6

[This question paper contains 4 printed pages]

Your Roll No. : .....

Sl. No. of Q. Paper : **2283** **IC**

Unique Paper Code : 32231201

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

Name of the Paper : Non-Chordates - II : Coelomates

Semester : II

Time : 3 Hours ***Maximum Marks : 75***

Instructions for Candidates :

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) Attempt any **five** questions including Question **No.1** which is compulsory.

(c) Please attempt various parts of a question at one place only.

(d) Draw well-labelled diagrams wherever necessary.

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

(i) Epitoky

(ii) Osphradium

(iii) Protandry

(iv) Papulae

(v) Cephalization

(b) Match the following : 3

Column I	**Column II**
1. Botryoidal tissue	(i) *Asterias*
2. Radula	(ii) *Sepia*
3. Pedicellariae	(iii) *Pila*
4. Green gland	(iv) *Pheretima*
5. Setae	(v) *Palaemon*
6. Ink gland	(vi) *Hirudinaria*

(c) Differentiate between the following pair of terms (any **four**) : 8

(i) Arachnida and Insecta

(ii) Enterocoel and Schizocoel

(iii) Book gills and Tracheal gills

(iv) Protostomia and Deuterostomia

(v) Ctenidia and Taenidia

(d) State whether the following statements are ***true*** or ***false***. In case of *false*, write the correct statement : 4

(i) Haemocoel is a space between the body wall and gut; and is packed with parenchyma cells.

(ii) Termites harbour a large number of *Trichonympha* which help in cellulose digestion.

(iii) Class Cephalopoda includes molluscs without a shell.

(iv) Annelids have an open type of blood vascular system.

(v) Echinoderms are the only eucoelomates having both exoskeleton and endoskeleton.

(e) Give the generic name of the following organisms and classify up to class. Give one characteristic feature of the phylum they belong to : 8

(i) Sea cucumber

(ii) Rag worm

(iii) Centipede

(iv) Elephant's tusk shell

What is metamorphosis ? With the help of suitable examples explain the different types of metamorphosis in insects and its hormonal control. 12

(a) Describe the respiratory organs of gastropods. How do they help the animal to lead an amphibious life ? 8

(b) Explain the process of pearl formation in bivalves. 4

4. Describe the excretory organs in Annelids and explain their working. 12

5. Give an account of social life of insects with special reference to honey bees. Add a note on their communication system. 12

6. (a) Discuss the water vascular system in Asteroidea. Add a note on its significance. 8

   (b) Briefly describe the affinities of Onychophorans. 4

7. (a) What is mosaic vision ? Describe the functioning of compound eye of arthropods in different intensities of light. 5

   (b) Give a brief account of tracheal respiration in insects. 7

8. Write short notes on any **three** of the following : $4 \times 3 = 12$

   (a) Torsion in gastropods

   (b) Affinities of Echinoderms

   (c) Metamerism

   (d) Pluteus larva of Echinoderms

   (e) Evolutionary significance of trochophore larva

1200

This question paper contains 4 printed pages]

Your Roll No. : .....

Sl. No. of Q. Paper : **2284** **IC**

Unique Paper Code : 32231202

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

Name of the Paper : Cell Biology

Semester : II

Time : 3 Hours ***Maximum Marks : 75***

Instructions for Candidates :

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) Attempt **five** questions in all.

(c) Question **No.1** is compulsory.

(d) Give neat labelled diagrams wherever necessary.

(e) Attempt all parts of a question together.

1. (a) Define the following : 6

(i) Viroid

(ii) Heterochromatin

(iii) Synaptonemal complex

P.T.O.

(iv) Cytoskeleton

(v) Autophagosome

(vi) Oxidative phosphorylation

(b) Differentiate between the following : 10

(i) Microtubule and Microfilament

(ii) Exocytosis and Endocytosis

(iii) Lysosome and Peroxisome

(iv) Active and Passive transport

(v) Autocrine and Paracrine signalling

(c) Expand the following : 5

(i) MAP

(ii) MPF

(iii) GPCR

(iv) NOR

(v) Cdk

(d) Name the following : 3

(i) A protein forming nuclear lamina

(ii) Terminal electron acceptor in electron transport chain

(iii) Suicidal bag of the cell

(e) Name the scientist(s) associated with : 3

(i) Discovery of nucleosome

(ii) Discovery of peroxisome

(iii) Discovery of prion

2. (a) Draw a well-labelled diagram of Nuclear Pore Complex. 4

(b) Describe the structure of mitochondria. Explain the topography and function of Electron Transport System. 8

