



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 4th Semester Examination, 2022

ZOOACOR08T-ZOOLOGY (CC8)

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.*

1. Answer any **eight** questions from the following: 2×8 = 16
 - (a) What is Syninx? State its function.
 - (b) How many air sacs are found in birds? Name them.
 - (c) What is carnassial teeth?
 - (d) Name the integumentary derivatives found in man.
 - (e) Define ARO.
 - (f) What do you mean by Holostylic Jaw Suspension? Where do you find it?
 - (g) What do you mean by tripartite concept?
 - (h) Define aortic arch. How many aortic arches are found in man?
 - (i) What is your dental formula?
 - (j) Mention origin and distribution of V-th and VII-th cranial nerves.
 - (k) Define double respiration.
 - (l) Name the different valves of mammalian heart and mention their position.

2. Answer any **three** questions from the following: 3×3 = 9
 - (a) Draw and describe briefly about reptilian heart. 1½ + 1½ = 3
 - (b) Explain mesonephric Kidney with simple diagrams. 3
 - (c) Describe the anatomy of mammalian ruminant stomach with suitable diagram. 1½ + 1½ = 3
 - (d) What do you mean by true horn? Where are they found? 2+1=3
 - (e) Explain Rheoreceptors with examples. 3

3. Answer any **three** questions from the following: 5×3 = 15
 - (a) Give a comparative account of aortic arches from fishes to birds through evolutionary lineage. 5
 - (b) Describe the structure of mammalian Skin with diagram. 3½ + 1½ = 5
 - (c) Classify different types of teeth found in mammals. 5
 - (d) Define cranial nerve. Mention the names of cranial nerves found in Vertebrates. 1+4=5
 - (e) Write short notes on: (Any **two**) 2½ × 2 = 5
 - (i) Foramen of Panizza (ii) Choroid Plexus (iii) Stomach of Birds

N.B. : Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.

—×—



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 4th Semester Examination, 2022

ZOOACOR09T-ZOOLOGY (CC9)

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.*

1. Answer any **eight** questions from the following: 2×8 = 16
 - (a) Which part is known as pacemaker and why?
 - (b) Mention two differences between lymphocyte and monocyte.
 - (c) What is Bohr effect?
 - (d) What are polycythemia and erythropania?
 - (e) What do you understand by Uricotelism?
 - (f) Distinguish between plasma and serum.
 - (g) Write down two functions of Saliva.
 - (h) What are stenohaline and euryhaline animals?
 - (i) What is the function of buffer solution?
 - (j) Mention the location and function of podocyte.
 - (k) What do you know about HbA and HbF?
 - (l) What is vasa recta?

2. Answer any **three** questions from the following: 3×3 = 9
 - (a) Mention the fate of different components of Hb during metabolism.
 - (b) How does Kidney regulate acid-base balance in our body?
 - (c) What is TMAO? State its role in osmoregulation. 1+2
 - (d) Discuss about various forms of CO₂ transport through blood in humans.
 - (e) What is 2, 3 BPG? State its effect on oxygen-haemoglobin dissociation curve. 1+2
 - (f) Mention the composition of gastric juice. State the function of oxyntic glands. 1+1+1
Name one carbohydrate digesting enzyme.

3. Answer any **three** questions from the following: 5×3 = 15
 - (a) What is renal corpuscle? Draw a labelled diagram of glomerulus. 1+4
 - (b) What is hyperthermia? How does the acclimatization of heat take place? 2+3



- (c) Delineate the formation and function of chylomicrons.
- (d) Name three accessory organs of digestion. Mention the role of bile in digestion.
- (e) Elaborate the osmoregulatory process in marine teleost.
- (f) Name different parts of lower respiratory tract. Distinguish between breathing and respiration.

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

—x—



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 4th Semester Examination, 2022

ZOOACOR10T-ZOOLOGY (CC10)

