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RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. in Applied Sciences
Second Year – Semester I Examination – June/July 2022

ZOO 2201 – ANIMAL HISTOLOGY AND PHYSIOLOGY

Question 1 200	Question 2 100	Question 3 100	Question 4 100	Total 400	Average 100	Final %

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) When an individual receives a vaccination containing weakened/attenuated pathogen,
      i. the ability to produce antibodies will decrease after the vaccination.
      ii. the ability to fight disease caused by the pathogen will increase due to antibody production.
      iii. the ability to fight disease will increase due to antibody received from the pathogen.
      iv. the ability to resist most types of diseases will increase.

   b) Which of the following regarding blood pressure is incorrect? Blood pressure
      i. is constant throughout the body.
      ii. varies throughout the cardiac cycle.
      iii. can be altered by adrenaline.
      iv. is regulated by renin-angiotensin-aldosterone pathway.

   c) Calcitonin is produced by
      i. thyroid gland.
      ii. adrenaline gland.
      iii. pituitary gland.
      iv. thymus gland.

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d) Loop of Henley is found in
   i. mammals only
   ii. birds and mammals
   iii. elasmobranchs and mammals.
   iv. terrestrial mammals, reptiles and birds

e) Select the **incorrect** statement regarding locomotion of animals.
   i. Circular and longitudinal muscles along with chaetae help the earthworm to locomote.
   ii. Locomotory method of "jetting" is only seen in Cephalopods.
   iii. Many animals with endoskeletons have a flexible exterior that accommodates the movements of their skeleton.
   iv. Ciliary and flagella beating is used as the mechanism of locomotion by most invertebrates.

f) Most likely place where stratified squamous epithelium can be found is
   i. lining of small intestine
   ii. blood vessels
   iii. vaginal wall
   iv. Alveoli of the lungs

g) The ..... is a gland that is present in the vertebrate eye.
   i. Ceruminous glands
   ii. Bartholin's glands
   iii. Eccrine glands
   iv. Meibomian gland

h) Which of the following statement is **incorrect** with regards to sensory reception of animals?
   i. The Jacobson's organ of snakes is responsible for detecting infra-red light.
   ii. Vampire bats have special infra-red sensitive leaf pits surrounding their nose.
   iii. Krause end bulbs detect coldness and Ruffini endings detect warmness in mammal skin.
   iv. Otoliths in the inner ear of fishes are responsible for the detection of sound in the form of vibration.

j) Which of these cells in the testes secrete testosterone?
   i. Sertoli cells.
   ii. Cells of leydig.
   iii. Cells of germinal epithelium.
   iv. Secondary spermatocytes.

k) Which one of the following are the **correct** matching pairs?
   i. Pulsation of the radial artery – valves in the blood vessels
   ii. Lub – sharp closure of the AV valves.
   iii. Dup – sudden opening of the semilunar valves.
   iv. Purkinje fibres – initiation of the heartbeat.

l) What would **not happen** if the core body temperature was too low?
   i. There would be a reduction blood flow through the skin capillaries.
   ii. Sweat would cool the body as it evaporated.
   iii. Shivering would release energy by muscle contraction.
   iv. Hair erector muscles would contract.

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m) Select the **incorrect** statement about the small intestine.
   i. Alkaline condition is due to the bicarbonate ions produced by the Brunner's gland.
   ii. Trypsinogen and chymotripsinogen are inactive precursors secreted to the intestine by the liver.
   iii. The crypt of Lieberkuhn secretes the enzyme enterokinase to small intestine.
   iv. Bilirubin, which is produced by the liver enter the duodenum at the duodenal papilla.

o) Which of these hormones are secreted by anterior pituitary gland?
   i. FSH
   ii. Growth Hormone
   iii. Oxytocin
   iv. TSH

n) Select the **incorrect** statement. Respiration in,
   i. amphibians is via lungs and ventilation is initiated by creating a positive pressure inside their mouth.
   ii. reptiles is via lungs and ventilation is initiated by creating a positive pressure inside the lungs.
   iii. birds is aided by air sacs by maintaining a unidirectional flow of air through parabronchi in the lungs.
   iv. fishes take place through capillaries by a counter-current system in gill lamellae.

