b) Describe the functions of Sertoli cells. (6)

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

   (a) Renin-Angiotensin-Aldosterone (RAA) pathway

   (b) Cell junctions

   (c) Types of cartilage

   (d) Oogenesis (3×4=12)

(1500)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1158

Unique Paper Code : 32237901

Name of the Paper : DSE- Animal Behaviour and Chronobiology

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

Semester : V 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.

1. (a) Define the following :

(i) Phase

(ii) Reinforcement

(iii) Supernormal stimulus

(iv) Code breakers

P.T.O.

(v) Innate behaviour

(vi) Ethogram (1×6=6)

(b) Differentiate between the following :

(i) Tropotaxis and klinotaxis

(ii) Habituation and sensitization

(iii) Alpha male and subordinate male

(iv) Ultradian and infradian rhythm

(v) Classical and Operant conditioning

(vi) Allomones and kairomones (2×6=12)

(c) Give Contributions of following :

(i) Wallace Craig

(ii) Ivan Pavlov

(iii) Niko Tinbergen

(iv) Karl von Frisch (1×4=4)

(d) State true or false :

(i) Imprinting takes place during a narrow window of time shortly after birth.

(ii) Genetic makeup and physical characteristics of animals are adaptations over time to the environment they are raised in.

(iii) Animals that have parental care produce more offspring than animals without parental care.

(iv) An example of kin selection is that peacocks have long, showy tails even though it makes them more obvious to predators and more difficult to fly.

(v) Round dance performed by honeybees has no directional component. (1×5=5)

2. (a) Give an account of photic and non photic zeitgebers. (6)

(b) Explain the adaptive significance of biological clock. (6)

6. (a) Explain proximate and ultimate causes of behavior with help of suitable examples. (6)

(b) Explain intersexual selection. Why is it advantageous for species? (6)

4. (a) Describe various methods of studying and recording animal behaviour. (6)

(b) Explain sexual dimorphism and its role in mate choice. (6)

5. (a) Explain the importance of Tinbergen's four questions in the modern study of animal behavior. (6)

(b) What do you understand by social behavior and explain its advantage and disadvantages. (6)

6 (a) Explain the role of hormones in honeybee society (6)

(b) Give the characteristics of a reflex action. Discuss their corresponding complex behavior patterns. (6)

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

(a) Classical conditioning

(b) Selfish gene

(c) Territorial behaviour

(d) Polyethism

(e) Parasitic brood care (3x4=12)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper: 1531

Unique Paper Code : 42237903

Name of the Paper : DSE: Animal Biotechnology

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

Semester : V. Theory Exam-Nov/Dec, 2022

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. Question number **1** is compulsory.
3. Substantiate your answer with diagrams wherever necessary.

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

(i) Primer

(ii) Genetically Modified Organisms

P.T.O.

(iii) Metagenomics

(iv) Cloning vector

(v) Transformation efficiency

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

(i) RT-PCR

(ii) YAC

(iii) RFLP

(iv) Taq

(v) STR

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

(i) Electroporation and Calcium chloride method of transformation.

(ii) Phasmid and Plasmid

(iii) Northern and Southern blotting

(iv) DNA Polymerase and DNA Ligase

(v) Type I and Type II restriction enzymes

(vi) PCR and RT-PCR

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

(i) Kary Mullis

(ii) Frederick Sanger

(iii) Sir Alec Jefferey

(iv) E. M Southern

(v) Hamilton Smith D. Nathans & Arber

2. (a) What are cloning vectors? Describe any two types of cloning vectors in detail. (6)

(b) Describe any one application of transgenic plants. (6)

3. (a) What is cDNA library? How it is different from genomic DNA library. Explain the process of creating cDNA library. (6)

(b) Explain in detail the DNA microinjection method of producing transgenic animals and its advantages. (6)

4. (a) What are DNA Microarrays? Explain the technique and its applications. (6)

P.T.O.

