



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 3rd Semester Examination, 2022-23



ZOOACOR05T-ZOOLOGY (CC5)

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
- Write two distinguishing features between Ratitae and Carinatae.
 - State two functions of swim bladder. \triangleright
 - What is pterylae?
 - What are catadromous fish? Give examples.
 - What is melon? \triangleright
 - What is the organ of Jacobson?
 - What are filoplume? \triangleright
 - Name two mammals found in Neotropical realm.
 - Distinguish between scales of fishes and reptiles.
 - What is Wallace line? \triangleright
 - What is solenoglyphous teeth? Give example. \triangleright
 - Justify the naming of Cephalochordata.
2. Answer any **three** questions from the following: 3×3 = 9
- Name the subdivisions of Oriental realm. Name two birds and two mammals of this realm. 1+1+1
 - Write the types of migration in birds with proper examples.
 - Enumerate the progressive and retrogressive changes that occur in the tadpole larva of *Ascidia* sp. \triangleright
 - Elaborate the structure of a contour feather in bird. \triangleright
 - Narrate the role of thyroid hormone in Amphibian metamorphosis. \triangleright
 - Write a short note on Dipleurula origin of chordata.
3. Answer any **three** questions from the following: 5×3 = 15
- Name the class and order of the following: 1×5 = 5
 - Myxine* sp (ii) *Scoliodon* sp (iii) *Hyla* sp (iv) *Gavialis* sp (v) *Loxodonta* sp
 - Write a note on the structure and location of Labyrinthine organ and Arborescent organ in fishes. 2½ + 2½
 - Elaborate the biting mechanism in Vipers. \triangleright 5
 - Briefly describe the adaptive radiation in land mammals with reference to their locomotory organs. 5
 - What are the different types of horns? Write about the epidermal glands in mammals. \triangleright 3+2
 - What are brood pouch, integumentary cup and foam nest? How mouth cavity is used for parental care in amphibians? 3+2



WEST BENGAL STATE UNIVERSITY
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ZOOACOR06T-ZOOLOGY (CC6)

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Full Marks: 40

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

2×8 = 16

- (a) State two functions of Sertoli cells. ✓
- (b) What is areolar connective tissue? ✓
- (c) What is motor end plate? ✓
- (d) What do you mean by hypothalamo-hypophyseal portal system? ✓
- (e) What is effector? Name the effector of cAMP and DAG.
- (f) What is C¹⁹ steroid? ✓
- (g) Name a peptide hormone secreted from thyroid gland and the cell from which it is secreted. ✓
- (h) What is oocyte maturation inhibition factor? ✓
- (i) Mention the function of calmodulin. ✓
- (j) Which epithelial tissues line the interior of blood vessels and lining of oviduct respectively? ✓
- (k) Distinguish between osteomalacia and osteoporosis.
- (l) Mention different constituents of bone matrix. ✓

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

3×3 = 9

- (a) What are reflexes? Discuss your opinion on whether reflexes are a more primitive or more advanced features of human nervous system. 1+2
- (b) Mention the role of troponin, actin and tropomyosin in muscle contraction. 1+1+1
- (c) Briefly explain the development of graafian follicle and the role of gonadotropins in this process. 1½+1½
- (d) What are the two hormone producing cells in testis? Distinguish between primary spermatocytes and secondary spermatocytes. 1+2
- (e) What is astrocyte? Mention different types of connective tissue. 1+2

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

5×3 = 15

- (a) Describe mechanism of bone reabsorption. What do you mean by primary bone and secondary bone? 2+3
- (b) What is refractory period? State the ionic basis of the generation of action potential. 2+3
- (c) State the features of three types of cartilages and mention the places where they are found in the body. 5
- (d) What are corticosteroids? Mention the layers of adrenal gland from which they are secreted. What is primary aldosteronism? 1+2+2
- (e) What is antrum? What do you mean by polyspermy? How polyspermy is prevented? 1+1+3



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ZOOACOR07T-ZOOLOGY (CC7)

