



WEST BENGAL STATE UNIVERSITY  
B.Sc. Honours 4th Semester Examination, 2024

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.

GROUP-A

1. Answer any **eight** questions from the following:

2×8 = 16

- What is ductus caroticus?
- Name the 1<sup>st</sup> and 2<sup>nd</sup> visceral arch found in vertebrates.
- What is double respiration?
- What is foramen of Panizza?
- State the differences between Wolffian duct and Mullerian duct.
- Mention the function of mammalian hair.
- How many aortic arches are found in elasmobranchs and reptiles?
- What do you mean by amphistylic jaw suspension? Where do you find it?
- Differentiate between Foramen of monro and Foramen ovale.
- Distinguish between ductus caroticus and ductus arteriosus.
- What is gill raker? Mention its function.
- Name all the bones found in our appendicular skeleton.

GROUP-B

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

3×3 = 9

- Compare between mesonephric and metanephric kidney with suitable diagram.
- State the functions of different teeth in mammalian heterodonty.
- Differentiate between horn and antler.
- Describe the evolution of urinogenital ducts in vertebrates.
- Distinguish between the Gills found in the elasmobranchs and bony fishes.

GROUP-C

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

5×3 = 15

- Write down a comparative account of brain in reptiles and mammals.  $2\frac{1}{2} + 2\frac{1}{2}$
- Classify different types of teeth found in mammals. 5
- Discuss the succession of kidney in vertebrates with labelled diagram. 5
- Discuss the evolution of visceral arches in amphibians, reptiles and mammals. 5
- Write short notes on: (any **two**)  $2\frac{1}{2} + 2\frac{1}{2}$ 
  - Hippocampus
  - Swim bladder
  - Jacobson's organ
  - Ruminant Stomach.

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WEST BENGAL STATE UNIVERSITY  
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ZOOACOR09T-ZOOLOGY (CC9)

Time Allotted: 2 Hours

Full Marks: 40

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2×8 = 16

1. Answer any **eight** questions from the following:

- What is heterothermy?
- What is residual volume of lungs?
- What is the function of saliva in digestion?
- How does monoxide act as a respiratory poison?
- What are podocytes?
- What is TMAO and state its significance in the Elasmobranchs.
- Why contraction in cardiac muscles cannot exhibit tetanus?
- What is Rh factor?
- Distinguish between isotonic and isosmotic fluids.
- What is the purpose of panting?
- Mention four factors which influence Haemoglobin-Oxygen Equilibrium.
- What is lactose intolerance?

3×3 = 9

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

- Explain Bohr effect with proper illustration.
- What are microalbuminuria and diuretics?
- Explain how a person with blood group O<sup>-</sup>, having both a and b agglutinins in blood plasma, can act as universal donor.
- What are salt glands? State their functions in osmoregulation.
- What is Cardiac output? Mention the factors affecting it.

3

1½ + 1½

3

1+2

1+2

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

- What are vasa recta? Explain the role of Loop of Henle in concentrating urine.
- Explain the mechanism of HCl secretion from parietal cells.
- Briefly describe the shivering and non-shivering thermogenesis. What is the role of sweat in thermoregulation in human?
- What are mast cells? State their functions. What is the function of monocytes?
- Explain the process of blood clotting and mention the role of Vitamin-K in this process.

5×3 = 15

1+4

5

3+2

1+2+2

4+1





WEST BENGAL STATE UNIVERSITY  
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ZOOACOR10T-ZOOLOGY (CC10)

Time Allotted: 2 Hours

Full Marks: 40

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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
- Name the barriers which comprise the innate immunity.
  - What is passive immunization?
  - Distinguish between primary and secondary lymphoid organs.
  - What are dendritic cells?
  - What are interleukins? Give examples.
  - Distinguish between antigen affinity and avidity.
  - How many polypeptide chains make up MHC class I molecule?
  - What do you mean by hypervariable region of an immunoglobulin? State its significance.
  - How is C3 convertase formed during classical pathway of complement activation?
  - Write down two applications of monoclonal antibodies.
  - Write the source and function of GM-CSF.
  - What are NK cells?
2. Answer any **three** questions from the following: 3×3 = 9
- Compare the different types of hypersensitivity. 3
  - What are adjuvants? Name two adjuvants. 2+1
  - What are monokines and chemokines? What is pleiotropy of cytokine action? 1+2
  - Distinguish between humoral immunity and cell mediated immunity. 3
  - Write a note on live attenuated vaccine. 3
3. Answer any **three** questions from the following: 5×3 = 15
- Briefly describe the classical pathway of complement activation. 5
  - What do you mean by MHC molecules? Distinguish between MHC-I and MHC-II molecules with suitable diagram. 1+2+2
  - Describe the structure of an immunoglobulin monomer with an appropriately labelled diagram. 3+2
  - Briefly describe the principle and method of competitive ELISA. 2+3
  - Write short notes on: 2½+2½
    - Conversion of monocytes to macrophages
    - Isotype, allotype and idio type.





