(1)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1770 **G**

Unique Paper Code : 223252230

Name of the Paper : Biochemistry: Basic concepts of Metabolism

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

Semester : III (ZOO-LS-DSC-09)

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

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

(a) Glycogenin

P.T.O.

(b) Amphibolic Pathway

(c) Zwitterion

(d) Carnitine

(e) Isozyme

(ii) Differentiate between **(any three)** : (6)

(a) Hexokinase and Glucokinase

(b) Ketogenic and glucogenic amino acids

(c) Synthase and Synthetase

(d) Saturated Fatty acid and Unsaturated Fatty acid

(e) Ureotelic and uricotelic organisms

(iii) Give the structure of the following : (5)

(a) Palmitic acid

(b) Phenylalanine

(c) Galactose

(d) Uridine diphosphate glucose

(e) Glyceraldehyde 3 phosphate

2. (a) Describe Urea Cycle with the help of chemical structures and diagrams. (10)

(b) Add a note on classification of enzymes. (5)

3. (a) Give a detailed account of P-oxidation of Palmitic acid. (8)

(b) Briefly describe oxidative phase of pentose phosphate pathway. (7)

4. (a) Describe the various components of mitochondrial respiratory chain and the basics of Chemiosmotic theory for ATP synthesis. (10)

(b) Discuss briefly the significance of storage and structural lipids. (5)

5. (a) Elaborate the citric acid cycle and its regulation. (12)

(b) Describe the induced fit model of enzyme action. (3)

P.T.O.

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

(a) Polysaccharides

(b) Transamination

(c) Glycogenolysis

(d) Glucose-Alanine cycle

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1539 **G**

Unique Paper Code : 2232012301

Name of the Paper : Diversity of Chordates

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

Semester : III

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 terms (any five): (5)

(a) Notochord

P.T.O.

(b) Preen Gland

(c) Amniote

(d) Proteroglyphous

(e) Paedogenesis

(f) Rete mirabile

(ii) Differentiate between the following **(any three)** : (6)

(a) Cephalochordate and Hemichordate

(b) Prototheria and Metatheria

(c) Anura and Apoda

(d) Artiodactyla and Perissodactyla

(iii) Give Genus name of the following and classify upto order **(any four)** : (4)

(a) Flying fish

(b) Squirrel

(c) Midwife toad

(d) Lamprey

(e) Krait

2. (a) Discuss various larval forms of protochordates and their significance.

(b) Give the general characteristics of Agnatha. (9+6)

3. (a) Describe the osmoregulation in marine fishes.

(b) Write a note on fauna of oriental region. (9+6)

4. (a) Give a stepwise account of biting mechanism of snake.

(b) Justify the statement 'Sphenodon is a living fossil'. (9+6)

5. (a) Describe the various adaptations of the Aves that make them the master of the air.

(b) How do birds find their way during migration? (9+6)

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

(a) Origin of Tetrapods

(b) Swim Bladder

(c) Parental Care in Amphibia

(d) Continental Drift Theory

(3)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4337 **G**

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) Tautomerism

   (ii) snRNPs

   (iii) Polysome

   (iv) Polymerase switching

   (v) Replicator

P.T.O.

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

(i) EF-Tu and EF-G

(ii) DNA pol α and DNA pol δ

(iii) Group I and Group II Introns

(iv) sRNA and siRNA

(v) Replisome and Replicon

(c) State the function of the following : (1×4=4)

(i) RRF

(ii) TFIID

(iii) RF-C

(iv) *Xist*

(d) State the most important contribution of the following scientists : (0.5×4=2)

(i) Fire and Mello

(ii) Hargobind Singh Khorana

(iii) Arthur Kornberg

(iv) Zamecnik and Hoagland

(e) Explain the following : (6)

(i) DNA polymerase is able to distinguish between deoxyribonucleotides and ribonucleotides.

(ii) The third base of codon can be recognised by more than one base at the first position of the anticodon.

(iii) Prokaryotic mismatch repair system is able to differentiate between parental DNA strand and newly synthesized strand.

2. (a) Describe the experiment conducted by Meselson and Stahl and explain its conclusion. (6)

(b) Describe the structure of double stranded B-DNA with suitable diagrams. (6)

3. (a) Illustrate the process of initiation of translation in Eukaryotes. (6)

(b) How many energy rich molecules are used per round of peptide bond formation? Name the steps where energy is consumed. (3)

(c) Ribosomes cannot discriminate between correctly and incorrectly charged tRNAs. Explain. (3)

4. (a) Illustrate the chemical reaction which leads to the synthesis of DNA. (2)

(b) What will be the consequence if helicase is not present during replication? (2)

(c) Describe the function of all the domains of DNA pol III. (4)

P.T.O.

