[This question paper contains 4 printed pages.]

(17) Your Roll No. 2022

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)

[This question paper contains 6 printed pages.]

(18) Your Roll No. 2022

**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



P.T.O.

(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)

P.T.O.

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.]

19 Your Roll No. 2022

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