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1. Answer any **eight** questions from the following: 2×8 = 16
- Give two examples of storage polysaccharides.
 - What is EC number?
 - What is Hn-RNA and mi-RNA?
 - Draw basic structure of amino acid.
 - What is K_m of enzymatic reaction?
 - What is isoenzyme? Give example.
 - What are the functions of myoglobin?
 - What is competitive inhibition?
 - What is saponification number?
 - How many molecules of ATP is formed in glycolysis?
 - Why fat is solid but oil is liquid in room temperature?
 - What is ionisation of water?
2. Answer any **three** questions from the following: 3×3 = 9
- Write a short note on Lineweaver-Burk plot.
 - Name two essential amino acids. Why they are called so? 1+2
 - Differentiate between Facilitated diffusion and Active transport.
 - Differentiate between B-DNA and Z-DNA.
 - What is Ketosis? How ketone bodies are produced in our bodies? 1+2
3. Answer any **three** questions from the following: 5×3 = 15
- Write down the process of glycogenolysis. What is epimer? Give example. 3+1+1
 - Write briefly on different classes of carbohydrates with example.
 - Explain the process of transamination.
 - Give a brief account on the different types of RNA with their functions. 3+2
 - Describe the types of bonds that stabilizes the level of protein structure. What is beta-pleated sheet? 3+2



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ZOOACOR05T-ZOOLOGY (CC5)

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1. Answer any **eight** questions from the following: 2×8 = 16
- (a) What do you mean by Hatschek pit?
 - (b) What is venom?
 - (c) What is a pterylae?
 - (d) State two characteristics of cyclostomata.
 - (e) What is organ of Jacobson?
 - (f) Name two poisonous and two non-poisonous snakes.
 - (g) Write the meaning of diapsida.
 - (h) What is down feather?
 - (i) What is the difference between Neoteny and Paedogenesis?
 - (j) What is red body and gas gland?
 - (k) What is crossopterygii? Give example.
 - (l) How many zoogeographical realms are there? Name them.
 - (m) Write down the chief characteristic features of chordate.
2. Answer any **three** questions from the following: 3×3 = 9
- (a) What is Axolotl larva? Write the hormonal control of metamorphosis. 1+2
 - (b) Classify Reptilia with example. 3
 - (c) Write down the subdivisions of Ethiopian realm. Name two birds and two mammals found in this realm. 1+1+1
 - (d) Write short note on the transfer of venom in case of poisonous snake. 3
 - (e) Write the comparison between Ratites and Carinates. 3



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

(a) Name the class and order of the following:

(i) *Mabuya* sp.

(ii) *Tenualosa* sp.

(iii) *Tylototriton* sp.

(iv) Parakeet

(v) Hippocampus.

(b) Describe the aerodynamics of flight in birds with suitable diagram. 4+1

(c) Write about two types of swim bladder found in fishes. Write about adaptive radiation with example. $2\frac{1}{2}+2\frac{1}{2}$

(d) Classify Amphibia with example. 5

(e) Write about echolocation in bat. What are the adaptations in cetaceans regarding echolocation? 3+2

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WEST BENGAL STATE UNIVERSITY
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ZOOACOR06T-ZOOLOGY (CC6)

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
 - (a) What are chondrocytes?
 - (b) How does epithelial tissue differ from connective tissue?
 - (c) What are glial cells? State their function.
 - (d) Differentiate between basal lamina and basement membrane.
 - (e) What is neuroendocrine gland? Give an example.
 - (f) What is fertilization cone?
 - (g) Distinguish between isometric and isotonic muscle contraction.
 - (h) What is rigor mortis?
 - (i) Distinguish between resting membrane potential and action potential.
 - (j) What happens when there is hyopsecretion of ADH?
 - (k) What is transitional epithelium? Mention its location.
 - (l) State the sites of synthesis of prolactin and glucagon.