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.*

1. Answer any **eight** questions from the following: 2×8 = 16
- (a) Differentiate between T-dependent and T-independent antigens.
 - (b) Name two enzymes used in ELISA test.
 - (c) Mention two uses of HLA typing.
 - (d) What is MAC?
 - (e) What is adjuvant? Give example.
 - (f) State the factors which influence immunogenicity of a potential antigen.
 - (g) Define hypersensitivity.
 - (h) State the function of Natural Killer (NK) cells.
 - (i) Differentiate between primary and secondary lymphoid organ.
 - (j) What do you mean by “memory” of immune cells?
 - (k) What is hybridoma?
 - (l) What are affinity and avidity during Antigen-Antibody reaction?
2. Answer any **three** questions from the following: 3×3 = 9
- (a) Differentiate between active and passive immunity.
 - (b) State the principle and application of Sandwich ELISA technique.
 - (c) Distinguish between T cell and B cell.
 - (d) “All immunogens are antigens, but not all antigens are immunogen” — Explain.
 - (e) Which region of an Immunoglobulin molecule determines its class? What is meant by the term ‘immunoglobulin class switching’? 1+2
3. Answer any **three** questions from the following: 5×3 = 15
- (a) Draw a schematic diagram of a typical IgG molecule and label each of the following parts: H chain, L chain, interchain disulphide bonds, intrachain disulphide bonds, hinge, Fab, F_c and all the domains. Indicate, which domains are involved in antigen binding. 3+2



- (b) List the three types of purified macromolecules that are currently used as vaccines. What are the advantages and disadvantages of using attenuated organisms as vaccines? 2+3
- (c) Briefly describe the stages in T-cell development in the thymus. Describe the mechanism that lead to self-tolerance. 3+2
- (d) How Dengue viruses trick immune system to infect host cells in human body? 3+2
What effect would removal of bursa of Fabricius (bursectomy) have on chicken?
- (e) Describe the activation and control of the alternative pathway of complement activation. What does the term 'immunologic memory' mean? 3+2

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

—x—



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 4th Semester Examination, 2021

ZOOACOR08T-ZOOLOGY (CC8)

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.*

1. Answer any **eight** questions from the following: 2×8 = 16
- (a) What is Bulbus arteriosus?
 - (b) Name four dermal derivatives found in mammals.
 - (c) What is craniostylic jaw suspension? Where does it found?
 - (d) Distinguish between sulci and gyri.
 - (e) Draw a diagram of mammalian hair and label it.
 - (f) Name fifth and seventh cranial nerves found in vertebrates.
 - (g) Write down the name and location of valves in heart.
 - (h) Write down two properties of receptors.
 - (i) What are corpus striatum and choroid plexus?
 - (j) Write down the dental formula of elephant and guinea pig.
 - (k) What kind of jaw suspensions are found in crossopterygian and bony fishes?
 - (l) What is syrinx? State its function.
 - (m) What is carnassial teeth?
2. Answer any **three** questions from the following: 3×3 = 9
- (a) Enumerate briefly the Jaw suspension of lizards and snakes. 3
 - (b) Describe the dentition in vertebrates on the basis of mode of attachment. 3
 - (c) Write a short note on double circuit heart. 3
 - (d) What are the modifications of lungs found in birds for aerial mode of life? 3
 - (e) Draw and label a typical mammalian teeth. 3
 - (f) How is horn of buffalo different from that of antler? 3



3. Answer any **three** questions from the following:

- (a) Give a comparative account of heart in fish and amphibian. 5
- (b) Describe the comparative account of stomach in reptiles and birds with simple diagram. $2\frac{1}{2} \times 2 = 5$
- (c) Briefly discuss the significance of aortic arches. 5
- (d) Write short notes on (any **two**): $2\frac{1}{2} \times 2 = 5$
 (i) Ruminant stomach, (ii) Reptilian heart, (iii) Classification of receptors
- (e) Write down a comparative account of brain in reptiles and mammals. $2\frac{1}{2} \times 2 = 5$
- (f) What is meant by 'true horns'? Where is it found? How do they differ from 'hair horns'? $2+1+2$

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

—x—



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 4th Semester Examination, 2021

ZOOACOR09T-ZOOLOGY (CC9)

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.*

1. Answer any **eight** questions from the following: 2×8 = 16
- (a) What do you mean by Tidal volume and state its value in an adult human?
 - (b) What is the role of Sinoatrial node in heart beat?
 - (c) What is juxtaglomerular apparatus?
 - (d) Explain the term 'fibrinolysis'.
 - (e) What is acclimatization?
 - (f) Mention the function of basophil.
 - (g) Define endothermy.
 - (h) What is lactose intolerance?
 - (i) What is chloride shift?
 - (j) Differentiate between hyperthermia and fever.
 - (k) What is vasa recta?
 - (l) What do you mean by buffer solution?
 - (m) Compare between osmoconformers and osmoregulators.
 - (n) What is systolic blood pressure?
 - (o) What is Rh factor?
2. Answer any **three** questions from the following: 3×3 = 9
- (a) Where does digestion of protein begin? What is essential amino acid? In which organ urea is synthesized? 1+1+1
 - (b) What is cardiac output? State factors affecting cardiac output. 1½ + 1½
 - (c) What is GFR? Mention the factors determining GFR. 1+2
 - (d) Explain heterothermy with a suitable example. 3
 - (e) Distinguish between R and T forms of Hemoglobin. 3
 - (f) Mention the name of the muscles involved in Inspiration and Expiration. What do you mean by dead space in respiration? 2+1