3. (a) Describe nucleosome model of chromatin fiber organization and also explain chromatin packaging in metaphase chromosome. 6

(b) Discuss the concept of second messenger in intracellular signaling. 6

4. (a) Describe the various phases of cell cycle with their molecular events. 6

(b) Give an account of various types of cell junctions. 6

5. (a) What are intermediate filaments ? Explain its structure and functions. 7

(b) Depict the process of meiosis only with the help of labelled diagrams. 5

6. (a) Describe the role of RER and Golgi complex in cell secretion. 7

(b) Explain the various roles played by lysosomes in cell. 5

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

(i) Facilitated transport

(ii) Chemiosmotic hypothesis

(iii) Signal hypothesis

(iv) Function of SER

(v) Fluid Mosaic model

This question paper contains 4 printed pages]

Your Roll No. : .....

Sl. No. of Q. Paper : **2285** **IC**

Unique Paper Code : 32231401

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

Name of the Paper : Comparative Anatomy of Vertebrates

Semester : IV

Time : 3 Hours ***Maximum Marks : 75***

Instructions for Candidates :

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) Attempt **five** questions in all.

(c) Question **No. 1** is compulsory.

1. (a) Define the following terms : 5

(i) Zygodactyly

(ii) Iter

(iii) Opisthonephros

(iv) Plastron

(v) Synsacrum

P.T.O.

(b) Differentiate between the following terms : 10

(i) True horns and antlers

(ii) Monocondylic and dicondylic skull

(iii) External and internal glomeruli

(iv) Plantigrade and digitigrade

(v) Spinal and cranial nerves

(c) State exact location and function of the following : 8

(i) Preen glands

(ii) Gill raker

(iii) Meibomian glands

(iv) Jacobson's organ

(d) State whether following statements are **True/False** : 4

(i) Larynx is the voice box of birds.

(ii) Placoid scales are epidermal derivatives.

(iii) Sebacous glands of mammals are apocrine.

(iv) Reissner's membrane is not present in the mammalian ear.

2. With the help of neat diagram, discuss in detail the evolution of aortic arches in vertebrates. 12

3. Describe the evolution of male and female urinogenital system in amniotes. 12

4. Describe structure and working of respiratory organs in fishes. 12

5. (a) Classify receptors and give their functions. 6

(b) Explain the structure of vertebrate brain with labelled diagram. 6

6. (a) Compare the digestive tracts of reptiles, birds and mammals. 6

(b) Describe the types of Centrum in vertebrates. 6

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

(a) Types of feathers

(b) Jaw suspensorium in vertebrates

(c) Scales in fishes

(d) Dentition

(e) Cranial nerves in mammals

[This question paper contains 4 printed pages]

Your Roll No. : .....

Sl. No. of Q. Paper : **2286** **IC**

Unique Paper Code : 32231402

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

Name of the Paper : Animal Physiology : Life Sustaining Systems

Semester : IV

Time : 3 Hours ***Maximum Marks : 75***

Instructions for Candidates :

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) Attempt **five** questions in all.

(c) Question **No. 1** is compulsory.

(d) **Draw** diagrams where ever required.

1. (a) Define the following terms : 5

(i) Haustral churning

(ii) Herring-Breuer reflex

(iii) Plasminolysis

(iv) Ectopic focus

(v) Antiporter

P.T.O.

(b) Differentiate between : 10

(i) Metabolic and Respiratory acidosis

(ii) Isovolumetric ventricular systole and diastole

(iii) Micelles and chylomicrons

(iv) Bohr and Haldane effect

(v) Coagulating and anti-coagulating factors

(c) Expand the following : 2

(i) ANP

(ii) JGA

(iii) ESV

(iv) EPO

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

(i) The clotting factor responsible for platelet aggregation.

(ii) The physiological condition when arterial pCO_2 is less than 40 mmHg.

(iii) Ion that move from the peritubular capillaries in to the tubular lumen.

