



**RAJARATA UNIVERSITY OF SRI LANKA  
FACULTY OF APPLIED SCIENCES**

**Bachelor of Science in Applied Sciences  
Second Year – Semester I Examination –July/August 2023**

**ZOO 2201 – ANIMAL HISTOLOGY AND PHYSIOLOGY**

For Office use only					
Question 1 200	Question 2 100	Question 3 100	Question 4 100	Total 400	Final 100

**Time: Two (02) hours**

**Answer the compulsory question and TWO (02) of the optional questions.**

**Compulsory Question:** [Approximate time allocation is **ONE (01)** hour]

1. Answer **ALL** questions. **Underline** the most suitable answer using a pen. **No marks** will be given for multiple responses. (08 x 25 = 200 marks)

- a) The kidneys
  - i. help regulate blood volume.
  - ii. help control blood pressure.
  - iii. help control pH.
  - iv. all of the above.
- b) The three main types of movements shown by human cells are
  - i. visceral, muscular and skeletal.
  - ii. amoeboid, ciliary and skeletal.
  - iii. amoeboid, muscular and skeletal.
  - iv. visceral, amoeboid and muscular.
- c) A vaccine used against an infectious disease usually contain
  - i. toxic enzymes.
  - ii. a variety of antibiotics.
  - iii. specialized blood cells.
  - iv. a weakened pathogen.
- d) Blood volume is regulated by
  - i. antidiuretic hormone.
  - ii. nitric oxide.
  - iii. aldosterone.
  - iv. all of the above.

- e) Select the **incorrect** statement.
- Synovial joints allow the bones to move in directions dictated by the structure of the joint.
  - Joint between the first and second vertebrae in neck is an example for pivot joint.
  - Compact bones are made up of large number of parallel tube shaped structures called Osteons.
  - All of these are incorrect.
- f) What portion of the nephron extends into the medulla?
- Nephron loop
  - Papillary duct
  - Proximal convoluted tubule
  - Distal convoluted tubules
- g) The most common method of CO<sub>2</sub> transportation inside the body is
- by dissolving in plasma.
  - with blood cells.
  - by binding with haemoglobin.
  - by diffusing into red blood cells.
- h) In a positive feedback loop, if a variable decreases slightly from its initial value, then
- it will be returned to its initial value.
  - it will decrease further and further from its initial value.
  - it will increase above its initial value, becoming greater and greater.
  - it will remain at its new value indefinitely.
- j) Which of these hormones are produced by the posterior pituitary?
- ADH
  - Growth hormones
  - Prolactin
  - Thyroxin
- k) Which one of the following are the **incorrect** matching pairs?
- HCl in stomach - stops the action of amylase
  - Intrinsic factor - absorption of vitamins
  - Pepsinogen in the gastric juice - activated by HCl and digests proteins
  - Mucus in the stomach - prevents mechanical damage to the wall
- l) In respiration,
- air is taken into the lungs by creating a positive pressure.
  - external inter-costal muscles relax to increase the volume inside the lungs.
  - air enters the lungs when the pressure inside is lower than the atmospheric air pressure.
  - energy is needed for inhalation and exhalation.
- m) Select the **incorrect** statement about nerve impulse transmission.
- Depolarization makes the membrane potential less negative.
  - When a neuron is not stimulated it maintains a resting potential.
  - Hyperpolarization makes the membrane potential more positive.
  - In myelinated sheaths, electrical changes across the membrane can only occur at the gaps.