3. Answer any *three* questions from the following:
- | | |
|---|-----|
| (a) Describe the countercurrent mechanism of urine formation in kidney. | 5 |
| (b) State the role of hypothalamus in regulating body temperature in human. Explain the mechanism of non-shivering thermogenesis. | 2+3 |
| (c) How oxygen is transported in blood? | 5 |
| (d) Define cardiac cycle and describe the course of circulation of blood through human heart during each cardiac cycle with a neat diagram. | 3+2 |
| (e) How do marine elasmobranchs maintain salt and water balance? | 5 |
| (f) Describe the steps involved in breakdown and absorption of carbohydrates. | 3+2 |

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

—x—



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 4th Semester Examination, 2021

ZOOACOR10T-ZOOLOGY (CC10)

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

1. Answer any **eight** questions from the following: 2×8 = 16
- What do you mean by secondary lymphoid organ?
 - What is meant by the term anaphylaxis?
 - Differentiate between T_H1 and T_H2 cell.
 - What is ADCC?
 - State the occurrence and function of Langerhans cell.
 - What do you mean by interleukin and interferon?
 - Give an example of passive immunization.
 - What is haptan?
 - Distinguish between affinity and avidity of antibody.
 - What is superantigen?
 - What is the function of secondary antibody in ELISA?
 - Distinguish between polyclonal and monoclonal antibody.
 - Mention the source and function of GM-CSF.
 - What is auto-immune disease?
 - What is Herd immunity?
2. Answer any **three** questions from the following: 3×3 = 9
- Distinguish between agglutination and precipitation in antigen-antibody reaction. 3
 - Evaluate the role of Bursa of Fabricius as an organ in immunity. 3
 - State the sequential steps of hybridoma production. 3
 - How T cells are selected in thymus in the process of maturation? 3
 - What is live vaccine and killed vaccine? Give example of each type. 3
 - Which region of an immunoglobulin molecule determines its class? What is meant by the term immunoglobulin class switching? 1+2



3. Answer any *three* questions from the following:
- (a) Classify immunoglobulin molecules based on the nature of H-chain. Which of these classes of antibody secretes with body fluid? 4+1
 - (b) Briefly outline two non-specific defences against infection. What is NSI antigen test? 4+1
 - (c) Describe how the immune system defeats the Dengue virus. 5
 - (d) Write down the major difference between primary and secondary immune response. What is immunological tolerance? 4+1
 - (e) What is delayed type hypersensitivity? Explain with an example. 5
 - (f) Compare and contrast the phenotypical and functional features of neutrophils and macrophages. Name the main cytokines produced by these cells and their role in the inflammatory response. 2+3

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

—X—



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 4th Semester Examination, 2020

ZOOACOR08T-ZOOLOGY (CC8)

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

1. Answer any **eight** questions from the following: 2×8 = 16
- What is aqueduct of Sylvius?
 - Distinguish between sulci and gyri.
 - What is “foramen of Panizza”?
 - What do you know about tectum and tegmentum?
 - Name the 1st and 2nd visceral arch found in vertebrates.
 - Comment on Craniostylic Jaw Suspension.
 - Differentiate between apocrine and merocrine gland.
 - State the functions of 10th cranial nerve in mammals.
 - Classify nociceptors present in the skin.
 - Distinguish between Wolffian duct and Müllerian duct.
 - What are carnassials?
 - State the functions of neopallium.
 - Draw a neat diagram of a mammalian teeth and label its major parts.
 - How many aortic arches are found in cyclostomes and reptiles?
 - What is Axial skeleton?
2. Answer any **three** questions from the following: 3×3 = 9
- What are the various types of horns found in mammals? How do they differ from antlers? 2+1
 - Discuss the basic plan of lung structure in mammals. 3
 - Compare between mesonephric and metanephric kidney with suitable diagram. 3
 - Discuss the structure of female urinogenital ducts in various vertebrate groups. 3
 - Delineate the modification of aortic arch in mammals with suitable diagram. 3
 - Define Receptor. Add a note on chemoreceptor in vertebrates. 1+2