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

(e) Give the location and function (any **four**) : 4

(i) Chordae tendineae

(ii) Podocytes

(iii) K cells

(iv) Septal cells

(v) Crypts of Lieberkühn

(f) Give reasons (any **two**) : 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 subatmospheric.

2. (a) How is the blood pressure regulated ? Explain. 7

(b) Describe the blood clotting pathways. 5

3. (a) Draw and explain portal triad. Briefly discuss the functions of the liver. 8

(b) Describe how HCl is formed in the stomach ? 4

4. (a) Draw the detailed structure of a nephron. 3

(b) Describe the various mechanisms of tubular absorption and tubular secretion in PCT. 7

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

5. (a) Define pulmonary ventilation. Discuss the various factors affecting it. 6

(b) Elucidate the changes in partial pressures of oxygen and carbon dioxide during external and internal respiration. 6

6. (a) Define cardiac output. Add a note on the factors that regulate stroke volume. 6

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

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

(i) Absorption of carbohydrates in the small intestine.

(ii) ECG

(iii) Countercurrent exchange mechanism

(iv) Coronary circulation

(v) Pulmonary volumes and capacities.

s question paper contains 4 printed pages]

r **Roll No.** : .....

No. of Q. Paper : **2287** **IC**

que Paper Code : 32231403

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

e of the Paper : Biochemistry of Metabolic Processes

ester : IV

ne : 3 Hours ***Maximum Marks : 75***

tructions for Candidates :

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) Attempt **five** questions in **all**.

(c) Question **NO.1** is compulsory.

(d) Attempt all parts of a question together.

(i) Define the following : 5

(a) Reducing Equivalent

(b) Phophorylation

(c) Amphibolic Pathway

(d) Protein Motive Force

(e) Ketosis

P.T.O.

(ii) Differentiate between :

(a) Bisphosphate and diphosphate

(b) Ureotelic and Urecotelic Organism

(c) Glycogenesis and Glycogenolysis

(d) Anabolism and Catabolism

(iii) Name the enzyme responsible for following chemicals reaction (with structural formulae) :

(a) Glutamine to Glutamate

(b) Succinyl CoA to Succinate

(c) Alanine to Pyruvate

(d) Lactate to pyruvate

(iv) Expand the following :

(a) EMP

(b) NADPH

(c) DHAP

(d) PEP

(e) LDH

(f) AST

(v) Give structural formulae for following :

(a) A C-18 saturated fatty acid

(b) Oxaloacetate

(c) Fructose 1,6 Bisphosphate

(d) Ornithine

(vi) Fill in the blanks : 3

(a) ..... is an acyl group carrier that transports fatty acids into and out of mitochondrial matrix.

(b) The Pyruvate dehydrogenase complex has ..... number of coenzymes.

(c) The three carbon unit produced at the end of Oxidation of odd chain fatty acids is .....

2. (a) Describe the three thermodynamic barriers of glycolysis that need to be overcome by different enzymes and reactions in gluconeogenesis. 8

(b) Describe the Malate –Aspartate shuttle. 4

3. (a) Give detailed pathway of Tricarboxylic acid cycle along with the structural formulae. How many ATPs are produced per cycle ? 8

(b) Describe coupled reactions using suitable examples. 4

4. (a) Describe Urea cycle in detail clearly indicating which reactions take place in mitochondria and in cytosol. 8

(b) Describe oxidative deamination. 4

5. Describe the sequence of reactions involve when one molecule of C-16 fatty acid is to b oxidized. Add a note on energetic involved. 1

6. (a) Discuss the various components o mitochondrial respiratory chain.

   (b) Discuss the activation and transport of fatt acid across the mitochondria durin β -oxidation.

7. Write short notes on any **three** of the following 4x

   (a) Glycogenesis
   (b) Cori cycle
   (c) Pentose Phosphate Pathway
   (d) Inhibitors and Uncouplers of ETC
   (e) Carnitine Shuttle

[This question paper contains 3 printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : 3006

Unique Paper Code : 32235907 IC

Name of the Paper : Human Physiology

Name of the Course : Zoology : G.E. for Honours

Semester : II

Duration : 3 Hours Maximum Marks : 75

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

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

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

(*i*) Myxodema

(*ii*) External respiration

(*iii*) Tetany

(*iv*) Porta hepatis

(*v*) Refractory period.