(d) Explain the mechanism which ensures that eukaryotic chromosomes are replicated only once per cell cycle (with illustration). (4)

5. (a) Illustrate the steps involved in spliceosome mediated RNA splicing. (6)

(b) Explain the regulation of gene expression by attenuation in tryptophan operon. (6)

6. (a) What will be the sequence of RNA transcribed from the following DNA template (2)

5' ATGTCTGGAGGCTAG 3'

(b) Draw the chemical structure of two modified bases found in tRNA. (3)

(c) Illustrate the process of mismatch repair of DNA in Prokaryotes. (3)

(d) Explain the steps involved in processing of pri-miRNA into miRNA. (4)

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

(a) Pyrimidine dimerization

(b) Alternative Splicing

(c) Rho independent termination

(d) Lac Operon (3×4=12)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1558 **G**

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.

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

(a) Osculum

P.T.O.

(b) Bilateral Symmetry

(c) Plasmotomy

(d) Ootype

(e) Kinety

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

(a) Schizogony and Sporogony

(b) Monogenea and Digenea

(c) Nematocyst and Trichocyst

(iii) Match the Columns : (4)

(a) Pinacocytes	1) *Hydra*
(b) Amphids	2) *Ctenoplana*
(c) Comb Plates	3) Sponges
(d) Gastrovascular cavity	4) Nematoda

(iv) Give the exact location and one function of each of the following **(any three)** : (3)

(a) Pyrenoids

(b) Acetabulum

(c) Colloblast cells

(d) Pneumatophore

2. (a) Why man acts as primary host of *Plasmodium?* Give the illustrated account of life history of malarial parasite in man.

(b) Describe the process of conjugation in *Paramecium* and discuss its significance. (9+6)

3. (a) Give the general characteristics of Phylum Porifera.

(b) Give an account of different types of canal systems in Porifera and give its significance. (5+10)

4. (a) Describe Polymorphism in Cnidaria. Comment upon its significance.

(b) Give an outline classification of phylum Cnidaria with characters and examples of each class. (9+6)

P.T.O.

5. (a) Give a detailed account of parasitic adaptations in Helminthes.

(b) Give graphic life cycle of *Taenia solium*.

(10+5)

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

(a) Course of migration of *Ascaris* larva within its host body.

(b) Coral reefs.

(c) Asexual reproduction in protozoa.

(d) Compare and contrast flatworms with roundworms.

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1596 **G**

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)

   (i) Osmosis

   (ii) Aquaporins

P.T.O.

(iii) Glycocalyx

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

(i) Lamins

(ii) Cadherins

(iii) Flippase

(iv) Signal Peptide

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

(i) Gorter and Grendel

(ii) Benda

(iii) Peter Mitchell

(iv) Tim Hunt, Paul Nurse, L H Hartwell

(d) Fill in the blanks : (1×4)

(i) _____ organelle is also referred to as suicidal bag.

(ii) A structure found within the nucleus contains much RNA, this structure is called _____ .

(iii) _____ is an intracellular protein that release calcium from within the lumen of Endoplasmic reticulum.

(iv) The effector protein in GPCR that releases cAMP is _____.

(e) Expand the following : (1×2)

(i) MTOC

(ii) NPC

2. (a) Write an account on the structure and function of mitochondrial respiratory chain. (6)

(b) Why is Golgi apparatus termed as the "Post Office of the Cell"? Discuss with suitable diagram. (6)

(c) Distinguish between co-translational and post-translational transport of proteins. (3)

3. (a) Explain with diagram the events that regulate the cell cycle. (9)

(b) Distinguish between microfilaments and intermediate filaments. (3)

P.T.O.

(c) Explain the Endosymbiotic theory. (3)

4. (a) Explain GPCR pathway with any one secondary messenger. (7)

(b) Discuss role of protein glycosylation within ER. (5)

(c) Distinguish between Passive and Facilitated diffusion. (3)

5. (a) Explain the assembly of microtubules and its role in cellular mobility. (8)

(b) What are the polymorphic forms of Lysosomes? (4)

(c) Enumerate with diagram the organization within nucleolus. (3)

6. (a) What are the major cell-to-cell interactions? (6)

(b) Comment with diagram upon the transport across nucleus. (6)

(c) What is euchromatin and how it is different from heterochromatin? (3)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1634 **G**

Unique Paper Code : 2232011103

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

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

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.