3. Answer any *three* questions from the following:

- | | |
|---|---------|
| (a) Furnish an account on the comparative anatomy of cerebellum in different vertebrate groups with suitable diagram. | 5 |
| (b) How does the anatomy of ruminant stomach differ from that of other mammals? What is lacteal and what is its function? | 3+2 |
| (c) How does auditory transduction occur in the inner ear? What is “organ of Corti”? | 3.5+1.5 |
| (d) Register anatomical features of crocodilian heart. Draw a neat and labelled diagram of Neoceratodus heart. | 3+2 |
| (e) Discuss the evolution of visceral arches in birds and mammals. What are the components of contour feather? | 3+2 |
| (f) Describe the components of appendicular skeleton in human. | 5 |

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

—x—



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 4th Semester Examination, 2020

ZOOACOR09T-ZOOLOGY (CC9)

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.*

1. Answer any **eight** questions from the following: 2×8=16
- (a) What are the different types of movements of small intestine?
 - (b) Distinguish between cortical and juxtaglomerular nephrons.
 - (c) Write the function of Gall bladder.
 - (d) What is Carboxyhemoglobin?
 - (e) Name four factors which influence Haemoglobin-Oxygen Equilibrium.
 - (f) What is Cardiac cycle?
 - (g) What is haemopoiesis?
 - (h) What is afferent branchial system?
 - (i) What is Thermoregulation?
 - (j) Name two hormones and their respective roles related to urine formation.
 - (k) Name a proteolytic and a lipolytic pancreatic enzyme.
 - (l) Write about the regulation of acid – base balance by the lungs.
 - (m) What is chylomicron?
 - (n) How does cardiac muscle differ from other muscles?
 - (o) What is piloerection?
2. Answer any **three** questions from the following: 3×3 = 9
- (a) Explain Bohr effect with proper illustration of oxygen dissociation curve. 3
 - (b) Where does digestion of carbohydrate begin? Name the enzyme responsible for it 1+0.5
and the fate of carbohydrates after the process. What is chyme? +0.5+1



- (c) What is cardiac output? Comment on coronary circulation. 1+2
- (d) What is haematopoiesis? Mention its site in an adult human. State the distinguishing features between Red blood cells and White blood cells. 0.5+0.5+2
- (e) Write a short note on juxta – glomerular apparatus.
- (f) What are endotherms? How can they increase heat production in their body? 1+2
3. Answer any *three* questions from the following: 5×3 = 15
- (a) Discuss the composition, function and regulation of salivary secretion. 1.5+1.5+2
- (b) Describe the phases of cardiac cycle with diagram. 5
- (c) Explain the process of blood clotting and mention the role of Vitamin K in this process. 4+1
- (d) Describe the composition and functions of Bile. What is bilirubin? 4+1
- (e) Describe the mechanism of Osmoregulation in fresh water teleost and in Shark. 3+2
- (f) Describe the different parts of a nephron with a diagram. 3+2

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

—x—



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 4th Semester Examination, 2020

ZOOACOR10T-ZOOLOGY (CC10)

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

1. Answer any **eight** questions from the following: 2×8 = 16
- What is passive immunity?
 - What are epitope and paratope?
 - What is cytokine? Write its function.
 - Differentiate between primary and secondary lymphoid organs.
 - What is adjuvant? Give example.
 - How does sickle cell protect against malaria?
 - Compare between antigen and immunogen.
 - State the role of mast cells in immunity.
 - What do you mean by professional and non-professional antigen presenting cells?
 - Mention the source and function of the Tumour Growth factor.
 - What is APC? Give examples.
 - What is Autoimmune disorder? Give example.
 - Write the full form of AIDS. Why is it so called?
 - What is cluster of differentiation?
2. Answer any **three** questions from the following: 3×3 = 9
- Distinguish between T-cell and B-cell. 3
 - What is active and passive immunization? Cite example. 2+1
 - Mention the sources and functions of IL-4, IL-12 and IFN-gamma. 1.5+1.5
 - How do tumour cells escape immune system attack? 3
 - What is innate immunity? Briefly describe the components of the innate immune system. 1+2
 - What are MHC molecules? Differentiate between class I and class II MHC? 1+2



3. Answer any *three* questions from the following:
- (a) What is immunoglobulin? Describe briefly the structure of an immunoglobulin molecule with a neat diagram. 2+3
 - (b) What is Membrane Attack Complex (MAC)? State its role in cell lysis. 2+3
 - (c) What do you mean by hypersensitivity? State the sequence of events in a typical type I hypersensitivity reaction. 2+3
 - (d) State the principle and applications of ELISA technique. 2+3
 - (e) What do you mean by vaccination? Differentiate between active and passive immunization. 2+3
 - (f) Briefly explain the exogenous pathway of antigen presentation. 5

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

—x—