2022

ZOOLOGY — HONOURS

Paper : CC-8

(Comparative Anatomy of Vertebrates)

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) Distinguish between 'Ductus Arteriosus' and 'Ductus Caroticus'.

(b) What is branchiostegal membrane? Where is it found?

(c) Distinguish between 'Conus arteriosus' and 'Bulbus arteriosus'.

(d) What do you mean by opisthonephric kidney?

(e) Distinguish between a single circuit heart and a double circuit heart with suitable examples.

(f) What is craniostylic jaw suspension? Where is it found?

(g) Distinguish between Pallium and Neopallium.

(h) What is gyri and sulci?

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

(a) Describe the structural peculiarities of Pronephros and Metanephros kidneys with proper diagrams. Define Wolffian duct and Mullerian duct. (3+3)+2+2

(b) Describe the structure of Teleost gill with diagram. Describe the process of respiration in Teleost. (4+2)+4

(c) Draw and describe the modifications of aortic arches in reptiles. Distinguish between heart of fish and heart of Amphibia. Name three epidermal derivatives in mammals. 4+3+3

(d) Give a comparative account of cerebrum and cerebellum of Reptiles and Mammals with diagams. Comment on 4 cranial nerves and their distribution in Amniotes. 6+4

(e) Comment on the role of anaerobic bacterial function in ruminant stomach of Bos. Define four types of dentition in mammals with labelled diagram and example. 4+(4+2)

(f) How does the skin of amphibians help them in respiration and water absorption? What do you mean by tadpoles tooth? Name the bones of pelvic girdle in Pigeon. 5+2+3

(g) Write short notes on (***any two***) : 5×2

(i) Poison glands in Amphibians

(ii) Function of Mammalian ear in balancing and hearing

(iii) Olfactory receptors in fish.

(h) Distinguish between (***any four***) : 2½×4

(i) Salt gland and Sweat gland

(ii) Air sac and Air capillary

(iii) Rectrices and Remiges

(iv) Foramen Magnum and Foramen Monro

(v) Molar and Pre molar.

2022

ZOOLOGY — HONOURS

Paper : CC-9

(Animal Physiology : Life Sustaining Systems)

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 ***questions no.*** **1** and ***any four*** from the rest.

1. Answer ***any five*** questions : 2×5

(a) Define stroke volume.

(b) Distinguish between IRV and ERV.

(c) Define Root effect.

(d) What is pace-maker of human heart?

(e) What is brown fat?

(f) Define Goblet cell with function.

(g) Distinguish between Cortical and Juxta-medullary nephron.

(h) Name four layers constituting stomach.

2. (a) Describe the mechanism of CO_2 transport in blood as bi-carbonate ions and in combination with haemoglobin.

(b) Mention Haldane effect.

(c) What are the effects of carbon-monoxide poisoning (*any two*)? 6+2+2

3. (a) Describe the method of osmoregulation in catadromous fish.

(b) Write two significance of osmoregulation.

(c) Define Cardiac output and Glomerular Filtration Rate (GFR). 4+2+(2+2)

4. (a) How carbohydrate is digested in small intestine?

(b) Mention the process of fat emulsification. 6+4

5. (a) Distinguish between homeotherm and poikilotherm with example.
   (b) Discuss the process of erythropoiesis.
   (c) Name any two blood clotting factor. 3+5+2

6. (a) Explain the process of mammalian expiration and inspiration with diagram.
   (b) Discuss the major factors affecting vital capacity.
   (c) Define anatomical dead space. (4+2)+2+2

7. (a) Describe the process of temperature regulation in camel.
   (b) Mention the role of ADH in urine formation.
   (c) Add a note on the role of hypothalamus in controlling ADH production. 5+3+2

8. Write short notes on following (***any two***) : 5×2
   (a) Cardiac Cycle
   (b) O_2 dissociation curve
   (c) ABO blood group
   (d) Counter-current mechanism.

2022

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 :
   - (a) What is opsonization? 2
   - (b) How many polypeptide chains make up MHC class I molecule? 2
   - (c) What is hypervariable region of immunoglobulin? State its significance. 1+1
   - (d) What are GALT and CALT? 1+1
   - (e) Mention the biological functions of complements. 2
   - (f) State two function of eosinophils. 2
   - (g) Define lymphokines. 2
   - (h) What are NK Cells? 2
   - (i) What do you mean by passive immunization? 2

2. (a) What is complement system?
   - (b) Describe the classical pathway of complement activation and MAC formation with diagram.
   - (c) What are interferons? 2+(3+2+1)+2

3. (a) What is monoclonal antibody?
   - (b) How does HAT medium facilitate selection of B-cell hybridoma?
   - (c) State the properties of IgM. Draw a labelled diagram of IgG. 2+3+(2+3)