1. (a) Define the following : (3)

   (i) Autecology

   (ii) Modular population

   (iii) Detritus food chain

P.T.O.

(b) Distinguish between the following : (6)

(i) Pioneer and climax community

(ii) Mutualism and Amensalism

(iii) Physiological and realized mortality

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

(i) Types of survivorship curves

(ii) Patterns of dispersion

(d) Name the scientists associated with the following terms : (2)

(i) Exponential population growth

(ii) Ecosystem

(iii) Law of tolerance

(iv) Food chain

2. (a) Explain with suitable diagrams and equations the exponential and logistic growth forms of population. (8)

(b) Describe various density dependent factors that regulate the population size near carrying capacity level. (7)

3. (a) What are the main causes of wildlife depletion in India? What are the different strategies for wildlife conservation? (9)

(b) What is environmental impact assessment? Add a note on its significance. (6)

4. (a) What is competitive exclusion principle? Briefly describe the experiments conducted by Gause to explain this principle in the laboratory. (9)

(b) Differentiate between numerical and functional response of the predator. (6)

5. (a) Explain the Universal and Y-shaped energy flow model with the help of suitable diagrams. (9)

(b) Discuss the various types of ecological pyramids. (6)

P.T.O.

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

(a) Nitrogen cycle

(b) Raunkiaer's life forms

(c) Ecological efficiency

(d) Protected areas

(e) Temperature as a limiting factor

(f) Theories of climax in succession

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1577 **G**

Unique Paper Code : 2232012302

Name of the Paper : Biochemistry : Metabolic Processes

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

Semester : III

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. (i) Define the following terms **(Any four)** : (1×4=4)

   (a) Ubiquinone

   (b) Chemiosmosis

P.T.O.

(c) Ketogenesis

(d) Substrate level phosphorylation

(e) Catabolism

(f) Uridine Diphosphate Glucose (UDPG)

(ii) Differentiate between **(Any two)** : (2×2=4)

(a) Phosphofructokinase I and Phosphofructokinase II

(b) Glycogen phosphorylase and Glycogen synthase

(c) Acyl CoA and Acetyl CoA

(d) SGOT and SGPT

(e) Phosphoenolpyruvate carboxykinase and Pyruvate kinase

(iii) Write the steps to bring about the following conversions with Structural formula **(Any two)** : (2×2=4)

(a) Pyruvate to Acetyl CoA

(b) Succinyl CoA to Succinate

(c) Fatty acid to Fatty acyl CoA

(d) Aspartate to Glutamate

(iv) Give reasons for the following **(Any Three)** : (1×3=3)

(a) Elevated level of glucose and acetone in untreated diabetes mellitus.

(b) Strenuous exercise leads to an increase in formation of lactate.

(c) Upon entering a cell glucose is phosphorylated. Give two reasons why this reaction is required.

(d) Role of biotin in Fatty acid oxidation

2. (i) Trace the path of electrons starting from Complex-I to Molecular Oxygen. Also discuss oxidative phosphorylation in its reference. (12)

(ii) Give any three reactions catalyzed by dehydrogenases in Kreb's Cycle. (3)

3. (i) Elucidate the metabolic pathway for the biosynthesis of palmitic acid. Give the Structure of fatty Acid Synthase Complex. (9)

(ii) Enumerate the steps of glycolysis with chemical structures. (6)

P.T.O.

4. (i) Explain the hexose Monophosphate shunt with structural formula and its physiological importance. (10)

(ii) Explain the role of transamination in the catabolism of amino acids. Support your answer with suitable examples. (5)

5. (i) Describe omithine-citrulline cycle, represent chemical reaction with structures and enzymes only. (10)

(ii) What is gluconeogenesis? Gluconeogenesis is energetically expensive but essential. Explain. (5)

6. Write short notes **(Any three)** : (3×5=15)

(i) Fate of C-skeleton of amino acids

(ii) Omega Oxidation of Fatty acid

(iii) Glycogen Metabolism

(iv) Shuttle system

(v) Cascade of metabolic events in fasting and starvation

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1713 **G**

Unique Paper Code : 2233012003

Name of the Paper : DSE-3, Medical Zoology

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

Semester : III (DSE-3)

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. (a) Define the following : (2×5=10)

(i) Epidemiology

(ii) Tetany

P.T.O.