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

5. What are the methods used for molecular diagnosis of sickle cell anaemia. Explain in detail. (12)

6. (a) Describe sanger's dideoxy chain termination method of DNA sequencing. (8)

(b) Briefly explain CRISPR CAS-9 system as genome editing tool. (4)

7. Write short note on the following **(Any three)**: (4×3=12)

(i) Insecticide resistant plants

(ii) Southern Blotting

(iii) Electroporation

(iv) Restriction enzymes

(v) DNA fingerprinting

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1265 **C**

Unique Paper Code : 32237909

Name of the Paper : Immunology

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

Semester : V (CBCS)

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 a question together.

1. (a) Define :

   (i) Opsonin

   (ii) Avidity

   (iii) Adjuvant

   (iv) Anaphylatoxin

   (v) Hematopoiesis (1×5)

P.T.O.

(b) Differentiate between the following :

(i) Active and Passive Immunity

(ii) Primary and Secondary Immune response

(iii) Exogenous and Endogenous antigens

(iv) Polyclonal and Monoclonal Sera

(v) Innate and Adaptive Immunity (2×5)

(c) Write the contribution/s of the following scientists :

(i) Cesar Milstein and Georges E. Köhler

(ii) Jules Bordet (1×2)

(d) Expand the following :

(i) HLA

(ii) GM-CSF

(iii) ADCC

(iv) MAC

(v) RIA

(vi) CDR (1/2×6)

(e) Write the immunological significance of the following

(i) Interferons

(ii) Bursa of Fabricius

(iii) CLIP

(iv) Rheumatoid Factor (1×4)

(f) Give reasons :

(i) Burn victims are more prone to infections.

(ii) IgA survives the proteolytic degradation in GI tract.

(iii) Self antigens do not produce immune response in normal persons. (1×3)

2. (a) Describe the basic structure of an antibody. How was the structure of antibody deduced.

(b) Differentiate between T cell and B cell epitopes. (8,4)

3. (a) Describe Gell and Coomb's classification of hypersensitivity with suitable examples.

(b) Describe the process of Hematopoiesis with a diagram with examples from myeloid and lymphoid lineages. (6,6)

P.T.O.

4. (a) Differentiate between primary and secondary lymphoid organs. Write a note on structure and function of Lymph Node.

   (b) Briefly discuss major types of vaccines with appropriate examples. (6,6)

5. (a) Describe the formation of MAC through classical pathway of complement activation.

   (b) What is a hapten? Describe the factors which determine immunogenicity. (6,6)

6. (a) Illustrate and discuss the cytosolic pathway for processing antigen.

   (b) How Clonal Selection theory justifies the four cardinal features of adaptive immune response? (6,6)

7. Write short notes : **(Any Three)**

   (a) Innate Immune barriers

   (b) Immunodeficiency

   (c) Cytokines

   (d) Antigen- Antibody interaction as tools in Research and diagnosis (4×3)

(1500)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1018

Unique Paper Code : 32231501

Name of the Paper : Molecular Biology

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

Semester : V

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. Question No.1 is compulsory.
3. Attempt **five** questions in all.
4. Draw neat, labelled diagrams wherever necessary.

1. (a) Define the following terms : (1×5=5)
   (i) Replication fork
   (ii) Exon shuffling
   (iii) Enhancer
   (iv) Polyribosome

P.T.O.

(v) Riboswitches

(b) Expand the following : (0.5×6=3)

(i) cccDNA

(ii) TRCF

(iii) MSH

(iv) MTE

(v) ITS

(vi) ORC

(c) State the function of the following : (1×5=5)

(i) TATA Box

(ii) TF II D

(iii) Shine-Dalgarno Sequences

(iv) RNase P

(v) Telomerase

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

(i) Leading and Lagging strands

(ii) RNA polymerase II and RNA polymerase III

(iii) A-site and P-site

(iv) Promoter and Operator

(v) miRNA and siRNA

(e) State the best-known contribution of the following scientists : (1×4=4)

(i) Roger Kornberg

(ii) Charls Yanofsky

(iii) Robert William Holley

(iv) Phillip Allen Sharp

2. Compare and contrast the process of transcription in prokaryotes and eukaryotes. (12)

3. (a) Discuss the process of activation of amino acids and formation of initiation complex in prokaryotes. (8)

(b) Describe the salient features of Genetic code. (4)

4. (a) Describe the sequence of events during DNA Replication in eukaryotes while explaining the role of various proteins involved in it. (8)

(b) Explain the Rolling circle replication in bacteria with suitable illustration. (4)

P.T.O.

