

2023

ZOOLOGY — HONOURS

Paper : CC-8

(Comparative Anatomy of Vertebrate)

Full Marks : 50

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*1. Answer **any five** questions :

2×5

(a) What is stratum compactum?

(b) Distinguish between holobranch and hemibranch.

(c) What is carnassial teeth?

(d) State the role of spiral valve in an anuran heart.

(e) What is syrinx?

(f) Define jaw suspension.

(g) Name the IX cranial nerve and its distribution in fishes.

(h) What is head kidney?

2. Answer **any four** questions from the following :

(a) Draw and describe the microscopic structure of a mammalian hair with associated glands. Discuss the process of double respiration in birds. (2+3)+5

(b) Explain the trend of succession of kidney in vertebrate series. Elaborate on the significance of Wolffian duct and Müllerian duct highlighting their modification. 5+5

(c) What is 'deciduous dentition'? Elaborate the anatomy of a mammalian canine with diagram. Mention the structural peculiarities of a typical reptilian heart. 1+(3+1)+(3+2)

(d) What do you mean by vomeronasal organ? Compare the functional development of forebrain and midbrain between fish and amphibia. List the skeletal parts of pectoral girdle in pigeon. 2+6+2

(e) What is 'corpus callosum'? State the Components of Telencephalon. In what respect the structures of ruminant stomach of a camel differs from that of *Bos*? 3+3+4

(f) Define diastema with example. What is pseudobranch? Where it is found? Describe the modification of aortic arches found in mammals. (2+1)+(2+1)+4

Please Turn Over

(g) Write short notes on (*any two*) :

- (i) Structure of cochlea in mammals
- (ii) Heart of a teleost
- (iii) Fine structure of a nephron
- (iv) Thermoregulatory and protective function of amphibian skin.

(h) Distinguish between *any four* of the following :

2½×4

- (i) Nail and Claw
- (ii) Quill and Covert feather
- (iii) Corpus callosum and Corpus striatum
- (iv) Sensory and Motor nerves
- (v) Foramen of Panizza and Foramen Ovale
- (vi) Parotid gland and Preen gland.



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ZOOLOGY — HONOURS

Paper : CC-9

(Animal Physiology : Life Sustaining System)

Full Marks : 50*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.**Question no. 1 is compulsory and answer any four questions from the rest.*1. Answer *any five* questions :

2×5

- ~~(a)~~ What do you mean by chloride shift?
~~(b)~~ Where is bile synthesised? State one function of bile.
~~(c)~~ Why blood group AB is called universal recipient?
 (d) What is hyperventilation?
 (e) What are stem cells?
~~(f)~~ Mention two features of coronary circulation.
~~(g)~~ What do you mean by Effective filtration pressure?
 (h) Mention two features of PCT cells.

2. ~~(a)~~ Describe with labelled diagram the structure of haemoglobin.~~(b)~~ What do you mean by 'Bohr's effect'? Explain with diagram.

(4+2)+(2+2)

3. ~~(a)~~ Mention the names of the enzymes, their source and site of action involved in complete digestion of protein.~~(b)~~ State the role of factor VIII and factor XIII in blood clotting system.

6+(2+2)

4. ~~(a)~~ Mention the process of osmoregulation in marine fishes.~~(b)~~ Discuss the changes that occur during ventricular systole and ventricular diastole of cardiac cycle.~~(c)~~ What do you mean by Cardiac output?

4+4+2

5. (a) Discuss the steps involved in formation of neutrophil from haemopoietic stem cells.

(b) Comment on any two factors that regulate haematopoiesis.

6+4

Please Turn Over

6. (a) What do you mean by counter current mechanism in urine formation? Describe the process with labelled diagram. Add a note on its significance.

(b) What do you mean by renal clearance?

[1+(3+2)+2]+2

2×5

7. Distinguish between the following :

(a) Osmoregulator and Osmo-conformer

(b) R-Form and T-Form of haemoglobin

(c) Agglutination and Deglutination

(d) Haemoglobin and Myoglobin

(e) Lipase and Amylase.

5×2

8. Write short notes on (*any two*) :

(a) Thermoregulation in Polar bear

(b) Renin-angiotensin System

(c) Rh incompatibility

(d) Acid-base balance in kidney.

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ZOOLOGY — HONOURS

Paper : CC-10

(Immunology)

Full Marks : 50

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*Answer *question no. 1* and *any four* questions from the rest.

