



UNIVERSITY OF JOHANNESBURG

FACULTY OF SCIENCE

ZOOLOGY 3B01

APK CAMPUS

COMPARATIVE ANIMAL PHYSIOLOGY

2016

EXAMINER

Mr. R Musa

EXTERNAL EXAMINER

TIME 2 HOURS

MARKS 100

Please read the following instructions carefully

Section A

List the statements that are true e.g. a, d, f, k etc.

Question 1.1 [10]

- a) Metanephridia are found in organisms that lack a true body cavity.
- b) Glucocorticoids are responsible in regulating carbohydrate metabolism.
- c) Humans perceive light in a very narrow wavelength of 800 to 900 nm.
- d) The three types of cones found in the human eye are sensitive to blue, yellow and red.
- e) Adrenaline is a tyrosine-derived hormone.
- f) Vasopressin has the same effect as ADH.
- g) The adenohypophysis is responsible for the release of the Growth-stimulating hormone (GSH).
- h) The neurohypophysis is responsible for the release of the melanocyte stimulating hormone (MSH).
- i) The effect of Noradrenaline released into the blood from the adrenals resembles the effects of a general stimulation from the sympathetic nervous system.
- j) Ligand gated channels open in response to an electric stimulus.
- k) Typical negative feedback mechanisms are known as closed loop systems.
- l) A sarcomere is the region between two Z bands.
- m) The difference between cilia and flagella is their internal structure
- n) The excretory system of insects consists of tubules known as Malpighian tubules.
- o) Ultrafiltration is process of forcing a fluid through a semi-permeable membrane that withholds proteins.
- p) Active movements in biological systems are universally accomplished by converting chemical potential energy of ATP into mechanical work.
- q) Myosin filaments extend from the Z-bands of muscle fibres.
- r) Water movements are parallel to the longitudinal axis of cilia.

Question 1.2 [10]

- a) The temperature and pressure of a gas determine its solubility.
- b) The normal mechanism for the filling of the lungs differs for reptile bird and mammals.
- c) Slow swimming fish make use of water pumps for ventilation and fast swimming fish use ram ventilation.
- d) Small haemoglobin molecules give greater facilitated diffusion.
- e) Heart frequency is positively correlated to body size.
- f) Systole is the relaxation phase of the heartbeat.
- g) The clotting of blood is an example of the cascade effect.
- h) Proteins may be synthesised from protein chains.
- i) One (1) calorie is equal to 3.872 joules.
- j) The difference between the melting and freezing points is known as the thermal hysteresis.
- k) All diving animals experience the bends if they rise to the surface too quickly after diving.
- l) Diurnal animals tend to have a temperature peak during the night.
- m) Super-cooling allows a fluid sample to be cooled to below freezing point without the formation of ice crystals.
- n) Invertebrates have pepsin-like enzymes for the digestion of proteins.
- o) All mammals begin their lives as fluid feeders.
- p) Fibrin is formed from fibrinogen by the action of thrombin.
- q) The amount of carbon dioxide produced during metabolism is closely related to the amount of oxygen consumed.
- r) The atmospheric pressure at sea level is 760 mmHg.

Section B**Question 1 [10]**

Describe in detail the sequence of events that occurs during the stimulation, contraction and relaxation of skeletal muscle.

Question 2 [10]

Explain the formation of urine in mammalian kidneys by referring to the mechanisms of nephron function.

Question 3 [10]

Explain how the endocrine system functions with respect to moulting in insects by referring to both types of lifecycles.

Question 4 [10]

Discuss cellulose digestion in ruminant herbivores.

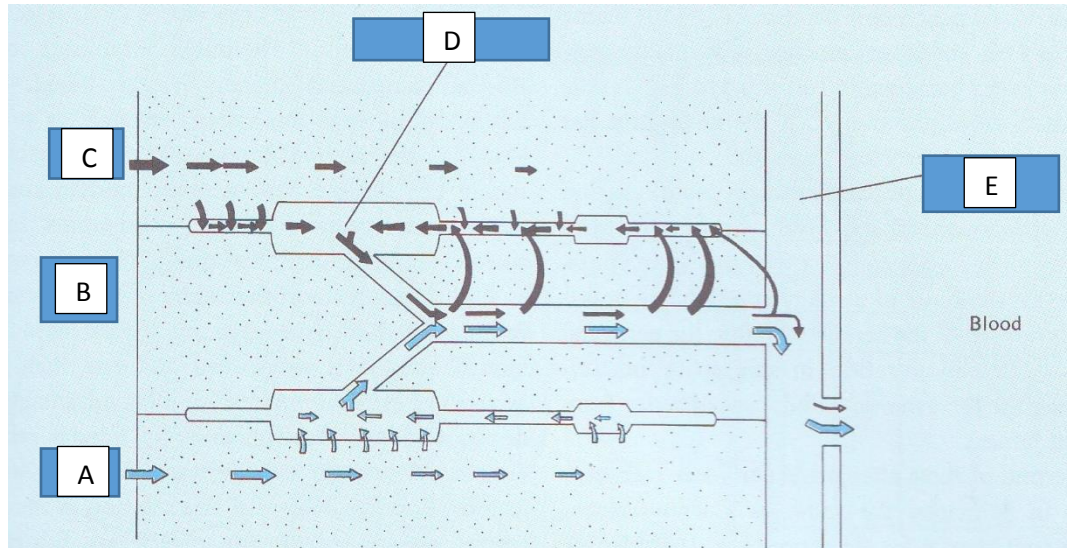
Question 5 [20]

Discuss in detail temperature regulation of vertebrates with inclusion of examples, taking keeping cool and keeping warm into account.

Section C

Question 1 [10]

Label the following letters (A-E) and briefly discuss the mechanisms that are occurring in this process.



Question 2 [10]

Identify the specific oxygen dissociation curves for the cat, elephant, mouse, horse, dog, human, rat and sheep and briefly discuss differences in the dissociation of oxygen in these organisms.