(*b*) Differentiate between the following: 6×2

(*i*) Simple and saltatory conduction.

P.T.O.

(ii) Skeletal and smooth muscle.

(iii) Insulin and Glucagon hormone.

(iv) Renin and Rennin.

(v) Gastric acid and Gastrin.

(vi) Blood and lymph.

(c) Expand the following :

(i) EBG

(ii) RBC

(iii) EPSP

(iv) ICSH

(v) CCK

(vi) GnRH.

(d) Fill in the blanks :

(i) The liver is primarily located in ..... the abdomino-pelvic quadrants.

(ii) ..... processes of astrocytes are in in the blood-brain barrier.

(iii) The average life span of a red blood approx .....

(iv) Intrinsic factor secreted by the parietal cells of the stomach is important for the absorption of .....

(v) The property that allows the heart to generate and conduct electrical impulses on its own is .....

(vi) The ..... carries oxygenated blood from the lungs to the heart.

Describe the structure and functions of Pancreas. 12

Explain in detail the mechanism of nerve impulse/action potential. 12

Discuss the physiology of menstrual cycle. 12

Describe the composition and function of bile juice. 12

With help of a diagram, describe the structure of the heart. 12

Write short notes on any *three* of the following : 12

(*a*) Urine formation

(*b*) Functions of Liver

(*c*) Agranulocytes

(*d*) Thyroid hormones.

(*e*) Plasma Proteins.

This question paper contains 4 printed p

Roll No. | | | | | | | | | | |

S. No. of Question Paper : **3127** **IC**

Unique Paper Code : **32235903**

Name of the Paper : **Aquatic Biology**

Name of the Course : **Zoology : General Elective**

Semester : **IV**

Maximum Marks

Duration : **3 Hours**

(Write your Roll No. on the top immediately on receipt of this question pap

Attempt *five* questions in all.

Q. No. 1 is compulsory.

1×

1. (*a*) Define the following :

(*i*) Oil spills

(*ii*) Thermal stratification

(*iii*) Estuary

(*iv*) Biomagnification.

(*b*) Differentiate between any *two* of the following :2×

(*i*) Macrophytes and Periphyton

(*ii*) Eutrophic and Oligotrophic lakes

(*iii*) Lentic and Lotic ecosystem.

P.

(*c*) Fill in the blanks 1×5=5

(*i*) .....is the equipment to measure turbidity in water.

(*ii*) The organisms living in the bottom of aquatic ecosystem are called .....

(*iii*) .....is the amount of dissolved oxygen needed by aerobic biological organisms to break down organic material present in given water sample at certain temperature over a specific time period.

(*iv*) Water blooms are caused by luxuriant growth of .....

(*v*) Sunderbans is an example of ..... ecosystem.

(*d*) **Match the followings** 1×6=6

(i) Stenohaline	(*a*) Mercury
(*ii*) Metalimnion	(*b*) Region of high productivity
(*iii*) Littoral Zone	(*c*) Narrow range of tolerance to salinity
(*iv*) Minamata disease	(*d*) Lower layer of the lake
(*v*) Eutrophication	(*e*) Sea weeds
(*vi*) Phycocolloids	(*f*) Phosphates and nitrates make water bodies rich in nutrients.

(*e*) State whether true *or* false : 1

(*i*) Phytoplanktons are present in the profundal re of the open water zone of lakes.

(*ii*) Nektons are the aggregate of actively swim aquatic organisms in a body of water.

(*iii*) Swamps and marshes are the types of wetla

(*iv*) Thermal stratification occurs in intertidal zo

2. (*a*) Discuss the structure and function of lentic ecosyste

(*b*) Discuss of the importance of oxygen in aqu ecosystem.

3. (*a*) Discuss the types and causes of water pollution

(*b*) Describe the ways to assess the quality of water.

4 What are Coral reefs. Describe various kinds of coral r with suitable diagram.

5. (*a*) Explain briefly the Thermal pollution.

(*b*) What are the adaptations of marine fauna in d sea ?

(*c*) Briefly discuss the importance of Sea weeds.

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

(*a*) Biological magnification

(*b*) Eutrophication

(*c*) Stream order

(*d*) Wetlands

(*e*) Nitrogen cycle