2. Answer any **three** questions from the following: 3×3 = 9
 - (a) What is the difference between myelinated and non-myelinated nerve fibres? Which one conducts nerve impulse faster and why? 1+2
 - (b) Mention role of calcium in muscle contraction. 3
 - (c) Comment on the capacitation of mammalian sperm. 3
 - (d) Mention the factors which affect neuromuscular transmission. What is “all or none law”? 2+1
 - (e) What is corpus luteum? Comment on its formation and degeneration. 1+2

3. Answer any **three** questions from the following: 5×3 = 15
 - (a) Discuss the first messenger and second messenger concept of hormone action. 5
 - (b) Distinguish between voluntary and involuntary muscle. Describe “Walk- Along” theory of contraction. 2+3
 - (c) State the function of sodium pump in action potential. Elucidate synaptic conduction of nerve impulse with suitable diagram. 1+4
 - (d) What do you mean by “spontaneous and induced ovulator”? Give a brief account of hormonal control of ovulation in mammals. 2+3
 - (e) Describe different types of stratified squamous epithelium with location and function. 3+2

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WEST BENGAL STATE UNIVERSITY
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ZOOACOR07T-ZOOLOGY (CC7)

BIOCHEMISTRY

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
 - (a) What are ketone bodies?
 - (b) What is pK_a of water?
 - (c) What is Z-DNA?
 - (d) What is Chargaff's rule?
 - (e) What is coenzyme?
 - (f) Define isoelectric point of an amino acid.
 - (g) Draw the chemical structure of a disaccharide.
 - (h) What are the functions of TCA cycle?
 - (i) What are miRNA and siRNA?
 - (j) Name two buffers in living system.
 - (k) Name one non-polar amino acid and one sulphur containing amino acid.
 - (l) Draw basic structure of a nucleotide.

2. Answer any **three** questions from the following: 3×3 = 9
 - (a) Describe the urea cycle with a flowchart.
 - (b) Describe the pentose phosphate pathway with a flowchart.
 - (c) Why is thermogenin called an uncoupler?
 - (d) Write a short note on different factors affecting enzyme action.
 - (e) Write a short note on Lineweaver-Burk plot.

3. Answer any **three** questions from the following: 5×3 = 15
 - (a) Describe the steps of β -oxidation of a saturated fatty acid molecule.
 - (b) Describe the steps of oxidative phosphorylation with a short note on its biological significance.
 - (c) Derive Michaelis-Menten equation.
 - (d) Write short notes on transamination and deamination. 2½ + 2½
 - (e) Write down the steps of gluconeogenesis. What is reducing sugar? 4+1

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WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 3rd Semester Examination, 2020, held in 2021

ZOOACOR05T-ZOOLOGY (CC5)

CHORDATES

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 adaptive radiation or divergent evolution?
 - (b) Distinguish between cursorial and fossorial adaptation.
 - (c) State two characteristic features of *Petromyzon* sp.
 - (d) Cite two examples (scientific name) of the animals belonging to order Apoda.
 - (e) What is contour feather?
 - (f) What is opisthoglyphous fang?
 - (g) What is “pit of Hatschek”?
 - (h) Distinguish between endostyle and urostyle.
 - (i) What is ctenoid scale and where can it be found?
 - (j) What type of accessory respiratory organ does *Anabas* sp. Possess?
 - (k) Which countries do belong to the Neotropical realm?
 - (l) State two features of synapsid skull.
2. Answer any **three** questions from the following: 3×3 = 9
- (a) Distinguish between physostomous and physoclistous swim bladder with suitable diagram.
 - (b) How do bats echolocate?
 - (c) What are the different adaptive groups radiated from terrestrial mammals?
 - (d) Furnish an account on reptilian, avian and mammalian species found in Ethiopian realm, at least one.
 - (e) What are the progressive and retrogressive changes occur in the tadpole larva of *Ascidia* sp?



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

(a) Name the class and respective order of the following animals:

- (i) *Mabuya* sp. (ii) *Myxine* sp. (iii) *Pteropus* sp. (iv) *Caecilia* sp.
(v) *Tenualosa* sp.

(b) Classify class Amphibia up to living orders with suitable examples.