5. (a) Explain how the deletion of the following features would affect a eukaryotic pre-mRNA? (6)

(i) AAUAAA consensus sequence

(ii) 5' cap

(iii) Poly(A) tail

(b) Explain (with illustration) the regulation of *Lac* operon. (6)

6. (a) Describe the structure of Globin Gene and explain the molecular mechanism of splicing. (8)

(b) One gene may code for more than one polypeptide in eukaryotes. Justify the statement. (4)

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

(i) Structure of tRNA

(ii) RNA interference

(iii) Mismatch Repair

(iv) Synthesis of rRNA

[This question paper contains 6 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1054

Unique Paper Code : 32231502

Name of the Paper : B.Sc. (Honours) Zoology

Name of the Course : **Principles of Genetics-LOCF**

Semester : V

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

(a) Tautomeric shift

(b) Barr body

P.T.O.

(c) Test cross

(d) Idiogram

(e) Sexduction

(f) Chiasma

(ii) Fill in the blanks: (5)

(a) Genes that affect the viability of organisms are termed as _____

(b) The sex of Drosophila is _____ when X:A ratio is greater than 1

(c) When a chromosome segment is reversed 180°, it causes _____ mutation

(d) _____ elements in *Drosophila* causes hybrid dysgenesis

(e) Bacterial cells that are able to take up naked DNA in the process of transformation are known as _____ cells

(iii) Expand the abbreviations **(any five)**: (5)

(i) PKU

(ii) SRY

(iii) ITR

(iv) RTF

(v) HAT

(vi) CIB

(iv) What are the contributions of the following scientists **(any four)**: (4)

(i) Barbara Mc Clintock

(ii) Karpechenko

(iii) T.H. Morgan

(iv) Margret Kidwell

(v) Carl Correns

P.T.O.

(v) Differentiate between the following pair (any 4): (8

(i) Pleitropic and Polygenic traits

(ii) Conservative and Replicative transposition

(iii) Nonsense and Missense mutation

(iv) Penetrance and Expressivity

(v) Auxotroph and Prototroph

2. (a) How does epistatic interaction modify th Mendelian dihybrid ratio? Explain with 3 suitabl examples. (6

(b) Describe Muller's experiment to demonstrate th role of X-rays as mutagens. (

3. (a) With a suitable experiment, discuss the cytologic basis of crossing over. (

(b) In a hypothetical plant species, fruit weight is polygenic character. A homozygous plant, with 2

gm fruit weight is crossed with a homozygous plant with 50 gm fruit weight. In the F_2 generation of 128 plants, 2 plants have a fruit weight of 20 gm, and 2 plants have fruit weight of 50 gm, and the rest of the plants have fruit weights between 20gm and 50gm.

(i) On the basis of this data, determine how many genes control the fruit weight.

(ii) Determine the genotypes and fruit weights of the progeny of a back cross between an F_1 plant and a plant with 50 gm fruit weight. (2+5)

4. (a) Diagrammatically explain the process of bacterial transduction and differentiate between generalized and specialized transduction. (8)

(b) Explain the genetic basis of shell coiling in *Limnea peregra*. (4)

5. (a) Discuss sex determination in *Drosophila*. (6)

(b) What are "jumping genes"? Diagrammatically illustrate the cointegrate model of transposition of Tn3 elements. (6)

6. (a) Explain how the somatic cell hybridization technique is used for mapping genes. (8)

(b) Differentiate between sex limited and sex-linked traits with examples. (4)

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

(i) Bombay phenotype

(ii) Dosage compensation

(iii) Benzer's complementation test

(iv) Position effect

(v) Chromosomal number aberrations