4. (a) State the major steps involved in the development of inflammation.
   - (b) Distinguish between T-Cell and B-Cell.
   - (c) Briefly discuss Gell and Coomb's classification of hypersensitivity reactions. 3+3+4

5. (a) Enumerate the role of T_H Cells in B-Cell activation.
   - (b) What is prozone effect?
   - (c) Cytokines control adaptive immune response by regulating T-Cell activation and functions — Justify the statement. 3+2+5

6. (a) Distinguish between Primary and Secondary Antigen-Antibody interaction.
   (b) Differentiate between live attenuated vaccine and subunit vaccine. Give examples.
   (c) Describe the structure of MHC-I molecule with diagram. 2+(2+2)+(3+1)

7. (a) What is the basic difference between RIA & ELISA?
   (b) Differentiate between humoral and cell mediated immunity mentioning the respective components.
   (c) Briefly discuss the events of T-Cell development. 2+4+4

8. Write short notes on (***any four***) : 2½×4
   (a) Hapten
   (b) Adjuvant
   (c) Affinity and avidity of antibody
   (d) Structural organization of lymph node
   (e) Chemokines
   (f) Antibody-dependent cell mediated cytokines (ADCC).

2022

ZOOLOGY — HONOURS

Paper : SEC-B-1

(Aquarium Fish Keeping)

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

Answer ***any eight*** questions.

1. (a) Distinguish between egg layers and live bearers.
   (b) Write the scientific name of Gold fish. Enumerate its morphological characters and social behaviour.
   (c) How will you distinguish between male and female Guppy fish? 2+(1+2½+2½)+2

2. (a) Why is fish meal an important component of artificial feed?
   (b) Mention three advantages of using *Artemia* as feed.
   (c) Why are additives added to fish feed? Name one such additive. 4+3+(2+1)

3. (a) Mention the employment avenues related to the ornamental fish industry.
   (b) How does this industry help in rural development and women empowerment?
   (c) Write the scientific name of Angel fish. 4+(2½+2½)+1

4. Write short notes on ***any two*** of the following : 5×2
   (a) Chemical methods for water and fish treatment during transport
   (b) Potential exotic larvivorous fishes
   (c) Phytoplanktons used for live fish feed in aquarium.

5. Write an account on morphological characteristics mentioning sexual dimorphism and breeding strategies of — 5×2
   (a) Blue morph fish
   (b) Angel fish.

6. (a) Mention the scientific names of any three endemic species of aquarium fishes.
   (b) How can you select a breeding pair before successful production of ornamental fish?
   (c) What are the criteria for selection of ornamental fish? 3+3+4

7. Write short notes on ***any two*** of the following : 5×2

   (a) Fishing nets

   (b) Anemone fish

   (c) Pelletization.

8. (a) What qualities should be considered for a transparent polythene bag as a packing device for aquarium fishes?

   (b) Comment on the influences of (i) Stocking Density (ii) Temperature (iii) Dissolved gases in the packaging procedure of aquarium fishes.

   (c) Write a note on problems of ornamental fish culture in India. 3+(1½+1½+1½)+2½

9. (a) Mention the importance of Brine shrimp and Tubifex as aquarium fish food.

   (b) What do you mean by fore-ground and back-ground aquarium plant?

   (c) Write down the feeding behaviour of Guppy. (2+2)+(2+2)+2

10. (a) What is 'infosuria'? Mention its major organismic content and raising process.

    (b) Distinguish between suspension and Pelletized formulated fish food.

    (c) Enlist the nutrient composition and mention their respective content in an ideal formulated fish food. (1+2+3)+1+3

11. (a) Why salinity and ammonia content are being considered as two of the major stress factors during transportation of aquarium fishes? How will you remediate these two stress factors during transportation of the said fishes?

    (b) Name two sedatives used during transportation of aquarium fishes. [(2+2)+(2+2)]+2

12. (a) Enlist the steps involved in the monthly maintenance procedure of an aquarium.

    (b) What is carbonate hardness (KH)? Mention its role in the maintenance procedure of an aquarium.

    (c) Mention the importance of filter to keep an aquarium healthy. 4+(2+2)+2

13. (a) Give an account of aerators and biological filters in home aquarium.

    (b) Discuss briefly the influence of fertilizers on the growth of aquarium plants.

    (c) State the advantages of live feed. 4+4+2

14. Answer ***any five*** of the following questions : 2×5

    (a) What is the scientific name of Butterfly fish?

    (b) Comment on sexual dimorphism of Sword tail fish.

    (c) Write about the role played by copper sulphate and potassium per-manganate in aquarium maintenance.

(d) Comment on territorial behaviour of aquarium fish.

(e) Name two marine based exotic fishes.

(f) What do you mean by Aquascaping?

(g) Name two rotifers used as live fish food for aquarium fishes.

(h) Write the importance of Shrimp meal.