- n) After consuming a banana, which hormones would likely increase?
- |              |                 |
|--------------|-----------------|
| i. Prolactin | iii. Insulin    |
| ii. Glucagon | iv. Parathyroid |
- o) Select the **incorrect** statement.
- Most amphibians and reptiles use a trot or lateral sequence gait to walk.
  - Snakes have only two kinds of vertebrae.
  - Swimming depends on the way the aquatic animals bend their bodies and the use of fins.
  - Long hind-limbs let toads walk or take small hops.
- p) A skull was found with a pair of prominent canine teeth and sharp incisor teeth and with simple hinge joints on the plane of teeth. The dietary preference of this species can be;
- |                |                                       |
|----------------|---------------------------------------|
| i. herbivorous | iii. carnivorous                      |
| ii. omnivorous | iv. not enough information to predict |
- q) Which of the following statements is **true** about regulation of calcium concentration in the blood?
- Calcitonin lowers blood calcium; parathyroid hormone raises blood calcium.
  - Parathyroid hormone lowers blood calcium; calcitonin raises blood calcium.
  - Thyroxine and triiodothyronine together regulate calcium levels, as needs dictate.
  - Both parathyroid hormone and the three thyroid hormones function to regulate blood calcium levels.
- r) Select the matching pair of receptor and function.
- Proprioceptors - light detection
  - Pacinian corpuscles - pressure
  - Baroreceptors - heat detection
  - Nociceptors - cold detection
- s) Which of the following about smooth muscles is true?
- Smooth muscle is striated and involuntary
  - Nuclei are peripherally located in the fibers
  - It has branching fibers
  - Fibers are small and spindle-shaped
- t) Select the **correct** statement.
- Regeneration and fragmentation are asexual reproductive measures seen in cnidarians.
  - Major difference in sexual reproduction compared to asexual reproduction is having gametes.
  - Many invertebrates and vertebrates involve in asexual reproduction and consider energy saving method.
  - Hermaphroditic animals often do not look for another individual for reproduction.



- u) B-cells and T-cells are two types of cells involved in .....  
 i. acquired immunity                      iii. innate immunity.  
 ii. active immunity                      iv. passive immunity.
- v) The body of freshwater teleost/bony fishes face the problem of  
 i. losing water.                      iii. gaining water.  
 ii. gaining solutes                      iv. none of the above.
- w) Select the **incorrect** statement about circulation.  
 i. Amphibian heart has a single ventricle, which allows the mixing of oxygenated blood and deoxygenated blood.  
 ii. In fishes blood loses much of its pressure inside the gills and slows the blood circulation to the other parts of the body.  
 iii. Red blood cells of birds are elliptical and enucleated with a life span of 28 - 45 days.  
 iv. Double circulation is seen in mammals, which is highly efficient.
- x) The liquid which is collected in the cavity of Bowman's capsule is  
 i. concentrated urine.  
 ii. blood plasma minus blood proteins.  
 iii. a solution containing excretory waste.  
 iv. a solution containing wastes.
- y) Ureters, bladder and parts of the urethra are lined with  
 i. cuboidal epithelium                      iii. stratified squamous epithelium  
 ii. ciliated epithelium                      iv. transitional epithelium
- z) A difference between endocrine glands and exocrine glands is that  
 i. endocrine glands secrete directly to the blood and exocrine glands secrete to ducts.  
 ii. endocrine glands produce large volume of hormones and exocrine glands secrete smaller volumes.  
 iii. both originate from connective tissue layer.  
 iv. both i and ii are correct.

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**Optional Questions:** [Approximate time allocation is **ONE (01)** hour].  
**Answer TWO (02) questions.**

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2.

- a) Explain the processes on a synapse where the nerve meets the skeletal muscle of the hand. **(40 marks)**
- b) When a flame is accidentally touched, our hand is withdrawn instantly. Describe the underlying neurological mechanism of impulse transmission for this incident. **(60 marks)**

3. Formulate brief physiological interpretations to the following phenomena.

- a) During a hot humid day, more sweat is produced and feel thirsty most of the time. **(25 marks)**
- b) Certain allergies can be deadly. **(25 marks)**
- c) Ear is blocked when going up in altitudes and when you open your mouth it is resolved. **(25 marks)**
- d) After applying insecticides the limbs of some insects show continuous shaking movements in their limb. **(25 marks)**

4.

- a) Describe the menstrual cycle explicitly stating the role of the hypothalamus, pituitary hormones and ovarian hormones. **(60 marks)**
- b) Provide a concise account of the strategies of offspring development in vertebrates. **(40 marks)**

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