p) A skull was found with a prominent diastema and large, sharp molar teeth. Dietary preference of this species can be;
   i. herbivorous.
   ii. omnivorous
   iii. carnivorous.
   iv. not enough information to predict.

q) Which of the following statements are **true**?
   i. An action potential occurs if the membrane goes from +30 mV to -70 mV.
   ii. An action potential occurs when the membrane is hyperpolarized.
   iii. An action potential occurs if there are more sodium ions than potassium ions on the inside of an axon.
   iv. An action potential occurs if there are more potassium ions than sodium ions on the inside of an axon.

r) In case of low blood glucose concentration, the negative feedback mechanism will involve in the,
   i. conversion of glucose to glycogen.
   ii. conversion of glucogen to glycogen.
   iii. conversion of insulin to glycogen.
   iv. conversion of glycogen to glucose.

s) If the tricuspid valve of the human heart is partially non-functional due to an injury, what will be the immediate effect?
   i. The flow of blood into the aorta will be slowed down.
   ii. The pacemaker will stop working.
   iii. The blood will tend to flow back into the left atrium.
   iv. The flow of blood into the pulmonary artery will be reduced.

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t) Select the **correct** statement.
   i. Osmoregulation by kidney is mainly due to aldosterone hormone.
   ii. Renin-angiotensin-aldosterone system is responsible for controlling blood volume and pressure.
   iii. Atrial natriuretic hormone is responsible for decreasing the blood volume.
   iv. Aldosterone stimulate the excretion of Na^+ and Cl^- from distal convoluted tubules in the Kidney.

u) Immunological memory is present in,
   i. acquired immunity
   ii. acquired and innate immunity
   iii. innate immunity.
   iv. none of the above.

v) The cluster of cells in the pancreas that produces hormones are the;
   i. nodules.
   ii. pancreatic medulla
   iii. islets of Langerhans.
   iv. pancreatic cortex.

w) Which of the following strategies would **not** help restore the high body temperature to normal?
   i. Increase sweating.
   ii. Non-shivering thermogenesis.
   iii. Dilating of blood vessels in the periphery.
   iv. Hair erector muscles staying relaxed.

x) Which of these events occur between the days 16 to 28 of the menstrual cycle?
   i. Shedding of the uterus and start of menstrual cycle.
   ii. Ovulation and fertilization of the ovum.
   iii. Build-up of the uterus wall with more blood capillaries and nutrients.
   iv. Lining of the uterus remains in place for the possible arrival of an embryo.

y) Ear is responsible for;
   i. amplification of the sound
   ii. sensing gravity
   iii. balancing.
   iv. all of the above.

z) Bohr effect is due to the,
   i. decrease of partial pressure of CO_2 in haemoglobin and decrease in blood pH levels..
   ii. increase of partial pressure of CO_2 in haemoglobin and decrease in blood pH levels.
   iii. increase of H^+ ion in blood leading to increase the affinity of O2 in the Haemoglobin.
   iv. increase in haemoglobin's 'affinity to O_2 and CO_2

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

2. a) If an infection produces a chemical that has been shown to destroy troponin in human, predict how it will affect skeletal muscle contraction and discuss your prediction. **(60 marks)**

   b) A vaccine was prepared for the above mentioned infection and healthy people were injected with it to protect them from future infections. An assurance was given that the vaccine would confer lifetime immunity from the disease. Explain the underlying reasons for this assurance. **(40 marks)**

3. "Birds show unique physiological adaptations to support their aerial lifestyle". Justify this statement using **three (03)** physiological adaptations. **(100 marks)**

4. Write short notes on the following.
   a) Endothermic adaptations to regulate temperature **(35 marks)**
   b) Asexual reproductive strategies among invertebrates **(35 marks)**
   c) Action of lipophilic hormones **(30 marks)**

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