- ✓ 1. Answer *any five* questions : 2×5
- ✓ (a) What is epitope? ✓
- ✓ (b) State two functions of neutrophil. ✓
- (c) What do you mean by isotype and allotype?
- (d) State the structure and function of cytokines.
- ✓ (e) Mention the role of MAC in complement system. ✓
- (f) What do you mean by CDR?
- ✓ (g) What are antigen presenting cells?
- ✓ (h) Define ITAM.
- ✓ 2. (a) Mention the primary lymphoid organs and state their functions. How do they differ from secondary lymphoid organs? (2+2+3)+3
- ✓ (b) What are the differences between antigenicity and immunogenicity?
- ✓ 3. (a) Describe the structure of an immunoglobulin monomer with an appropriate labelled diagram.
- ✓ (b) Briefly describe the principle and application of Sandwich ELISA.
- ✓ (c) What are the major sources of IL-2 and IL-6? (3½+1½)+(1½+1½)+(1+1)
4. (a) What is MHC? Distinguish between Class 1 and Class 2 MHC molecules.
- (b) Describe how intracellular antigens are processed and presented to cell surface using suitable diagram. (1+4)+(4+1)
5. (a) Describe the structure of T-cell receptor with suitable labelled diagram.
- (b) Briefly explain Type-III hypersensitivity reaction with suitable example.
- (c) Distinguish between CD4⁺ and CD8⁺ cells. (3½+1½)+3+2

Please Turn Over

6. (a) State about humoral and cell mediated immunity.
(b) What are the characteristic features of monoclonal and polyclonal antibodies?
(c) Describe the alternative pathway of complement activation with diagram. $2\frac{1}{2}+2\frac{1}{2}+(4+1)$
7. (a) Explain how anatomical and inflammatory barriers play critical roles in the innate immunity of an organism.
(b) Describe agglutination and precipitation reactions. $(2\frac{1}{2}+2\frac{1}{2})+(2\frac{1}{2}+2\frac{1}{2})$
8. Write short notes on (*any four*) : $2\frac{1}{2}\times 4$
- (a) Competitive ELISA
 - (b) Role of IgA
 - (c) MALT
 - (d) Dendritic cells
 - (e) Acquired immunity
 - (f) Active and passive immunization.
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ZOOLOGY — HONOURS

Paper : SEC-B-1

(Aquarium Fisheries)

Full Marks : 80

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words
as far as practicable.*1. Answer **any ten** questions :

2×10

- ✓(a) What is the scientific name of Gold fish?
- ✓(b) Differentiate between sinking and floating fish feed.
- ✓(c) Name any two common live fish feed organisms.
- ✓(d) State the role of binders in artificial fish feed.
- ✓(e) How can you identify a healthy ornamental fish?
- (f) Name one micro element and one macro element required for aquarium plant growth.
- ✓(g) Why spawns are starved prior to transportation?
- ✓(h) Write two advantages of using live fish feed.
- (i) How can you manage nitrogenous waste products accumulated inside an aquarium?
- ✓(j) Elucidate the social behaviour of Molly.
- ✓(k) Comment on sexual dimorphism of Guppy.
- (l) Mention the role of purifying resin in an aquarium.
- ✓(m) Give the scientific names of any two endemic species of Aquarium fishes.
- (n) Name one plant protein source and one animal protein source used in artificial fish feed.

2. Write short notes on **any four** of the following :

5×4

- (a) Nitrogen cycle in aquarium
- ✓(b) Sexual dimorphism in Sword tail
- ✓(c) Scope of Aquarium Fish Industry as a Cottage Industry
- (d) Oxygen packing for fish transportation
- (e) Role of biological filters in home aquarium
- ✓(f) Major problems of ornamental fish culture in India
- ✓(g) Aquarium fish as larval predator.

Please Turn Over

3. Answer *any four* questions :

- (a) (i) State common characters of Angel fish.
(ii) What do you mean by live-bearers? Give two examples.
(iii) Name two marine-based exotic fishes who are egg layers. 4+(2+2)+2
- (b) (i) What are the basic criteria of a good anesthetic?
(ii) Mention the name of any three anesthetics used for fish transportation.
(iii) Mention four characteristics that a community aquarium fish should possess. 3+3+4
- (c) Comment on general characters, sexual dimorphism and breeding strategies of : (2+2+1)×2
(i) Butterfly fish
(ii) Anemone fish.
- (d) (i) "Guppy is a potential larvivorous fish." — Justify the statement.
(ii) What do you mean by endemic species of Aquarium fishes? Write the common and scientific names of any four exotic aquarium fish species. 3+(3+4)
- (e) (i) Describe the steps of home aquarium installation.
(ii) Why attractants are added in commercial fish feed?
(iii) Give the formula used to find out the number of fish seeds that can be transported. 5+2+3
- (f) (i) How is conditioning of fish seeds done prior to transport?
(ii) State the reasons of fish mortality during transportation.
(iii) Why post shipment acclimation of fish is important? 3+5+2
- (g) (i) With suitable example state the differences between simple feed and compound feed.
(ii) Prepare a budget for small scale ornamental fish business in India. 4+6