

JUNE, 2026
(Endocrinology and Reproductive Biology)

Time -3 hours

Full Marks-100

Figures in the right-hand side of margin indicates marks
Give illustrated diagrams wherever required

PART- I

1. Answer all the questions

[10x1=10]

- a) The posterior pituitary releases _____, which promotes water reabsorption in kidneys.
- b) The hormone secreted by the pineal gland is _____.
- c) Deficiency of iodine causes enlargement of thyroid called _____.
- d) TRH stands for _____ Releasing Hormone.
- e) Prolactin secretion is inhibited by _____.
- f) The HPG axis stands for _____ axis.
- g) Testosterone is secreted by _____ cells.
- h) Ovulation is triggered by a surge of _____ hormone.
- i) ZIFT stands for _____.
- j) Emergency contraceptive pills are effective within ----- hours.

PART – II

2. Answer all questions within maximum 50 words each:

[9x2=18]

- a) Distinguish between endocrine and exocrine glands.
- b) What is cretinism?
- c) Define neurohormones? Give examples.
- d) What are intracellular receptors?
- e) What is corpus luteum?
- f) What is polyspermy? How is it prevented?
- g) What is the difference between primary and secondary infertility?
- h) What is PROST?
- i) Define infertility?

PART -III

3. Answer any *eight* questions within 250 words each.

[8x5=40]

- a. Describe the general characteristics of hormones?
- b. Distinguish between steroid and protein hormones with examples?
- c. What is negative feed back regulation? Explain with suitable examples?
- d. Describe the structure and functions of the hypothalamus?
- e. Explain the process of folliculogenesis?
- f. Discuss the hormonal regulation of parturition and lactation?
- g. Describe the histological structure of the ovary with a neat labeled diagram?
- h. Discuss the role of sperm bank in assisted reproduction?
- i. Explain the process of in vitro fertilization (IVF) and its significance in infertility treatment.
- j. What is crude birth rate and crude death rate? Explain with example.

PART-IV

4. Answer any *four* questions with maximum 800 words each.

[4x8=32]

- a) Explain the structure, hormones, and functions of the pituitary gland?
- b) Discuss the chemical nature, classification and mechanism of hormone action.
- c) What is Hypothalamic -Pituitary-Gonadal axis? Describe the hormones and regulation of H-P-G axis.
- d) Define infertility. Discuss the causes, diagnosis and management of female infertility.
- e) Explain the process of spermatogenesis and its hormonal regulation?

April, 2026

Comparative Anatomy of Vertebrates

Full Mark - 100

Time -3 Hours

Answer as per instructions. Figures in the right hand margin indicates marks

1. Answer in MCO /One word/ One Sentence (All are Compulsory) 10x1=10

- i. True mammalian hair is derived entirely from which embryonic tissue layer?
A) Dermis
B) Epidermis
C) Hypodermis
D) Mesoderm
- ii. Which skeletal element forms the primary structural support for the third pair of visceral arches in ancestral jawed vertebrates?
A) Mandibular arch
B) Hyoid arch
C) First branchial arch
D) Epibranchial cartilage
- iii. Which accessory respiratory organ is found in teleost fishes like the climbing perch (*Anabas testudineus*)?
A) Labyrinthine organ
B) Dendritic organ
C) Pharyngeal diverticula
D) Suprabranchial organ
- iv. The ruminant stomach is highly specialized for microbial fermentation. Which chamber functions as the true glandular stomach secreting gastric juices?
A) Rumen
B) Reticulum
C) Omasum
D) Abomasum
- v. During countercurrent exchange in fish gills, how does blood flow relative to water flow across the lamellae?
A) Parallel and in the same direction
B) Perpendicular to the water flow
C) In the exact opposite direction
D) Intermittently alternating direction
- vi. During the embryonic development of amniotes, which kidney type functions as the transient, middle evolutionary stage before the definitive adult kidney develops?
A) Pronephros
B) Mesonephros
C) Metanephros
D) Opisthonephros
- vii. What type of mammalian uterus is characterized by completely separate uteri opening into two distinct vaginae, as observed in marsupials?
A) Duplex uterus
B) Bipartite uterus
C) Bicornuate uterus
D) Simplex uterus
- viii. Which region of the vertebrate brain undergoes the most massive evolutionary expansion to form the cerebral hemispheres in mammals?
A) Mesencephalon
B) Diencephalon
C) Telencephalon
D) Metencephalon
- ix. Which cranial nerve is responsible for transmitting auditory and equilibrium sensory information from the inner ear to the mammalian brain?
A) Cranial Nerve V
B) Cranial Nerve VII
C) Cranial Nerve VIII
D) Cranial Nerve X
- x. What specific type of receptor cells are the rods and cones located within the human retina?
A) Chemoreceptors
B) Mechanoreceptors
C) Photoreceptors
D) Nociceptors