(iii) Metastasis

(iv) Merozoites

(v) Thrombosis

(b) Distinguish between : (2×4=8)

(i) Primary host and secondary host

(ii) Benign tumours and malignant tumours

(iii) Parasitism and symbiosis

(iv) Incidence and Prevelance

(c) State True or False. (1×4=4)

(i) Culex is the vector of Dengue virus.

(ii) Cushing's syndrome is caused by low levels of hormone cortisol.

(iii) The SARS virus is a DMA virus.

(iv) *Myxovirus parotiditis* is causative agent for mumps.

(d) Fill in the blanks : (1×4=4)

(i) In TNM staging of cancer, N and M stands for _____ & _____, respectively.

(ii) Pellagra is related to thy deficiency of _____ .

(iii) _____ is commonly, known as the giant Asian intestinal fluke.

P.T.O.

(iv) MMR is related to the vaccination of _____ .

(e) Choose the correct options : (1×4=4)

(i) HIV is thought to have originated from-

(A) Dogs

(B) Chimpanzees

(C) Deer

(D) Goat

(ii) Which one is caused by bacterial infection-

(A) Mumps

(B) Cholera

(C) Addison's disease

(D) Influenza

(iii) For malaria parasite man is the-

(A) Intermediate host

(B) Definitive host

(C) Accidental host

(D) Sexual host

(iv) Marasmus is caused due to deficiency of-

(A) Vitamin A

(B) Protein

(C) Fat

(D) Carbohydrate

2. (a) What are the differences between acromegaly and gigantism? (3)

(b) How is parasitism different from symbiosis and commensalism? (3)

(c) Enlist three nutritional deficiencies along with their treatments. (9)

3. What are the clinical manifestations of *Wuchereria bancrofti* infection? How is it transmitted, diagnosed and treated? (15)

4. (a) Write a short note on carcinogens. (5)

(b) Describe staging and grading in cancer. (10)

5. (a) Describe iron deficiency Anaemia (5)

(b) What is the causative organism of tuberculosis? Explain diagnosis and treatment of the tuberculosis disease. (10)

6. What are the different diseases which come under cardiovascular diseases (CVD)? Explain three of them. (15)

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

(a) Cretinism.

(b) How is diabetes mellitus different from diabetes insipidus?

(c) Inflammatory Bowel Disease (IBD)

(d) Osteoporosis

(e) Dengue (5×3=15)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4495 **G**

Unique Paper Code : 32237901

Name of the Paper : DSE – Animal Behaviour and Chronobiology

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

   (i) Sign stimulus

   (ii) Polymorphism

   (iii) Siblicide

   (iv) Actograms

   (v) Zeitgeber (2×5=10)

P.T.O.

(b) Differentiate between the following :

(i) Intersexual and Intrasexual selection

(ii) Master clock and Slave clock

(iii) Daily rhythms and Free-running rhythms

(iv) Focal sampling and scan sampling

(2×4=8)

(c) Match the following :

(i) R. A. Fisher	Imprinting
(ii) Oscar Heinroth	Sexual selection
(iii) E. L. Thorndike	Reciprocal altruism
(iv) Robert Trivers	Circadian rhythm
(v) Franz Halberg	Operant conditioning

(1×5=5)

(d) Fill in the blanks/ True-False : (1×4=4)

(i) Infanticide is caused by Intra-sexual selection.

(ii) Species exhibiting altruism are relatively more likely to discriminate against outsiders (non relatives).

(iii) Melatonin secretion is often used as a marker of the body clock.

(iv) In Orthokinesis, relationship exists between the rate of change of direction (turning) and intensity of stimulus.

(v) King Solomon's Ring (book) was written by Konrad Lorenz.

2. (a) Describe foraging in honey bee and comment upon the advantages of waggle dance. (6)

(b) Discuss various methods of studying and recording animal behaviour. (6)

3. (a) What is associative learning? Explain Pavlov's classical experiments with dogs involving conditioned reflex. (6)

(b) Explain the correlation between sign stimulus, innate releasing mechanism and fixed action pattern. (6)

P.T.O.

4. (a) Classify and explain various form of orientation with suitable example. (6)

(b) What is filial imprinting? Discuss the role of imprinting in social development of mammals. (6)

5. (a) Give a detailed account of photoperiodic regulation of seasonal reproduction in vertebrates. (6)

(b) With the help of suitable diagram, discuss the various components of biological oscillators. (6)

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

(b) What are the basic characteristics of biological rhythm? Also state the various types of biological rhythms with suitable examples. (6)

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

(a) Chronotherapy

(b) Male-male rivalry

(c) Fisher's runaway theory

(d) Supernormal stimuli (4×3=12)