(c) Delineate the mechanism of biting in an elapidae snake. Comment on the nature of snake venom. 3+2

(d) State the important characteristic features of class Aves. Add a note on powered flight or flapping. 3+2

(e) Discuss the role of Thyroid hormone in amphibian metamorphosis. State the salient features of class Osteichthyes. $2\frac{1}{2} + 2\frac{1}{2}$

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WEST BENGAL STATE UNIVERSITY
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ZOOACOR06T-ZOOLOGY (CC6)

PHYSIOLOGY: CONTROLLING AND COORDINATING SYSTEMS

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 basal lamina?
 - (b) Define sarcomere.
 - (c) Give example of one glycoprotein hormone and one tyrosine-containing hormone.
 - (d) What is node of Ranvier?
 - (e) Distinguish between Basophils and Acidophils with one example of each.
 - (f) How does fibrocartilage differ from hyaline cartilage?
 - (g) What is corpus luteum?
 - (h) Differentiate between smooth and striated muscle.
 - (i) What is neurotransmitter? Give example.
 - (j) Where do you find yellow elastic connective tissue?
 - (k) What is transitional epithelium? Give example.
 - (l) Name a hormone affecting BMR.
2. Answer any **three** questions from the following: 3×3 = 9
- (a) Classify and describe different types of epithelial tissue. 3
 - (b) Where do you find sertoli cells? State their functions. 2+1
 - (c) How action potential is generated in a neuron? 3
 - (d) Compare the two types of bone with respect to structure and location. 3
 - (e) Enumerate the histology of endocrine pancreas with diagram. 3



3. Answer any *three* questions from the following:
- (a) State briefly the ultrastructure of skeletal muscle with labelled diagram. 3+2
 - (b) Describe the structure of neuromuscular junction with suitable diagram. 3+2
 - (c) State the mechanism of action of steroid hormone with illustration. 5
 - (d) Describe the histological structure of mammalian seminiferous tubule with a labelled diagram. 3+2
 - (e) Illustrate Haversian system of a mature mammalian bone with a labelled diagram. 3+2

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ZOOACOR07T-ZOOLOGY (CC7)

BIOCHEMISTRY

Time Allotted: 2 Hours

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1. Answer any **eight** questions: 2×8 = 16
- (a) What is an allosteric enzyme?
 - (b) What is pentose phosphate pathway?
 - (c) Name one amino acid with sulphur moiety and one amino acid with phenol ring.
 - (d) Name one saturated and one unsaturated fatty acid.
 - (e) Name one disaccharide with its basic sugar moieties.
 - (f) Name one anabolic and one catabolic mechanism in body.
 - (g) Define buffer.
 - (h) What is the function of urea cycle?
 - (i) What do you mean by redox system?
 - (j) How many ATP is generated in glycolysis?
 - (k) Name the bonds present in protein structure.
 - (l) Why TCA cycle is called so?
 - (m) What is the difference between a nucleoside and a nucleotide?
 - (n) Why histone molecules contain basic amino acids?
2. Answer any **three** questions: 3×3 = 9
- (a) Describe the basic structure of an amino acid. 3
 - (b) What are basic differences between DNA and RNA? 3
 - (c) Name one weak acid and one weak base. Why they are called so? 2+1
 - (d) If a 100 bp long DNA bears 36 Adenines how many other bases are there in that strand? 3



- (e) How alpha helix is generated in a protein?
- (f) Draw the molecular structure of any one carbohydrate.

3. Answer any *three* questions:

5×3 = 15

- (a) Deduce Michaelis-Menten Equation.
- (b) Describe beta-oxidation of a saturated fatty acid.
- (c) Schematically represent the TCA cycle.
- (d) Describe the different levels of protein structure with a suitable example.
- (e) Describe electron transport system (flow chart only).
- (f) What is Lineweaver-Burk Plot? What are the different factors affecting the rate of enzyme-catalyzed reactions?