2. Answer all the following questions in maximum 50 words each.

9x2=18

- i. What is the primary functional difference between hyostylic and autostylic jaw suspension?
- ii. Distinguish between the structural composition of a scale and a feather.
- iii. Explain the function of air sacs in the respiratory system of birds.
- iv. What is the physiological advantage of the spiral valve found in elasmobranch intestines?
- v. Define a duplex uterus and name an animal group where it is found.
- vi. What is the distinct evolutionary fate of the Wolffian duct in male versus female amniotes?
- vii. Describe the structural difference between an amphibian heart and a mammalian heart.
- viii. What is the Organ of Corti, and where is it located?
- ix. Classify olfactory and gustatory receptors based on stimulus type and explain how they work.

3. Answer any 8 out of 10 questions in a maximum 250 words each.

8x5=40

- i. Write a short note on epidermal derivatives of the integument.
- ii. Differentiate between axial and appendicular skeleton.
- iii. Give a brief account of visceral arches and their modifications.
- iv. Write a short note on digestive glands and their functions.
- v. Explain cutaneous respiration with suitable examples.
- vi. Write a short note on the evolution of the vertebrate heart.
- vii. Describe the succession of kidneys in vertebrates.
- viii. Describe the structure and functions of the spinal cord.
- ix. Write a short note on cranial nerves in mammals.
- x. Classify receptors based on the nature of stimuli received.

Part-IV - Long Type

4. Answer any 4 out of 5 questions in maximum 800 words each.

4x8=32

- i. Describe the different types of jaw suspensoria in vertebrates and trace their evolutionary modification from lower chordates to mammals.
- ii. Give a comparative account of the anatomy of the alimentary canal in vertebrates, highlighting structural adaptations related to different feeding habits.
- iii. Explain the comparative account of respiratory organs in aquatic and terrestrial vertebrates, detailing respiration through skin, gills and lungs.
- iv. Discuss the evolutionary succession of kidneys in vertebrates, explaining the structural transitions from pronephros to mesonephros and metanephros.
- v. Provide a comprehensive classification of sensory receptors based on their stimulus source and structural mechanism. Detailed the functional anatomy, location, and physiological roles of chemoreceptors and mechanoreceptors in humans.

APRIL , 2026

(Physiology: Life Sustaining Systems)

Time -3 hours

Full Marks-100

Figures in the right-hand side of margin indicates marks
Give illustrated diagrams wherever required

PART- I

1. Answer **all** the questions:

[10x1=10]

- a) The largest gland in the human body is the _____.
- b) Hydrochloric acid is secreted by _____ cells of the stomach.
- c) Gastrin is secreted by the _____.
- d) The functional units of lungs are the _____.
- e) The respiratory pigment in humans is _____.
- f) The hormone aldosterone increases reabsorption of _____ ions.
- g) The normal pH of blood is approximately _____.
- h) The peritubular capillaries that lies parallel to loop of Henle is called _____.
- i) Formation of blood cells is called _____.
- j) The life span of RBC is _____.

PART – II

2. Answer **all** questions within maximum 50 words each:

[9x2=18]

- a) What is peristalsis?
- b) Write two functions of bile?
- c) What is cholecystokinin?
- d) Define vital capacity?
- e) What is oxyhaemoglobin?
- f) Explain the structure of glomerulus?
- g) What is juxtaglomerular apparatus? Explain.
- h) Write the functions of leukocytes?
- i) What is cardiac output?

PART -III

3. Answer any **eight** questions within 250 words each.

[8x5=40]

- a. Explain the role of the liver in digestion?
- b. Discuss the structure and functions of the salivary gland.
- c. What is chylomicron?
- d. Describe the mechanism of inspiration and associated muscles?
- e. Explain the nervous regulation of respiration?
- f. Explain the Bohr effect and its physiological significance?
- g. Explain the structure of a nephron with a neat, labelled diagram?
- h. Discuss the renin-angiotensin-aldosterone system?
- i. Explain the ABO blood group system.
- j. Explain the Frank–Starling law of the heart?