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ZOOACOR08T-ZOOLOGY (CC8)

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
  - (a) Define cranial nerve. How many cranial nerves are found in human?
  - (b) Differentiate between mesonephric and metanephric kidney.
  - (c) Mention the different Valves in mammalian heart and their positions.
  - (d) What is parabronchi?
  - (e) Where do we find bunodont teeth?
  - (f) What is pyloric sphincter?
  - (g) Distinguish between sulci and gyri.
  - (h) Write down dental formula of elephant.
  - (i) What is aqueduct of Sylvius?
  - (j) What is Wolffian duct?
  - (k) How many aortic arches are found in cyclostomes and reptiles?
  - (l) How many types of uteri are found in vertebrates? Name them.
  
2. Answer any **three** questions from the following: 3×3 = 9
  - (a) Write down the role of afferent and efferent branchial artery in fish. 3
  - (b) Define foramen ovale, foramen magnum and foramen of Panizza. 1+1+1
  - (c) Enumerate briefly the jaw suspension of mammals. 3
  - (d) Define receptor. Add a note on chemoreceptor in Vertebrates. 1+2
  - (e) Describe the structure of Venous heart with simple diagram. 2+1
  
3. Answer any **three** questions from the following: 5×3 = 15
  - (a) Mention the components of respiratory system in birds. Write down the function of air sacs in birds. 2+3
  - (b) Describe the auditory receptor in human with diagram. 3+2
  - (c) Give a comparative account of aortic arch in mammals and birds. 5
  - (d) Explain any one integumentary derivative of birds with diagram. What is Pterylae? 3+1+1
  - (e) Write short notes on: (any **two**) 2½ × 2 = 5
    - (i) Gizzard in bird, (ii) Nail and Hoofs, (iii) C.S.F.

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**ZOOACOR09T-ZOOLOGY (CC9)**

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
- (a) Why is carbon monoxide said to be a respiratory poison?
  - (b) Give examples of ammonotelic, ureotelic and uricotelic animals.
  - (c) What is macula densa?
  - (d) What does the QRS Complex of ECG denote?
  - (e) State the functions of SA node and bundle of His.
  - (f) Write down the names of a vitamin and an inorganic ion necessary for blood clot formation.
  - (g) What is dead space in respiration?
  - (h) What is regional heterothermy? Give examples.
  - (i) Mention one extrarenal osmoregulatory organ in vertebrates and state its function.
  - (j) Where are crypts of Lieberkühn found? State their function.
  - (k) What is chloride shift?
  - (l) What is the purpose of panting?
2. Answer any **three** questions from the following: 3×3 = 9
- (a) Define vital capacity, tidal volume and total lung capacity.
  - (b) Describe the mechanism of osmoregulation in sharks.
  - (c) Write down the composition and functions of bile. Name two bile salts.



- (d) State the mechanisms by which an endotherm survive in cold environment.
- (e) Describe the intrinsic mechanism of blood clotting.
- (f) State major functions of kidney. What are the factors that may cause increased  $H^+$  secretion by kidney?

3. Answer any **three** questions from the following: 5×3 = 15
- (a) What is GFR? What are the factors that control GFR? Name two hormones and mention their respective roles in urine formation. 1+2+2
  - (b) Describe the methods of osmoregulation in migratory fishes. What will happen if a marine teleost is kept in a freshwater pond? 4+1
  - (c) Define cardiac output. Describe the events of cardiac cycle. 1+4
  - (d) Discuss the process of digestion and absorption of butter consumed during breakfast.
  - (e) Which muscles are responsible for inspiration and expiration? State the roles of diaphragm in respiration. What is your normal breathing rate? 2+2+1
  - (f) Write short notes on: 2½+2½
    - (i) Bohr Effect
    - (ii) Haldane Effect.