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1. Answer any *eight* questions from the following: 2×8 = 16
- What are eicosanoids and terpenoids?
 - Explain E.C. number of an enzyme with an example.
 - Write difference between anabolism and catabolism (basic) with example.
 - Draw the structure of a triglycerol.
 - What is glycosidic bond? Give example.
 - Define buffer. Name two buffer systems found in living organisms.
 - What do you mean by saponification number?
 - Distinguish between nucleotides and nucleosides.
 - Differentiate between essential and non-essential amino acids.
 - What is Lineweaver-Burk plot?
 - What are isoenzymes? Give examples.
 - How many ATP molecules are generated at each step after complete oxidation of one glucose molecule?
2. Answer any *three* questions from the following: 3×3 = 9
- Draw a flow diagram of electron transfer through the components of ETC.
 - Describe the clover leaf structure of t-RNA with diagram.
 - Distinguish between alpha-helix and beta-pleated sheet.
 - Mention the biological significance of pH.
 - Give a comparative account of A, B and Z-DNA.
3. Answer any *three* questions from the following: 5×3 = 15
- Classify major classes of enzymes citing example of each. 5
 - Elucidate the pathway of β -oxidation of saturated fatty acids. 5
 - Explain urea cycle in animals. 5
 - Explain the citric acid cycle along with its energetics. 4+1
 - State the effect of temperature on enzyme action. What are allosteric enzymes? Differentiate between competitive and non-competitive enzyme inhibition. 2+1+2



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2×8 = 16

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

- What are C-cells?
- What are absolute and relative refractory periods?
- What are chondroblasts?
- What is Schwann cell? State its function.
- What do you mean by paracrine signalling?
- Define resting membrane potential.
- Which endocrine gland is present only during pregnancy? Name two hormones produced by it.
- What do you mean by pseudo-stratified epithelium?
- Name the receptor type that interacts with steroid hormones. State one unique feature of it.
- Name the chromophil cells found in anterior pituitary and name one secretory product of each of these cells.
- Which type of cartilage is most abundant in human body? State one unique feature of it.
- How do compact bone and spongy bone differ?

3×3 = 9

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

- What do you mean by reflex action and reflex arc?
- Write a note on lateral specialization of epithelial tissue.
- Name the most abundant connective tissue of human body. Draw a labelled diagram of adipocyte.
- What is the difference between myelinated and non-myelinated nerve fibres?
- Describe a mature Graafian follicle with a labelled diagram.
- What do you mean by excitation-contraction coupling? Explain briefly.
- Mention the ultrastructure of chemical synapse.

3

3

1+2

3

2+1

3

3

5×3 = 15

5

1+4

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

- Classify hormones on the basis of their chemical nature.
- Why is pituitary considered as master gland? Discuss briefly the role of hypothalamo hypophyseal axis in regulating reproductive functions in human.
- Discuss Haversian system of a typical matured mammalian bone.
- Discuss the roles of sodium and potassium ions in the propagation of action potential.
- Write short notes on:
 - Sarcomere,
 - Na-K pump.

5

5

2½ + 2½



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ZOOACOR05T-ZOOLOGY (CC5)

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1. Answer any **eight** questions from the following: 2×8 = 16
- What kind of metamorphosis is found in Ascidia? Why is it so named?
 - Give two features of cyclostomes.
 - Name the types of feathers found in birds.
 - Distinguish between cartilaginous and bony fish.
 - What is diastema?
 - What is Foramen of Panizzae?
 - What is Wheel organ of Muller?
 - Distinguish between anapsid and diapsid skull.
 - Name the zoogeographical realms of the world.
 - Name the muscles associated with biting mechanism of venomous snake.
 - What is Wallace's line?
 - Where is Pineal eye found?
2. Answer any **three** questions from the following: 3×3 = 9
- Mention three characteristic features of Phylum Chordata. 3
 - Write a short note on echolocation of cetaceans. 3
 - Describe the metamorphosis of amphibia with example. 3
 - Write the role of Pharynx in feeding in *Branchiostoma* sp. with diagram. 2+1
 - Compare between: 1½ + 1½
 - Amphibian and Reptilian skins
 - Scales of Fish and Reptilia.
3. Answer any **three** questions from the following: 5×3 = 15
- Name the class and respective order of the following animals: 5
 - Rhacophorus
 - Gavialis
 - Ichthyophis
 - Balaenoptera
 - Macropus.
 - Classify class Reptilia up to living orders with example. 5
 - Write a note on the role of swim bladder in— 3+2
 - aerial respiration,
 - hydrostatic organ.
 - Describe the structure of a typical feather with diagram. 3+2
 - Elaborate the structure and function of poison apparatus in a viperidae snake. 3+2