PART-IV

4. Answer **any four** questions with maximum 800 words each.

[4x8=32]

- a) Explain the mechanism of urine formation?
- b) Explain the digestion and absorption of carbohydrate in the gastrointestinal tract?
- c) Give an account of transport of respiratory gases in the blood?
- d) What is hemostasis? Explain the intrinsic and extrinsic pathways of blood coagulation?
- e) What is blood pressure? Describe the nervous and chemical regulation of blood pressure

April, 2026

Diversity of Chordates: Protochordates to Mammalia

Full Mark - 100

Time -3 Hours

Answer as per instructions

Figures in the right-hand margin indicates marks

1. Answer in MCQ /One word/ One Sentence (All are Compulsory)

10x1=10

- i. Which of the following is a free-swimming, highly advanced larval form of Urochordates that shows all primary chordate characteristics?
A) Tornaria larva
B) Ascidian tadpole larva
C) Ammocoete larva
D) Bipinnaria larva
- ii. Cephalochordates are characterized by which of the following structural features?
A) A notochord that extends from the tail up to the anterior tip of the snout
B) A tunic or test made of cellulose-like tunicin
C) A three-part body consisting of proboscis, collar, and trunk
D) A muscular heart with a reversible heartbeat
- iii. Which of the following fish is considered a "living fossil" and belongs to the subclass Dipnoi, demonstrating an evolutionary link to tetrapods?
A) Latimeria
B) Protopterus
C) Clarias
D) Exocoetus
- iv. What structure serves as an accessory respiratory organ in the climbing perch (*Anabas testudineus*)?
A) Suprabranchial organ
B) Labyrinthine organ
C) Dendritic organ
D) Tubular air sacs
- v. The transition from aquatic vertebrates to the first terrestrial tetrapods involved structural modifications of which ancestral fish group?
A) Actinopterygii
B) Chondrichthyes
C) Rhipidistian Crossopterygii
D) Cyclostomata
- vi. In the biting mechanism of poisonous snakes, the rotation of which bone directly forces the fangs to erect vertically?
A) Maxilla
B) Quadrate
C) Pterygoid
D) Squamosal
- vii. Which anatomical modification serves as a vital flight adaptation in birds by keeping the body lightweight?
A) Well-developed urinary bladder
B) Pneumatic bones
C) Double ovary system
D) Heavy jaws with teeth
- viii. What muscle acts as the principal elevator of the wing during the avian flight downstroke and upstroke complex?
A) Pectoralis major
B) Supracoracoideus
C) Latissimus dorsi
D) Coracobrachialis

- ix. The modification of mammalian limbs into flippers in Cetaceans (whales and dolphins) for an aquatic lifestyle is an example of:
 A) Adaptive radiation B) Convergent evolution
 C) Discontinuous distribution D) Parallel evolution
- x. Which zoogeographical realm is characterized by the absolute native distribution of unique pouch-bearing marsupials and monotremes?
 A) Neotropical Realm B) Ethiopian Realm
 C) Australian Realm D) Oriental Realm

2. Answer the following questions in 50 words each (All are Compulsory)

9x2=18

- What is the basic concept of the Dipleurula theory?
- State two unique diagnostic features of subphylum Cephalochordata.
- What is the function of the endostyle in protochordates?
- Differentiate between anadromous and catadromous migration in fishes.
- Describe the accessory respiratory organ of the climbing perch (*Anabas testudineus*).
- Why is *Sphenodon punctatus* called a "living fossil"?
- Explain the role of the maxilla bone in the biting mechanism of poisonous snakes.
- Why is *Archaeopteryx* considered a connecting link between reptiles and birds?
- State three primitive reptilian characters retained by Prototheria (monotremes).

3. Answer any 8 out of 10 questions in maximum 250 words each.

8x5=40

- Describe the general characteristics and classification of Protochordates.
- Explain retrogressive metamorphosis in Urochordata with suitable examples.
- Describe the Echinoderm theory of origin of chordates.
- Describe the general characteristics and classification of Agnatha up to order.
- Discuss accessory respiratory organs in fishes with suitable examples.
- Discuss the evolutionary significance of Dipnoi.
- Describe the poison apparatus and biting mechanism in poisonous snakes.
- Discuss the affinities of *Sphenodon* with other reptiles.
- Discuss the affinities of Prototheria.
- Describe the general characteristics and classification of Mammalia up to order.

4. Answer any 4 out of 5 Questions in maximum 800 words each.

4x8=32

- Discuss the various larval forms found in protochordates and explain their evolutionary significance.
- Give a detailed account of migration in fishes, mentioning its types, causes, and significance.
- Describe the various flight adaptations in birds and discuss the phenomenon of migration in birds.
- Describe the major zoogeographical realms of the world and discuss the Continental Drift Theory in relation to animal distribution.
- Explain adaptive radiation in mammals with special reference to modifications of locomotory appendages.