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ZOOACOR10T-ZOOLOGY (CC10)

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
- (a) What is MALT?
  - (b) What is adaptive immunity? How does it differ from innate immunity?
  - (c) What do you mean by super antigen?
  - (d) Differentiate between epitope and paratope.
  - (e) What is hematopoietic stem cell?
  - (f) What is auto-immune disease?
  - (g) What is hapten? Give example.
  - (h) What is monoclonal antibody?
  - (i) How does sickle cell protect against malaria?
  - (j) What type of hypersensitivity are generally associated with an insect bite?
  - (k) What is adjuvant? Give example.
  - (l) What do you mean by ADCC?
2. Answer any **three** questions from the following: 3×3 = 9
- (a) What are MHC molecules? Differentiate between Class I and Class II MHC molecule. 1+2
  - (b) What is thymocyte? What do you mean by positive and negative selection during T cell maturation? 1+2
  - (c) Write a short note on immunization. 3
  - (d) Distinguish between agglutination and precipitation in antigen-antibody reaction. 3
  - (e) Mention the source and function of IL-4, IL-12 and IFN-gamma. 1+1+1
3. Answer any **three** questions from the following: 5×3 = 15
- (a) Differentiate between classical and alternative pathway of complement system. 5
  - (b) Explain different types of ELISA technique. State the basic principle of ELISA. 3+2
  - (c) Compare and contrast the phenotypical and functional features of neutrophils and macrophages. Name the main cytokines produced by these cells and their role in inflammatory response.  $2\frac{1}{2} + 2\frac{1}{2}$
  - (d) Describe the hybridoma technology. 5
  - (e) Classify immunoglobulin molecules based on the nature of H-Chain. Which of these classes of antibody secretes with body fluid? 4+1

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## WEST BENGAL STATE UNIVERSITY

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### ZOOACOR08T-ZOOLOGY (CC8)

Time Allotted: 2 Hours

Full Marks: 40

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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

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**WEST BENGAL STATE UNIVERSITY**  
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**ZOOACOR09T-ZOOLOGY (CC9)**

Time Allotted: 2 Hours

Full Marks: 40

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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 CO<sub>2</sub> 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.

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**ZOOACOR10T-ZOOLOGY (CC10)**

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Full Marks: 40

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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<sub>c</sub> 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?
- (c) Briefly describe the stages in T-cell development in the thymus. Describe the mechanism that lead to self-tolerance.
- (d) How Dengue viruses trick immune system to infect host cells in human body? What effect would removal of bursa of Fabricius (bursectomy) have on chicken? 3+2
- (e) Describe the activation and control of the alternative pathway of complement activation. What does the term 'immunologic memory' mean? 3+2

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Full Marks: 40

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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'?  $2+1+2$

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**ZOOACOR09T-ZOOLOGY (CC9)**

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Full Marks: 40

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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.   |     |
| (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 |

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**ZOOACOR10T-ZOOLOGY (CC10)**

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Full Marks: 40

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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
- (a) What do you mean by secondary lymphoid organ?
  - (b) What is meant by the term anaphylaxis?
  - (c) Differentiate between T<sub>H</sub>1 and T<sub>H</sub>2 cell.
  - (d) What is ADCC?
  - (e) State the occurrence and function of Langerhans cell.
  - (f) What do you mean by interleukin and interferon?
  - (g) Give an example of passive immunization.
  - (h) What is haptin?
  - (i) Distinguish between affinity and avidity of antibody.
  - (j) What is superantigen?
  - (k) What is the function of secondary antibody in ELISA?
  - (l) Distinguish between polyclonal and monoclonal antibody.
  - (m) Mention the source and function of GM-CSF.
  - (n) What is auto-immune disease?
  - (o) What is Herd immunity?
2. Answer any **three** questions from the following: 3×3 = 9
- (a) Distinguish between agglutination and precipitation in antigen-antibody reaction. 3
  - (b) Evaluate the role of Bursa of Fabricius as an organ in immunity. 3
  - (c) State the sequential steps of hybridoma production. 3
  - (d) How T cells are selected in thymus in the process of maturation? 3
  - (e) What is live vaccine and killed vaccine? Give example of each type. 3
  - (f) 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? 5
  - (c) Describe how the immune system defeats the Dengue virus. 4+1
  - (d) Write down the major difference between primary and secondary immune response. What is immunological tolerance? 5
  - (e) What is delayed type hypersensitivity? Explain with an example. 2+3
  - (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.

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



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

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|---|---------|
| (a) Furnish an account on the comparative anatomy of cerebellum in different vertebrate groups with suitable diagram.     |         |
| (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.*

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**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.  
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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.
- (d) What is haematopoiesis? Mention its site in an adult human. State the distinguishing features between Red blood cells and White blood cells.
- (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

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

**ZOOACOR10T-ZOOLOGY (CC10)**

Time Allotted: 2 Hours

Full Marks: 40

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All symbols are of usual significance.*

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

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